2024-2026 ECO TRIENNIAL PLAN

MINNESOTA ELECTRIC AND NATURAL GAS ENERGY CONSERVATION AND OPTIMIZATION PROGRAM

Docket #E,G002/CIP-23-92

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Xcel Energy®

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EXECUTIVE SUMMARY

Overview

Northern States Power Company, doing business as Xcel Energy (Company), submits to the Minnesota Department of Commerce, Division of Energy Resources (Department) our 2024-2026 Energy Conservation and Optimization (ECO) Triennial Plan.

This Triennial Plan continues the Company's long-standing commitment to energy efficiency. The programming and proposals detailed in this Plan build on the Company's established record of successful energy efficiency and demand response programming. In addition, they represent an exciting new chapter in utility-delivered programming in Minnesota, enabled by the landmark Energy Conservation and Optimization Act of 2021 (ECO Act). In combination, the various components of this ambitious Plan will achieve energy savings well above the minimum savings targets established in Minnesota Statutes and generate over $1.7 billion in net benefits.[1] Total annual spending and energy savings for the Company-administered portion of the portfolio are summarized in Table 1.

Table 1: Proposed Company-Administered Portfolio Budgets and Savings, 2024-2026[2]

		2024	2025	2026
Electric Spending		$135,640,027	$141,047,902	$147,294,579
Natural Gas Spending		$29,820,687	$31,603,116	$35,414,954
Electric Demand Savings (kW)		206,960	223,451	243,149
Electric Energy Savings (MWh)	First-Year	570,375	569,358	595,344
	Lifetime	8,954,889	8,938,924	9,346,905
Natural Gas Energy Savings (Dth)	First-Year	1,091,887	1,169,560	1,271,177
	Lifetime	15,360,340	15,762,865	17,204,888
Lifetime Cost of Saved Energy	Electric ($/kWh)	$0.0151	$0.0158	$0.0158
	Gas ($/Dth)	$1.9414	$2.0066	$2.0584

The total spending proposed for the Company's programs over this triennium is approximately $521 million. Including the expected costs of assessments and third-party programs increases the three-year total to $588 million. Among the drivers of the increase in spending relative to prior years are a significant increase in spending for income-qualified programs; increased budgets for commercial and industrial programs (particularly those helping customers identify and pursue holistic energy

[1] Net benefits based on the Minnesota Test, adopted as the primary test for cost-effectiveness. See Decision, *In the Matter of 2024-2026 Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities*, Docket No. E, G999/CIP-23-46, March 31, 2023. (Further referred to as 2023 Cost-Effectiveness Decision).

[2] Figures in Table 1 reflect only the Company-administered portions of the portfolio, omitting assessments and authorized Alternative CIP programs. Please see Table 2 for the total budgets and goals including assessments and Alternative CIPs. Electric and Natural Gas Spending in Table 1 includes both energy efficiency (EE) and efficient fuel switching (EFS) spending totals. Electric energy and demand savings include only impacts of EE and Demand Response; Natural Gas Energy Savings includes both EE savings and claimable Natural Gas Savings (net of electric consumption increase) from EFS measures.

savings opportunities); higher levels of spending for both residential and commercial demand response; and spending related to efficient fuel-switching, a new category of program activity enabled by ECO.[3] Despite the increase in total spending, the Company's overall portfolio remains highly cost-effective. As shown in Table 1, the lifetime cost of energy savings for both gas and electricity remain well below the commodity cost of energy, demonstrating that energy savings remain our most affordable energy resource.[4]

On the following pages, the Company provides brief historical context for its energy efficiency activity in Minnesota, a summary of the changes to Minnesota's conservation policy framework under ECO, and highlights of the major changes and additions included in this Plan. Finally, the tables at the end of this Executive Summary provide additional detail on the Company's proposed budgets and energy savings targets at both the segment and program levels.

Background: A Foundation of Achievement

For decades, Minnesota has been a national leader in energy efficiency. The state's utility-sponsored energy efficiency programs are among the longest-standing in the country, and Minnesota is the only Midwestern state that is consistently ranked in the top ten on the American Council for an Energy Efficient Economy's (ACEEE) State Energy Efficiency Scorecard. Minnesota utilities' energy savings achievements through demand side management (DSM) have saved billions of dollars for customers and avoided millions of tons of greenhouse gas and other pollutants while creating and supporting jobs in the state.[5] As Minnesota's largest electric utility and second-largest natural gas utility, Xcel Energy is proud of its contributions to these accomplishments, and equally proud to submit this 2024-2026 ECO Triennial Plan.

Although DSM activities in many states around the country have ebbed and flowed over time, Minnesota and Xcel Energy, as its largest utility, have maintained a consistent and high level of achievement. Between 1994-2022, the Company invested nearly $2.2 billion (nominal) resulting in 11,813 GWh of electric savings, 3,733 MW of electric demand savings and estimated 19.92 million Dth of natural gas savings. Xcel Energy's DSM portfolio has surpassed the statutory energy savings targets for both electricity and natural gas nearly every year since 2011.[6] Figures 1 and 2 provide an illustration of our recent expenditures and energy savings achievements through 2022, the approved 2023 targets, and the Company's proposed targets for 2024-2026.

[3] The Company notes that the significant inflation which has occurred since the filing of the 2021-2023 Triennial Plan also plays some role in the increase in program budgets, but it has not conducted a detailed analysis of the impact of inflation on portfolio costs.

[4] As of June 1, 2023 the Company's residential electric fuel cost charge was $0.05107 per kWh while the commodity cost of gas for residential customers was $2.3732 per Dth.

[5] The Aggregate Economic Impact of the Conservation Improvement Program 2008-2013, Minnesota Department of Commerce, Division of Energy Resources, Cadmus, October 2015. https://mn.gov/commerce-stat/pdfs/card-report-aggregate-eco-impact-cip-2008-2013.pdf.

[6] The exception being in 2019, in which year natural gas savings were 0.81 percent of sales. See *Analysis, Recommendations, and Proposed Decision* of the Staff of the Minnesota Department of Commerce in the Matter of Xcel Energy's 2022 Conservation Improvement Program Status Report (Docket No. E,G002/CIP-20-473, May 22, 2023), Tables 23 and 24 (pp. 20-22).

Figure 1: ECO Electric Achievements, 2007-2026

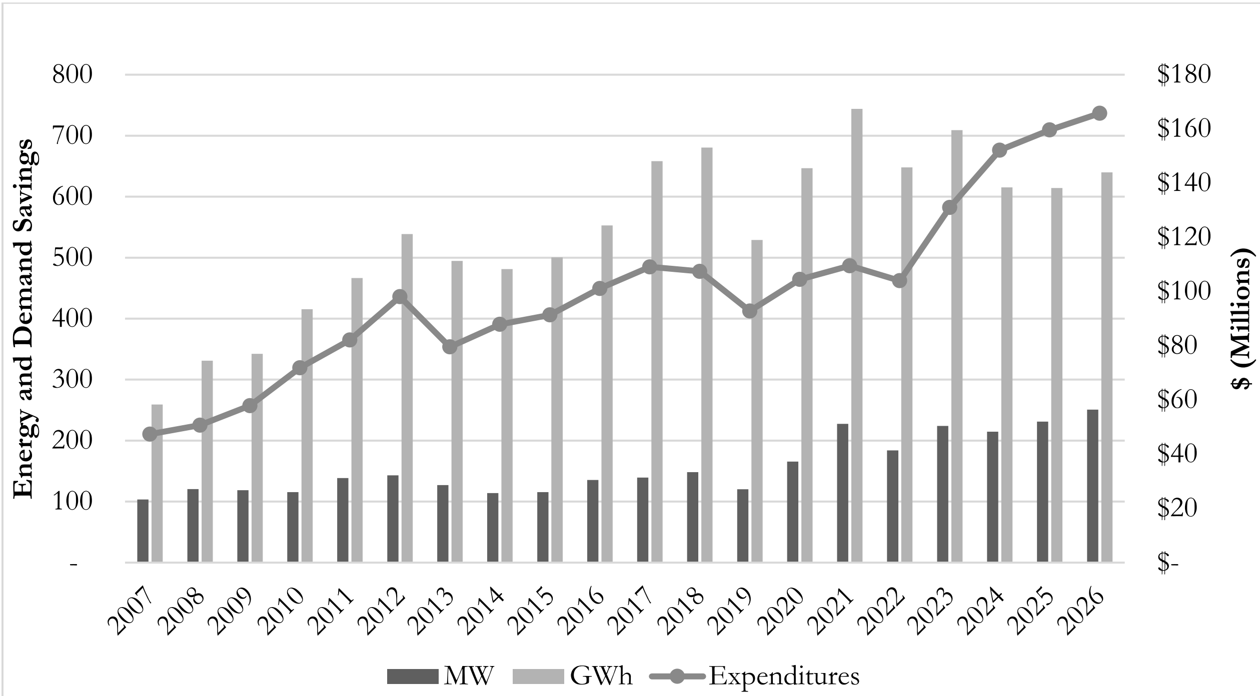
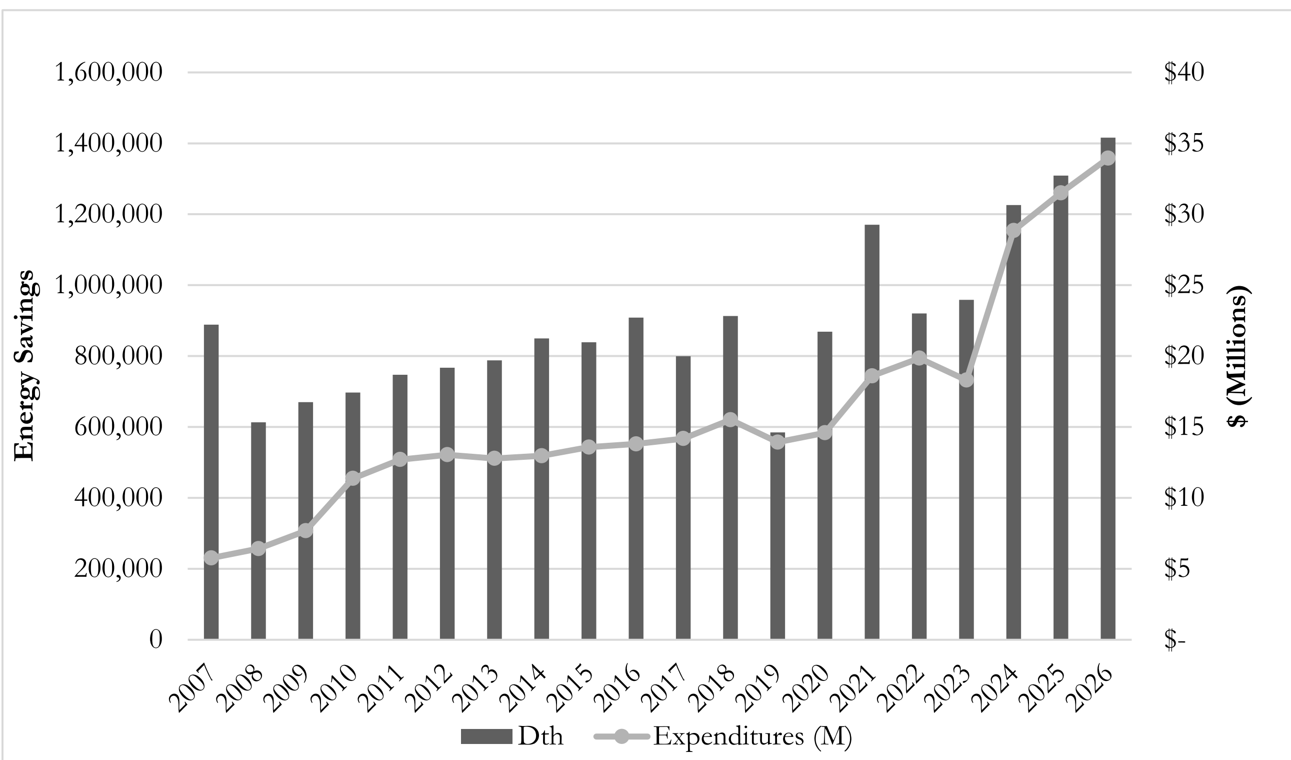


Figure 2: ECO Natural Gas Achievements, 2007-2026



2024-2026: From CIP to ECO

Xcel Energy was pleased to be part of a broad bipartisan coalition supporting passage of the landmark Energy Conservation and Optimization (ECO) Act of 2021. The most important energy-efficiency legislation in Minnesota since 2007's Next Generation Energy Act, ECO modernized the framework for customer-funded utility programs and re-imagined the scope of what such programs can include. In this first Triennial Plan under the new ECO framework, the Company seeks to take advantage of new technologies and new policy frameworks to bring even more ways to help customers save energy and money, reduce emissions and achieve their energy targets.

First and foremost, the programs and targets proposed in this Plan underscore the Company's long-standing and unshakeable commitment to energy efficiency. The Company has long achieved well above the minimum savings targets set in statute, and this Plan continues that tradition even considering the increased minimum electric savings set in ECO. The Plan proposes electric energy savings targets above two percent of sales and natural gas savings targets of approximately 1.5 percent of sales. While lighting – and especially residential lighting – has long been a mainstay of electric efficiency programs, the extensive market penetration of LED technologies has considerably reduced the incremental savings opportunity for utility programs focused on lighting. Nevertheless, the Company believes its proposed electric savings target of approximately 570 GWh is both aggressive and achievable.

This Plan also recognizes that the value of customer programs does not stem solely from the reduction of energy consumption. The ECO Act opened the door for load management (demand response) programs that go beyond traditional peak-hour load shedding and seek to optimize the time at which customers use energy. With this change, the Company can work with customers to help them use electricity at low-cost and low-emission times of day, benefitting the grid, the climate, and the customer simultaneously.

In perhaps the most transformational change enabled by ECO, this Plan also includes proposals to support customers who seek not only to use energy more efficiently, but to change the form of energy they use. The Company has carefully considered the statutory provisions, Department guidance, customer interest, current market realities, and grid impacts of efficient fuel-switching (EFS) in preparing the innovative proposals included in this Plan. EFS as an area of utility programming remains nascent and is limited by spending caps during the course of this Triennial. However, the Company believes that the incentives and support for EFS included here will both support customers interested in fuel-switching and provide avenues to learn and develop enhancements that can help scale EFS activity in future Triennial Plans.

Portfolio Highlights

Important additions and modifications to the Company's portfolio of programs are briefly summarized below. Further information on these changes as well as others can be found in the detailed segment sections of this document.

- **Residential Segment:** With the reduction of residential lighting as a major source of electric energy savings, the residential segment contributes a smaller – though still substantial – portion of the portfolio's total electric energy savings. Important innovations in the residential sector include leveraging educational opportunities to help customers lower their energy bills, reflected in the Home Energy Insights program. Recognizing the importance of building envelope measures to the success of fuel-switching and demand response, the Company has also increased both its electric and natural gas incentives for these measures, as well as bonus opportunities to support customers installing both insulation and fuel-switching measures. The Company will also continue to closely monitor the implementation of federal rebates under the Inflation Reduction Act (IRA) as well as state incentives[7] with the goal of maximizing alignment and making it easy for customers to understand and receive all of the incentives available to them.

- **Business Segment:** Customers continue to look to the utility to provide holistic opportunities for lowering energy use and meeting sustainability needs. As a result, the Company has updated its portfolio to focus on holistic engagement to provide a full view of customer opportunities that impact energy and usage with the addition of efficient fuel-switching and expanded demand response opportunities. Because heat pump technology development has tended to focus primarily on the residential market, activity in the business segment is expected to be concentrated on more traditional energy efficiency measures in the short term. Nevertheless, the Company anticipates a growing role for EFS measures in the future and will work with business customers interested in electrification through the custom rebate process. As technologies reach greater market maturity, the Company expects to submit proposals for the inclusion of additional prescriptive EFS incentives.

- **Income-Qualified Segment**: This Plan significantly increases the emphasis on supporting the Company's customers who are most in need of assistance. The budgets proposed for the Company's dedicated low-income programs are larger than in any previous plan, and at approximately $10 million (electric) and $5 million (gas) per year it doubles the portfolio spend and aims to go above the minimums established by ECO. To achieve these goals, the Company will simplify our participation process and begin to expand our eligibility requirements, following the recent revision to Minnesota Statutes defining income eligibility.[8] Further, we will need to help our partner organizations increase their program delivery capacity; we expect the successful workforce development programming that launched in 2022 to be important in this regard. The Company also plans to pursue opportunities to replace electric resistance heating with heat pumps and use pre-weatherization support to reduce the number of homes that are deferred for weatherization services.

[7] Minnesota Session Law, H.F. No 2310 appropriates funding for heat pump water heaters, electric panel upgrades and e-bikes administered by the Minnesota Department of Commerce.
[8] HF 2310 amended the definition of "low-income household," allowing additional customers to qualify and creating opportunities to streamline the eligibility verification process; the Company's implementation of these changes is discussed in the Income Qualified Segment section of this Plan.

- **Efficient Fuel-Switching:** Collaboration between CenterPoint Energy and the Company was essential in defining our efforts towards fuel-switching in this Plan. However, as the only combination electric and natural gas investor-owned utility in Minnesota, Xcel Energy is uniquely positioned to engage customers interested in fuel-switching. In this Plan we are proposing significant incentives to increase the market adoption of technologies such as air-source heat pumps and heat pump water heaters. Additionally, we propose a policy of "Geographic Consistency," applicable to customers who may have natural gas service with another utility. Described in more detail in the segment overview, this policy is intended to ensure all Xcel Energy electric customers can receive the same overall incentive for EFS measures regardless of their heating fuel provider. Consistent with the framework established by ECO, the incentives available to Xcel Energy natural gas customers interested in fuel-switching are provided through gas EFS funding, with net savings allocated to the gas portfolio. Electric EFS funding is used to support customer and contractor education and awareness, to encourage efficient fuel-switching of end-uses not currently met with natural gas, and to provide additional customer incentives in support of the Geographic Consistency policy.

  The Company also recognizes that adoption of EFS measures at scale will require addressing both up-front cost barriers through rebates and the reduction of operating costs to ensure favorable customer economics. While many residential customers will be able to realize operating cost savings by moving from the standard rate to the electric space heating rate, this is likely to be very dependent on the specifics of the customer's home and usage patterns. To address this, the Company intends to make an electric space heating rate proposal aimed at reflecting cost and providing an appropriate price signal to customers.[9] The Company anticipates filing this proposal with the Minnesota Public Utilities Commission before the end of 2023.

  Finally, the Company is excited to introduce proposals for EFS measures targeting end uses outside the historic scope of its CIP offerings. The Outdoor Equipment program provides incentives for electric lawnmowers to replace gasoline-powered mowers. The Company anticipates adding measures to the program over the course of the triennium, potentially including electric leaf blowers, snowblowers or other options.

- **Demand Response:** For the first time in Minnesota, the Company has created a Demand Response segment to begin to incorporate ECO opportunities. The Company has had demand response programs since the 1970s. Since then, our successful programs have extended to both residential and commercial customers and offer a variety of options for customer participation. However, as these programs move beyond traditional load-shedding and expand to include additional ways to manage consumption (including load management that optimizes the time of use without necessarily changing overall annual consumption), we believe it is useful to organize these programs into a single segment, rather than having them interspersed with more traditional

[9] The Company previously proposed a revision to its electric space heating rate in its most recent electric rate case; that proposal was rejected without prejudice and the Company was directed to re-file in a new docket.

efficiency programs in the residential and business segments. While the programs proposed for inclusion in the Demand Response segment in this Plan are already part of the 2021-2023 Triennial, we continue to explore opportunities to add to the segment. The Company may propose additional programs via the modification process, potentially including the incorporation of pilots approved in its Load Flexibility proposal as the pilots are completed.[10]

As in previous Plans, the Company expects to submit modifications as new technologies and improved program designs create new opportunities to benefit customers. The Company continuously seeks to improve its offerings throughout the portfolio, but one example in particular is worth highlighting. As the Company deploys Advanced Metering Infrastructure (AMI) to its electric customers, Distributed Intelligence (DI) capabilities associated with the new meters will open the door to localized analysis of how a customer uses energy with more accuracy and clarity than the current Home Energy Reports. These capabilities enable the company to provide personalized energy insights and tips to customers using the usage data collected by and analyzed on the meter. Through DI capabilities, the Company anticipates being able to provide customers with insights that could include real-time appliance level energy usage display, tailored recommendations based on individual usage patterns, benchmarking and goal setting. The Company plans to make these insights available to customers both through an application that can be downloaded onto a customer's personal mobile device and via the My Account section of the Company's website. Although no specific programming related to DI is included in this filing, the Company anticipates filing modifications to the Triennial Plan to utilize these capabilities as the installation of AMI metering continues.

Summary and Targets

Taken as a whole, the proposed 2024-2026 ECO Triennial Plan sets a course for the Company to invest approximately $588 million in customer programs over three years, driving cost-effective energy savings and reducing emissions and long-term utility costs in ways that benefit both participating and non-participating customers. Xcel Energy is proud to offer these innovative proposals – many of them enabled by the forward-thinking policy structures created by the ECO Act – to continue the ongoing evolution of its customer programs to support the clean energy transition. Even as the steady shift toward renewable forms of energy continues to reduce some of the traditional benefits of energy efficiency – such as fuel cost and emissions savings – the Company will continue to evolve its program designs to reflect other important and emerging benefits (e.g., using energy storage or dual-fuel heat pumps to reduce the peak capacity impacts of electrified heating loads) that make customer programming essential to the success of the overall energy transition. We believe this ECO Triennial Plan both reflects many of those changes and will serve as a catalyst for further enhancements in future years.

In this Plan, Xcel Energy respectfully requests approval of the portfolio-level budgets and energy savings targets presented in Table 2. The figures in Table 2 represent overall portfolio spending and

[10] Docket No. E002/M-21-101.

savings from both energy efficiency and EFS, including the estimated impacts of Alternative CIPs of which the Company is aware. Tables 3 and 4 summarize the spending and claimable gas savings attributed to energy efficiency and EFS separately.

Table 2: 2024-2026 Proposed ECO Portfolio; Budgets and Savings Targets

	Electric		Natural Gas	
Year	**Budget**	**Energy Savings (GWh)**	**Budget**	**Energy Savings (Dth)**
2024	$155,150,773	615	$29,820,687	1,102,563
2025	$163,096,354	615	$33,278,543	1,180,236
2026	$169,656,630	640	$37,139,290	1,281,853

Table 3: 2024-2026 Proposed Energy Efficiency; Budgets and Savings Targets[11]

	Electric			Natural Gas		
Year	**Budget**	**Proposed Energy Savings (GWh)**	**Savings as a % of Retail Sales**	**Budget**	**Proposed Energy Savings (Dth)**	**Savings as a % of Retail Sales**
2024	$152,464,140	615	2.26%	$28,791,282	1,090,881	1.41%
2025	$159,988,308	615	2.26%	$31,465,223	1,155,707	1.49%
2026	$165,921,964	641	2.35%	$33,750,180	1,235,604	1.59%

Table 4: 2024-2026 Proposed Efficient Fuel-Switching; Budgets and Savings Targets

	Electric		Natural Gas		Carbon Emission Reductions (Tons CO2e)	
Year	**Budget**	**Proposed Energy Savings (GWh)**	**Budget**	**Claimable Energy Savings (Dth)**[12]	**First Year**	**Lifetime**
2024	$2,686,633	NA	$1,029,405	11,682	909	20,181
2025	$3,108,046	NA	$1,813,320	24,529	2,273	41,918
2026	$3,734,666	NA	$3,389,110	46,249	4,206	77,451

[11] Proposed Energy Savings includes One Stop Shop which is administered by the Center for Energy and Environment. The Company elects to include this alternative filing as part of our portfolio and has included it as part of our incentive calculations since January 30, 2013. Budget and savings targets associated with Alternative CIPs, including One Stop Shop, will be updated to reflect final figures following the Deputy Commissioner's Decisions on each Alternative CIP.

[12] Claimable energy savings for EFS measures implemented by gas utilities represent the net impact of reduced gas usage and increased electricity usage. The full impacts of these measures on both electric and gas consumption, along with the claimable net savings in Dth, are provided in the program-level summaries below.

We provide segment-level targets for energy efficiency for each program in Tables 5-7, and program-level details in the subsequent Executive Summary tables.[13] Segment-level details for Efficient Fuel Switching are provided in Tables 8-10.

[13] Because the Company does not have adequate detail to analyze Alternative CIPs for cost-effectiveness, these programs are omitted from Tables 4-6. Alternative CIP filers will provide cost-effectiveness analyses with their program filings as necessary.

Table 5: 2024 Segment-Level Details – Energy Efficiency

	Electric				Natural Gas		
Segment	Budget	Demand (kW)	Savings (kWh)	MN Test Ratio	Budget	Savings (Dth)	MN Test Ratio
Residential	$ 30,306,472	35,083	135,748,086	3.59	$ 13,235,945	443,477	3.69
Business	$ 54,590,390	69,551	428,456,974	5.68	$ 6,398,014	606,408	8.68
Income-Qualified	$ 9,189,401	1,363	5,542,337	0.48	$ 4,069,972	29,681	1.02
Demand Response	$ 18,145,637	100,963	627,721	2.46	$ 32,765	639	1.71
Efficient Fuel Switching	$ -	-	-	0	$ -	-	-
Indirect Products and Services	$ 13,342,290	-	-	0	$ 3,205,173	-	0
Research, Eval & Pilots	$ 7,379,204	-	-	0	$ 723,630	-	0
Assessments	$ 4,973,841	-	-	-	$ 896,826	-	-
Total	$ 137,927,235	206,960	570,375,117	3.79	$ 28,562,325	1,080,205	4.25

Table 6: 2025 Segment-Level Details – Energy Efficiency

	Electric				Natural Gas		
Segment	Budget	Demand (kW)	Savings (kWh)	MN Test Ratio	Budget	Savings (Dth)	MN Test Ratio
Residential	$ 31,396,357	35,935	135,820,489	3.56	$ 13,862,071	456,271	3.72
Business	$ 53,595,201	68,214	425,867,852	5.71	$ 6,698,125	653,773	9.21
Income-Qualified	$ 10,996,722	1,637	6,799,722	0.51	$ 4,920,293	33,832	0.98
Demand Response	$ 19,271,908	117,664	870,164	2.43	$ 38,140	1,155	2.66
Efficient Fuel Switching	$ -	-	-	0	$ -	-	-
Indirect Products and Services	$ 15,025,429	-	-	0	$ 3,547,562	-	0
Research, Eval & Pilots	$ 7,654,239	-	-	0	$ 750,605	-	0
Assessments	$ 7,425,406	-	-	-	$ 1,414,206	-	-
Total	$ 145,365,262	223,451	569,358,227	3.68	$ 31,231,002	1,145,031	4.34

Table 7: 2026 Segment-Level Details – Energy Efficiency

	Electric				Natural Gas		
Segment	Budget	Demand (kW)	Savings (kWh)	MN Test Ratio	Budget	Savings (Dth)	MN Test Ratio
Residential	$ 33,295,807	37,360	147,770,554	3.63	$ 14,548,423	474,266	3.77
Business	$ 54,118,999	70,086	438,091,129	5.80	$ 6,796,124	710,059	9.72
Income-Qualified	$ 12,349,670	1,957	8,346,718	0.56	$ 6,125,554	39,448	0.93
Demand Response	$ 20,000,031	133,746	1,135,859	2.44	$ 41,307	1,155	2.52
Efficient Fuel Switching	$ -	-	-	0	$ -	-	-
Indirect Products and Services	$ 15,915,893	-	-	0	$ 3,738,343	-	0
Research, Eval & Pilots	$ 7,879,512	-	-	0	$ 776,093	-	0
Assessments	$ 7,622,477	-	-	-	$ 1,485,845	-	-
Total	$ 151,182,390	243,149	595,344,260	3.70	$ 33,511,689	1,224,928	4.41

Table 8: 2024 Segment-Level Details – Efficient Fuel Switching

	Efficient Fuel Switching						
Segment	**Electric Budget**	**Demand (kW)**	**Savings (kWh)**	**Gas Budget**	**Savings (Dth)**	**Claimable Savings (Dth)**	**MN Test Ratio**
Residential	$ 186,469	(6)	(1,789,245)	$ 672,657	15,859	9,754	1.11
Business	$ 90,622	(6)	(373,187)	$ 78,634	3,035	1,912	1.35
Income-Qualified	$ -	-	(31,505)	$ 148,064	124	16	0.10
Demand Response	$ -	-	-	$ -	-	-	-
Efficient Fuel Switching	$ 1,886,250	(4)	(54,251)	$ -	-	-	0.23
Indirect Products and Services	$ -	-	-	$ -	-	-	0
Research, Eval & Pilots	$ 523,291	-	-	$ 130,051	-	-	0
Assessments	$ -	-	-	$ -	-	-	-
Total	$ 2,686,633	(16)	(2,248,188)	$ 1,029,405	19,018	11,682	0.65

Table 9: 2025 Segment-Level Details – Efficient Fuel Switching

	Efficient Fuel Switching						
Segment	**Electric Budget**	**Demand (kW)**	**Savings (kWh)**	**Gas Budget**	**Savings (Dth)**	**Claimable Savings (Dth)**	**MN Test Ratio**
Residential	$ 376,695	(13)	(3,582,066)	$ 1,357,930	31,780	19,557	1.13
Business	$ 108,033	(40)	(776,528)	$ 182,197	7,284	4,980	1.60
Income-Qualified	$ -	-	(50,302)	$ 141,425	163	(8)	0.13
Demand Response	$ -	-	-	$ -	-	-	-
Efficient Fuel Switching	$ 2,091,250	(4)	(54,251)	$ -	-	-	0.21
Indirect Products and Services	$ -	-	-	$ -	-	-	0
Research, Eval & Pilots	$ 532,069	-	-	$ 131,768	-	-	0
Assessments	$ -	-	-	$ -	-	-	-
Total	$ 3,108,046	(56)	(4,463,147)	$ 1,813,320	39,226	24,529	0.84

Table 10: 2026 Segment-Level Details – Efficient Fuel Switching

	Efficient Fuel Switching						
Segment	**Electric Budget**	**Demand (kW)**	**Savings (kWh)**	**Gas Budget**	**Savings (Dth)**	**Claimable Savings (Dth)**	**MN Test Ratio**
Residential	$ 754,043	(24)	(7,077,599)	$ 2,709,947	63,118	38,969	1.16
Business	$ 128,341	(88)	(1,114,995)	$ 288,460	10,667	7,254	1.56
Income-Qualified	$ -	-	(64,808)	$ 257,158	247	26	0.12
Demand Response	$ -	-	-	$ -	-	-	-
Efficient Fuel Switching	$ 2,311,250	(4)	(54,251)	$ -	-	-	0.19
Indirect Products and Services	$ -	-	-	$ -	-	-	0
Research, Eval & Pilots	$ 541,032	-	-	$ 133,545	-	-	0
Assessments	$ -	-	-	$ -	-	-	-
Total	$ 3,734,666	(116)	(8,311,654)	$ 3,389,110	74,032	46,249	0.96

2024 Energy Efficiency Executive Summary

Program Name	Electric Participants	Electric Budget	Gen kW Savings	Gen kWh Savings	Gas Participants	Gas Budget	Dth Savings
Consumer Education	481,500	$ 963,000	-	-	321,000	$ 642,000	-
Efficient New Home Construction	2,925	$ 1,674,205	1,208	4,317,702	1,630	$ 2,299,104	39,905
Energy Efficient Showerheads	4,860	$ 146,428	118	1,440,811	6,840	$ 244,642	13,004
Home Energy Audit	13,843	$ 2,294,658	-	-	5,105	$ 1,518,714	-
Home Energy Insights	1,119,270	$ 1,312,724	5,604	28,289,302	277,060	$ 328,553	63,598
Home Energy Squad	11,322	$ 3,314,688	1,417	8,289,858	4,160	$ 1,020,713	33,827
Home Lighting	337,450	$ 6,512,219	7,733	68,000,679	-	$ -	-
Insulation Rebates	2,355	$ 307,036	292	221,656	2,313	$ 1,219,022	32,321
Lamp Recycling	471,787	$ 326,986	-	-	-	$ -	-
Refrigerator & Freezer Recycling	7,000	$ 1,535,915	866	7,414,303	-	$ -	-
Residential Heating & Cooling	41,862	$ 10,131,631	15,605	9,586,628	25,968	$ 5,393,065	205,540
School Education Kits	42,000	$ 1,704,759	2,189	7,885,093	21,500	$ 398,520	51,598
Whole Home Efficiency	215	$ 82,224	52	302,054	202	$ 171,612	3,685
Residential Segment Total	**2,536,389**	**$ 30,306,472**	**35,083**	**135,748,086**	**665,778**	**$ 13,235,945**	**443,477**
Business Education	20,191	$ 242,300	-	-	2,562	$ 30,750	-
Business Energy Assessments	453	$ 4,372,896	4,601	28,011,279	95	$ 418,929	27,552
Business New Construction	320	$ 11,757,153	13,859	65,579,288	32	$ 557,897	50,009
Compressed Air Efficiency	172	$ 979,183	1,291	9,016,793	-	$ -	-
Custom Efficiency	37	$ 1,162,191	859	6,115,321	9	$ 202,236	20,518
Data Center Efficiency	91	$ 1,236,777	922	15,070,217	-	$ -	-
Efficiency Controls	85	$ 629,119	320	8,206,755	24	$ 64,744	7,945
Empower Facilities	24	$ 964,662	-	-	6	$ 107,185	-
Empower Intelligence	386	$ 539,517	-	2,697,511	2	$ 53,947	61
Foodservice Equipment	54	$ 61,857	45	319,386	66	$ 94,749	5,536
HVAC+R	2,799	$ 4,121,836	6,069	34,073,550	692	$ 1,638,749	133,232
Lighting Efficiency	7,414	$ 11,951,825	18,975	115,021,767	-	$ -	-
Load Strategy Analysis	46	$ 745,263	622	6,455,982	6	$ 30,917	5,341
Multi-Family Building Efficiency	7,920	$ 2,279,319	477	3,314,283	1,293	$ 859,841	32,216
Non-Profit Energy Savings Program	210,924	$ 1,711,680	992	9,096,643	110,143	$ 922,649	158,528
Process & Commercial Efficiency	969	$ 11,655,440	20,298	124,477,870	54	$ 1,415,421	165,470
Self-Direct	1	$ 179,372	221	1,000,327	-	$ -	-
Business Segment Total	**251,886**	**$ 54,590,390**	**69,551**	**428,456,974**	**114,984**	**$ 6,398,014**	**606,408**
Affordable Efficient New Home Construction	25	$ 414,778	10	110,585	11	$ 198,213	460
Home Energy Savings Program	4,864	$ 2,900,491	395	1,659,600	754	$ 2,909,990	8,963
Low Income Home Energy Squad	2,521	$ 1,137,714	283	1,655,817	945	$ 363,983	6,702
Low Income Multi-Family Building Efficiency	3,691	$ 2,298,051	676	2,116,334	1,126	$ 162,778	13,556
Workforce Development & Education	87	$ 2,438,368	-	-	13	$ 435,008	-
Income Qualified Segment Total	**11,188**	**$ 9,189,401**	**1,363**	**5,542,337**	**2,849**	**$ 4,069,972**	**29,681**
Commercial AC Control	4,017	$ 3,287,549	5,883	359,116	83	$ 32,765	639
Critical Peak Pricing	30	$ 216,200	22,910	90,259	-	$ -	-
Electric Rate Savings	60	$ 764,536	9,467	18,661	-	$ -	-
Peak Partner Rewards	65	$ 1,355,116	19,843	117,235	-	$ -	-
Residential Demand Response	824,430	$ 12,522,236	42,860	42,450	-	$ -	-
Demand Response Segment Total	**828,602**	**$ 18,145,637**	**100,963**	**627,721**	**83**	**$ 32,765**	**639**
Efficient Fuel Switching Training & Support	-	$ -	-	-	-	$ -	-
Outdoor Equipment	-	$ -	-	-	-	$ -	-
Efficient Fuel Switching Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**
Advertising & Promotion	-	$ 7,097,042	-	-	-	$ 1,610,483	-
Application Development & Maintenance	-	$ 3,485,264	-	-	-	$ 712,737	-
CIP Training	-	$ 359,484	-	-	-	$ 146,397	-
Community Energy Reporting	229	$ 40,858	-	-	149	$ 13,625	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-
Energy Benchmarking	7,265	$ 126,771	-	-	2,325	$ 31,427	-
Partners in Energy	690,000	$ 1,332,871	-	-	345,000	$ 340,504	-
Planning & Regulatory Affairs	-	$ 900,000	-	-	-	$ 350,000	-
Indirect Products & Services Total	**697,494**	**$ 13,342,290**	**-**	**-**	**347,474**	**$ 3,205,173**	**-**
Market Research	-	$ 2,146,287	-	-	-	$ 525,579	-
Product Development	-	$ 5,232,917	-	-	-	$ 198,051	-
Research, Evaluations & Pilots Total	**-**	**$ 7,379,204**	**-**	**-**	**-**	**$ 723,630**	**-**
Portfolio Total	**4,325,559**	**$ 132,953,394**	**206,960**	**570,375,117**	**1,131,167**	**$ 27,665,499**	**1,080,205**
Minnesota Assessments	-	$ 1,932,291	-	-	-	$ 294,738	-
Minnesota Efficient Technology Accelerator	-	$ 3,041,550	-	-	-	$ 602,088	-
Assessments Segment Total	**-**	**$ 4,973,841**	**-**	**-**	**-**	**$ 896,826**	**-**
EnerChange	-	$ 551,304	-	-	-	$ 61,256	-
EnergySmart	-	$ 635,250	-	-	-	$ 46,725	-
One Stop Shop	1,918	$ 13,178,624	7,733	45,056,601	219	$ 99,099	10,676
Trillion BTU	-	$ 171,727	-	-	-	$ 21,877	-
Alternative Filings Total	**1,918**	**$ 14,536,905**	**7,733**	**45,056,601**	**219**	**$ 228,957**	**10,676**
Portfolio Total w Alternative Filings	**4,327,477**	**$ 152,464,140**	**214,693**	**615,431,718**	**1,131,386**	**$ 28,791,282**	**1,090,881**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

2024 Efficient Fuel Switching Executive Summary								
Program Name	**Electric Participants**	**Electric Budget**	**Gen kW Savings**	**Gen kWh Savings**	**Gas Participants**	**Gas Budget**	**Dth Savings**	**Claimable Dth Savings**
Consumer Education	-	$ -	-	-	-	$ -	-	-
Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Energy Efficient Showerheads	-	$ -	-	-	-	$ -	-	-
Home Energy Audit	-	$ -	-	-	-	$ -	-	-
Home Energy Insights	-	$ -	-	-	-	$ -	-	-
Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Home Lighting	-	$ -	-	-	-	$ -	-	-
Insulation Rebates	-	$ -	-	-	-	$ -	-	-
Lamp Recycling	-	$ -	-	-	-	$ -	-	-
Refrigerator & Freezer Recycling	-	$ -	-	-	-	$ -	-	-
Residential Heating & Cooling	707	$ 186,469	(6)	(1,702,732)	707	$ 658,489	15,417	9,608
School Education Kits	-	$ -	-	-	-	$ -	-	-
Whole Home Efficiency	19	$ -	(1)	(86,513)	12	$ 14,167	441	146
Residential Segment Total	**726**	**$ 186,469**	**(6)**	**(1,789,245)**	**719**	**$ 672,657**	**15,859**	**9,754**
Business Education	-	$ -	-	-	-	$ -	-	-
Business Energy Assessments	22	$ 24,692	-	(126,496)	22	$ 66,355	1,873	1,442
Business New Construction	-	$ -	-	-	-	$ -	-	-
Compressed Air Efficiency	1	$ 5,315	(4)	(37,387)	-	$ -	-	-
Custom Efficiency	3	$ 23,734	-	(13,315)	2	$ 863	99	76
Data Center Efficiency	-	$ -	-	-	-	$ -	-	-
Efficiency Controls	-	$ -	-	-	-	$ -	-	-
Empower Facilities	-	$ -	-	-	-	$ -	-	-
Empower Intelligence	-	$ -	-	-	-	$ -	-	-
Foodservice Equipment	-	$ -	-	-	-	$ -	-	-
HVAC+R	35	$ -	(2)	(182,674)	34	$ 8,275	866	243
Lighting Efficiency	-	$ -	-	-	-	$ -	-	-
Load Strategy Analysis	-	$ -	-	-	-	$ -	-	-
Multi-Family Building Efficiency	-	$ -	-	-	-	$ -	-	-
Non-Profit Energy Savings Program	-	$ -	-	-	-	$ -	-	-
Process & Commercial Efficiency	5	$ 36,881	-	(13,315)	5	$ 3,142	197	152
Self-Direct	-	$ -	-	-	-	$ -	-	-
Business Segment Total	**66**	**$ 90,622**	**(6)**	**(373,187)**	**63**	**$ 78,634**	**3,035**	**1,912**
Affordable Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Home Energy Savings Program	4	$ -	-	(25,416)	2	$ 13,475	79	(7)
Low Income Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Low Income Multi-Family Building Efficiency	1	$ -	-	(6,089)	1	$ 134,589	44	24
Workforce Development & Education	-	$ -	-	-	-	$ -	-	-
Income Qualified Segment Total	**5**	**$ -**	**-**	**(31,505)**	**3**	**$ 148,064**	**124**	**16**
Commercial AC Control	-	$ -	-	-	-	$ -	-	-
Critical Peak Pricing	-	$ -	-	-	-	$ -	-	-
Electric Rate Savings	-	$ -	-	-	-	$ -	-	-
Peak Partner Rewards	-	$ -	-	-	-	$ -	-	-
Residential Demand Response	-	$ -	-	-	-	$ -	-	-
Demand Response Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Efficient Fuel Switching Training & Support	550	$ 1,700,000	-	-	-	$ -	-	-
Outdoor Equipment	550	$ 186,250	(4)	(54,251)	-	$ -	-	-
Efficient Fuel Switching Total	**1,100**	**$ 1,886,250**	**(4)**	**(54,251)**	**-**	**$ -**	**-**	**-**
Advertising & Promotion	-	$ -	-	-	-	$ -	-	-
Application Development & Maintenance	-	$ -	-	-	-	$ -	-	-
CIP Training	-	$ -	-	-	-	$ -	-	-
Community Energy Reporting	-	$ -	-	-	-	$ -	-	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-	-
Energy Benchmarking	-	$ -	-	-	-	$ -	-	-
Partners in Energy	-	$ -	-	-	-	$ -	-	-
Planning & Regulatory Affairs	-	$ -	-	-	-	$ -	-	-
Indirect Products & Services Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Market Research	-	$ -	-	-	-	$ -	-	-
Product Development	-	$ 523,291	-	-	-	$ 130,051	-	-
Research, Evaluations & Pilots Total	**-**	**$ 523,291**	**-**	**-**	**-**	**$ 130,051**	**-**	**-**
Portfolio Total	**1,897**	**$ 2,686,633**	**(16)**	**(2,248,188)**	**785**	**$ 1,029,405**	**19,018**	**11,682**
Minnesota Assessments	-	$ -	-	-	-	$ -	-	-
Minnesota Efficient Technology Accelerator	-	$ -	-	-	-	$ -	-	-
Assessments Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
EnerChange	-	$ -	-	-	-	$ -	-	-
EnergySmart	-	$ -	-	-	-	$ -	-	-
One Stop Shop	-	$ -	-	-	-	$ -	-	-
Trillion BTU	-	$ -	-	-	-	$ -	-	-
Alternative Filings Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Portfolio Total w Alternative Filings	**1,897**	**$ 2,686,633**	**(16)**	**(2,248,188)**	**785**	**$ 1,029,405**	**19,018**	**11,682**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

2025 Energy Efficiency Executive Summary							
Program Name	**Electric Participants**	**Electric Budget**	**Gen kW Savings**	**Gen kWh Savings**	**Gas Participants**	**Gas Budget**	**Dth Savings**
Consumer Education	481,500	$ 1,011,150	-	-	321,000	$ 674,100	-
Efficient New Home Construction	3,211	$ 1,773,156	1,331	4,749,959	1,784	$ 2,443,495	43,764
Energy Efficient Showerheads	4,950	$ 152,129	128	1,568,872	7,250	$ 254,232	14,285
Home Energy Audit	15,607	$ 2,580,435	-	-	5,757	$ 1,707,142	-
Home Energy Insights	1,073,690	$ 1,341,583	6,027	29,698,787	243,620	$ 315,309	64,366
Home Energy Squad	12,455	$ 3,695,893	1,345	7,604,384	4,576	$ 1,131,141	35,882
Home Lighting	281,406	$ 6,188,693	7,949	66,138,029	-	$ -	-
Insulation Rebates	2,588	$ 329,829	321	236,271	2,541	$ 1,337,055	35,470
Lamp Recycling	452,816	$ 314,829	-	-	-	$ -	-
Refrigerator & Freezer Recycling	7,100	$ 1,571,689	879	7,520,222	-	$ -	-
Residential Heating & Cooling	42,552	$ 10,548,756	15,660	9,842,805	26,238	$ 5,398,370	205,540
School Education Kits	42,920	$ 1,772,397	2,223	7,988,977	21,970	$ 414,624	52,930
Whole Home Efficiency	282	$ 115,819	71	472,182	242	$ 186,602	4,035
Residential Segment Total	**2,421,077**	**$ 31,396,357**	**35,935**	**135,820,489**	**634,978**	**$ 13,862,071**	**456,271**
Business Education	20,191	$ 254,415	-	-	2,562	$ 33,000	-
Business Energy Assessments	538	$ 5,251,876	6,396	38,817,419	94	$ 435,924	29,859
Business New Construction	258	$ 9,777,425	12,135	60,945,779	37	$ 702,499	70,664
Compressed Air Efficiency	193	$ 1,094,767	1,625	10,536,355	-	$ -	-
Custom Efficiency	38	$ 1,209,943	938	6,290,044	9	$ 204,178	20,518
Data Center Efficiency	84	$ 1,191,899	890	14,120,715	-	$ -	-
Efficiency Controls	104	$ 728,907	461	9,891,105	29	$ 70,300	8,918
Empower Facilities	34	$ 880,689	-	-	6	$ 97,854	-
Empower Intelligence	414	$ 601,774	-	2,851,654	2	$ 65,672	61
Foodservice Equipment	49	$ 62,378	41	292,923	56	$ 95,657	4,806
HVAC+R	2,802	$ 4,237,488	6,071	34,119,425	691	$ 1,513,609	126,624
Lighting Efficiency	7,414	$ 12,065,388	18,975	115,021,767	-	$ -	-
Load Strategy Analysis	46	$ 773,752	622	6,455,982	6	$ 31,169	5,341
Multi-Family Building Efficiency	8,986	$ 2,541,301	658	4,000,742	1,428	$ 975,874	43,965
Non-Profit Energy Savings Program	221,642	$ 1,914,729	1,071	9,697,637	116,233	$ 1,073,364	183,991
Process & Commercial Efficiency	852	$ 10,826,644	18,111	111,825,977	55	$ 1,399,023	159,026
Self-Direct	1	$ 181,826	221	1,000,327	-	$ -	-
Business Segment Total	**263,646**	**$ 53,595,201**	**68,214**	**425,867,852**	**121,208**	**$ 6,698,125**	**653,773**
Affordable Efficient New Home Construction	25	$ 414,690	10	110,585	11	$ 198,540	460
Home Energy Savings Program	5,497	$ 3,293,220	450	1,971,529	874	$ 3,539,922	10,378
Low Income Home Energy Squad	3,152	$ 1,196,872	354	2,069,771	1,181	$ 378,635	8,378
Low Income Multi-Family Building Efficiency	4,290	$ 2,819,758	824	2,647,837	1,255	$ 220,880	14,616
Workforce Development & Education	104	$ 3,272,181	-	-	16	$ 582,316	-
Income Qualified Segment Total	**13,067**	**$ 10,996,722**	**1,637**	**6,799,722**	**3,337**	**$ 4,920,293**	**33,832**
Commercial AC Control	4,950	$ 3,750,507	7,024	522,387	150	$ 38,140	1,155
Critical Peak Pricing	50	$ 306,500	38,184	150,432	-	$ -	-
Electric Rate Savings	50	$ 735,687	7,889	15,551	-	$ -	-
Peak Partner Rewards	80	$ 1,465,934	22,324	131,890	-	$ -	-
Residential Demand Response	831,045	$ 13,013,280	42,244	49,905	-	$ -	-
Demand Response Segment Total	**836,175**	**$ 19,271,908**	**117,664**	**870,164**	**150**	**$ 38,140**	**1,155**
Efficient Fuel Switching Training & Support	-	$ -	-	-	-	$ -	-
Outdoor Equipment	-	$ -	-	-	-	$ -	-
Efficient Fuel Switching Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**
Advertising & Promotion	-	$ 7,817,396	-	-	-	$ 1,715,332	-
Application Development & Maintenance	-	$ 4,295,501	-	-	-	$ 774,219	-
CIP Training	-	$ 413,666	-	-	-	$ 167,856	-
Community Energy Reporting	239	$ 42,262	-	-	159	$ 14,093	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-
Energy Benchmarking	8,515	$ 148,025	-	-	2,785	$ 40,832	-
Partners in Energy	690,000	$ 1,377,080	-	-	345,000	$ 352,979	-
Planning & Regulatory Affairs	-	$ 931,500	-	-	-	$ 482,250	-
Indirect Products & Services Total	**698,754**	**$ 15,025,429**	**-**	**-**	**347,944**	**$ 3,547,562**	**-**
Market Research	-	$ 2,333,545	-	-	-	$ 550,837	-
Product Development	-	$ 5,320,694	-	-	-	$ 199,768	-
Research, Evaluations & Pilots Total	**-**	**$ 7,654,239**	**-**	**-**	**-**	**$ 750,605**	**-**
Portfolio Total	**4,232,719**	**$ 137,939,856**	**223,451**	**569,358,227**	**1,107,617**	**$ 29,816,796**	**1,145,031**
Minnesota Assessments	-	$ 1,932,291	-	-	-	$ 294,738	-
Minnesota Efficient Technology Accelerator	-	$ 5,493,115	-	-	-	$ 1,119,468	-
Assessments Segment Total	**-**	**$ 7,425,406**	**-**	**-**	**-**	**$ 1,414,206**	**-**
EnerChange	-	$ 567,843	-	-	-	$ 63,094	-
EnergySmart	-	$ 672,735	-	-	-	$ 50,085	-
One Stop Shop	1,972	$ 13,210,681	7,750	45,149,032	219	$ 99,099	10,676
Trillion BTU	-	$ 171,787	-	-	-	$ 21,943	-
Alternative Filings Total	**1,972**	**$ 14,623,046**	**7,750**	**45,149,032**	**219**	**$ 234,221**	**10,676**
Portfolio Total w Alternative Filings	**4,234,691**	**$ 159,988,308**	**231,201**	**614,507,259**	**1,107,836**	**$ 31,465,223**	**1,155,707**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

2025 Efficient Fuel Switching Executive Summary

Program Name	Electric Participants	Electric Budget	Gen kW Savings	Gen kWh Savings	Gas Participants	Gas Budget	Dth Savings	Claimable Dth Savings
Consumer Education	-	$ -	-	-	-	$ -	-	-
Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Energy Efficient Showerheads	-	$ -	-	-	-	$ -	-	-
Home Energy Audit	-	$ -	-	-	-	$ -	-	-
Home Energy Insights	-	$ -	-	-	-	$ -	-	-
Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Home Lighting	-	$ -	-	-	-	$ -	-	-
Insulation Rebates	-	$ -	-	-	-	$ -	-	-
Lamp Recycling	-	$ -	-	-	-	$ -	-	-
Refrigerator & Freezer Recycling	-	$ -	-	-	-	$ -	-	-
Residential Heating & Cooling	1,422	$ 376,695	(11)	(3,418,595)	1,422	$ 1,331,370	30,948	19,284
School Education Kits	-	$ -	-	-	-	$ -	-	-
Whole Home Efficiency	36	$ -	(1)	(163,471)	23	$ 26,560	831	273
Residential Segment Total	**1,458**	**$ 376,695**	**(13)**	**(3,582,066)**	**1,445**	**$ 1,357,930**	**31,780**	**19,557**
Business Education	-	$ -	-	-	-	$ -	-	-
Business Energy Assessments	52	$ 29,986	-	(319,568)	52	$ 121,727	4,733	3,642
Business New Construction	3	$ -	(28)	(132,978)	3	$ 44,584	1,130	676
Compressed Air Efficiency	2	$ 10,364	(9)	(74,773)	-	$ -	-	-
Custom Efficiency	8	$ 29,308	-	(46,604)	6	$ 2,588	296	228
Data Center Efficiency	-	$ -	-	-	-	$ -	-	-
Efficiency Controls	-	$ -	-	-	-	$ -	-	-
Empower Facilities	-	$ -	-	-	-	$ -	-	-
Empower Intelligence	-	$ -	-	-	-	$ -	-	-
Foodservice Equipment	-	$ -	-	-	-	$ -	-	-
HVAC+R	37	$ -	(2)	(189,290)	36	$ 10,068	928	282
Lighting Efficiency	-	$ -	-	-	-	$ -	-	-
Load Strategy Analysis	-	$ -	-	-	-	$ -	-	-
Multi-Family Building Efficiency	-	$ -	-	-	-	$ -	-	-
Non-Profit Energy Savings Program	-	$ -	-	-	-	$ -	-	-
Process & Commercial Efficiency	5	$ 38,374	-	(13,315)	5	$ 3,229	197	152
Self-Direct	-	$ -	-	-	-	$ -	-	-
Business Segment Total	**107**	**$ 108,033**	**(40)**	**(776,528)**	**102**	**$ 182,197**	**7,284**	**4,980**
Affordable Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Home Energy Savings Program	6	$ -	-	(38,124)	3	$ 20,100	119	(11)
Low Income Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Low Income Multi-Family Building Efficiency	2	$ -	-	(12,178)	1	$ 121,324	44	3
Workforce Development & Education	-	$ -	-	-	-	$ -	-	-
Income Qualified Segment Total	**8**	**$ -**	**-**	**(50,302)**	**4**	**$ 141,425**	**163**	**(8)**
Commercial AC Control	-	$ -	-	-	-	$ -	-	-
Critical Peak Pricing	-	$ -	-	-	-	$ -	-	-
Electric Rate Savings	-	$ -	-	-	-	$ -	-	-
Peak Partner Rewards	-	$ -	-	-	-	$ -	-	-
Residential Demand Response	-	$ -	-	-	-	$ -	-	-
Demand Response Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Efficient Fuel Switching Training & Support	650	$ 1,930,000	-	-	-	$ -	-	-
Outdoor Equipment	550	$ 161,250	(4)	(54,251)	-	$ -	-	-
Efficient Fuel Switching Total	**1,200**	**$ 2,091,250**	**(4)**	**(54,251)**	**-**	**$ -**	**-**	**-**
Advertising & Promotion	-	$ -	-	-	-	$ -	-	-
Application Development & Maintenance	-	$ -	-	-	-	$ -	-	-
CIP Training	-	$ -	-	-	-	$ -	-	-
Community Energy Reporting	-	$ -	-	-	-	$ -	-	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-	-
Energy Benchmarking	-	$ -	-	-	-	$ -	-	-
Partners in Energy	-	$ -	-	-	-	$ -	-	-
Planning & Regulatory Affairs	-	$ -	-	-	-	$ -	-	-
Indirect Products & Services Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Market Research	-	$ -	-	-	-	$ -	-	-
Product Development	-	$ 532,069	-	-	-	$ 131,768	-	-
Research, Evaluations & Pilots Total	**-**	**$ 532,069**	**-**	**-**	**-**	**$ 131,768**	**-**	**-**
Portfolio Total	**2,773**	**$ 3,108,046**	**(56)**	**(4,463,147)**	**1,551**	**$ 1,813,320**	**39,226**	**24,529**
Minnesota Assessments	-	$ -	-	-	-	$ -	-	-
Minnesota Efficient Technology Accelerator	-	$ -	-	-	-	$ -	-	-
Assessments Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
EnerChange	-	$ -	-	-	-	$ -	-	-
EnergySmart	-	$ -	-	-	-	$ -	-	-
One Stop Shop	-	$ -	-	-	-	$ -	-	-
Trillion BTU	-	$ -	-	-	-	$ -	-	-
Alternative Filings Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Portfolio Total w Alternative Filings	**2,773**	**$ 3,108,046**	**(56)**	**(4,463,147)**	**1,551**	**$ 1,813,320**	**39,226**	**24,529**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

2026 Energy Efficiency Executive Summary							
Program Name	**Electric Participants**	**Electric Budget**	**Gen kW Savings**	**Gen kWh Savings**	**Gas Participants**	**Gas Budget**	**Dth Savings**
Consumer Education	481,500	$ 1,061,708	-	-	321,000	$ 707,804	-
Efficient New Home Construction	3,542	$ 1,939,974	2,289	12,427,389	1,962	$ 2,632,130	53,554
Energy Efficient Showerheads	5,150	$ 160,292	139	1,709,662	7,425	$ 264,686	15,695
Home Energy Audit	17,639	$ 2,909,095	-	-	6,511	$ 1,924,822	-
Home Energy Insights	1,031,550	$ 1,362,227	6,101	29,893,776	212,540	$ 302,989	63,285
Home Energy Squad	13,700	$ 4,053,136	1,297	7,005,339	5,034	$ 1,236,574	38,808
Home Lighting	309,362	$ 6,201,004	8,166	69,741,372	-	$ -	-
Insulation Rebates	2,846	$ 353,737	353	252,647	2,796	$ 1,470,935	39,026
Lamp Recycling	433,845	$ 302,681	-	-	-	$ -	-
Refrigerator & Freezer Recycling	7,200	$ 1,610,175	891	7,626,140	-	$ -	-
Residential Heating & Cooling	43,922	$ 11,344,004	15,770	10,351,846	26,778	$ 5,374,118	205,540
School Education Kits	43,867	$ 1,843,027	2,260	8,091,666	22,453	$ 431,439	53,956
Whole Home Efficiency	361	$ 154,746	94	670,717	288	$ 202,925	4,403
Residential Segment Total	**2,394,484**	**$ 33,295,807**	**37,360**	**147,770,554**	**606,787**	**$ 14,548,423**	**474,266**
Business Education	20,191	$ 267,750	-	-	2,562	$ 35,050	-
Business Energy Assessments	564	$ 5,305,310	6,306	36,195,555	104	$ 443,922	32,034
Business New Construction	262	$ 10,339,461	14,556	80,667,002	42	$ 695,185	94,860
Compressed Air Efficiency	207	$ 1,151,675	1,857	11,164,825	-	$ -	-
Custom Efficiency	39	$ 1,259,632	1,017	6,464,768	9	$ 206,188	20,518
Data Center Efficiency	64	$ 896,090	650	10,255,381	-	$ -	-
Efficiency Controls	122	$ 818,250	579	11,065,001	33	$ 76,105	9,825
Empower Facilities	58	$ 545,840	-	-	12	$ 60,649	-
Empower Intelligence	445	$ 670,933	-	3,082,869	2	$ 73,140	61
Foodservice Equipment	45	$ 64,236	37	260,588	53	$ 98,206	4,626
HVAC+R	2,806	$ 4,315,824	6,075	34,207,680	691	$ 1,468,757	123,345
Lighting Efficiency	7,414	$ 12,205,974	18,975	115,021,767	-	$ -	-
Load Strategy Analysis	46	$ 780,244	622	6,455,982	6	$ 37,669	5,341
Multi-Family Building Efficiency	10,098	$ 2,774,969	854	5,281,569	1,575	$ 1,054,868	50,251
Non-Profit Energy Savings Program	232,898	$ 2,022,376	1,154	10,328,831	122,666	$ 1,133,631	210,171
Process & Commercial Efficiency	797	$ 10,515,135	17,183	106,638,985	55	$ 1,412,754	159,026
Self-Direct	1	$ 185,298	221	1,000,327	-	$ -	-
Business Segment Total	**276,057**	**$ 54,118,999**	**70,086**	**438,091,129**	**127,810**	**$ 6,796,124**	**710,059**
Affordable Efficient New Home Construction	25	$ 413,743	10	110,585	11	$ 199,664	460
Home Energy Savings Program	6,150	$ 3,798,435	515	2,241,852	1,093	$ 4,729,485	13,129
Low Income Home Energy Squad	3,939	$ 1,256,787	442	2,587,214	1,477	$ 396,741	10,472
Low Income Multi-Family Building Efficiency	4,883	$ 3,265,152	990	3,407,067	1,384	$ 156,582	15,386
Workforce Development & Education	114	$ 3,615,554	-	-	17	$ 643,082	-
Income Qualified Segment Total	**15,111**	**$ 12,349,670**	**1,957**	**8,346,718**	**3,981**	**$ 6,125,554**	**39,448**
Commercial AC Control	5,950	$ 3,988,997	8,165	709,752	150	$ 41,307	1,155
Critical Peak Pricing	70	$ 307,000	53,457	210,605	-	$ -	-
Electric Rate Savings	40	$ 707,260	6,311	12,441	-	$ -	-
Peak Partner Rewards	100	$ 1,566,989	24,804	146,544	-	$ -	-
Residential Demand Response	836,160	$ 13,429,785	41,009	56,518	-	$ -	-
Demand Response Segment Total	**842,320**	**$ 20,000,031**	**133,746**	**1,135,859**	**150**	**$ 41,307**	**1,155**
Efficient Fuel Switching Training & Support	-	$ -	-	-	-	$ -	-
Outdoor Equipment	-	$ -	-	-	-	$ -	-
Efficient Fuel Switching Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**
Advertising & Promotion	-	$ 8,470,383	-	-	-	$ 1,828,013	-
Application Development & Maintenance	-	$ 4,362,657	-	-	-	$ 785,777	-
CIP Training	-	$ 478,064	-	-	-	$ 193,333	-
Community Energy Reporting	249	$ 43,714	-	-	169	$ 14,578	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-
Energy Benchmarking	9,615	$ 174,396	-	-	3,090	$ 51,759	-
Partners in Energy	690,000	$ 1,422,577	-	-	345,000	$ 365,754	-
Planning & Regulatory Affairs	-	$ 964,103	-	-	-	$ 499,129	-
Indirect Products & Services Total	**699,864**	**$ 15,915,893**	**-**	**-**	**348,259**	**$ 3,738,343**	**-**
Market Research	-	$ 2,469,193	-	-	-	$ 574,548	-
Product Development	-	$ 5,410,319	-	-	-	$ 201,545	-
Research, Evaluations & Pilots Total	**-**	**$ 7,879,512**	**-**	**-**	**-**	**$ 776,093**	**-**
Portfolio Total	**4,227,837**	**$ 143,559,913**	**243,149**	**595,344,260**	**1,086,988**	**$ 32,025,844**	**1,224,928**
Minnesota Assessments	-	$ 1,932,291	-	-	-	$ 294,738	-
Minnesota Efficient Technology Accelerator	-	$ 5,690,186	-	-	-	$ 1,191,107	-
Assessments Segment Total	**-**	**$ 7,622,477**	**-**	**-**	**-**	**$ 1,485,845**	**-**
EnerChange	-	$ 584,878	-	-	-	$ 64,986	-
EnergySmart	-	$ 714,525	-	-	-	$ 52,395	-
One Stop Shop	2,022	$ 13,268,321	7,780	45,306,375	219	$ 99,099	10,676
Trillion BTU	-	$ 171,850	-	-	-	$ 22,011	-
Alternative Filings Total	**2,022**	**$ 14,739,574**	**7,780**	**45,306,375**	**219**	**$ 238,491**	**10,676**
Portfolio Total w Alternative Filings	**4,229,859**	**$ 165,921,964**	**250,929**	**640,650,635**	**1,087,207**	**$ 33,750,180**	**1,235,604**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

2026 Efficient Fuel Switching Executive Summary

Program Name	Electric Participants	Electric Budget	Gen kW Savings	Gen kWh Savings	Gas Participants	Gas Budget	Dth Savings	Claimable Dth Savings
Consumer Education	-	$ -	-	-	-	$ -	-	-
Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Energy Efficient Showerheads	-	$ -	-	-	-	$ -	-	-
Home Energy Audit	-	$ -	-	-	-	$ -	-	-
Home Energy Insights	-	$ -	-	-	-	$ -	-	-
Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Home Lighting	-	$ -	-	-	-	$ -	-	-
Insulation Rebates	-	$ -	-	-	-	$ -	-	-
Lamp Recycling	-	$ -	-	-	-	$ -	-	-
Refrigerator & Freezer Recycling	-	$ -	-	-	-	$ -	-	-
Residential Heating & Cooling	2,842	$ 754,043	(22)	(6,835,088)	2,842	$ 2,670,172	61,863	38,541
School Education Kits	-	$ -	-	-	-	$ -	-	-
Whole Home Efficiency	55	$ -	(2)	(242,511)	36	$ 39,776	1,255	427
Residential Segment Total	**2,897**	**$ 754,043**	**(24)**	**(7,077,599)**	**2,878**	**$ 2,709,947**	**63,118**	**38,969**
Business Education	-	$ -	-	-	-	$ -	-	-
Business Energy Assessments	66	$ 46,154	-	(399,460)	66	$ 152,289	5,916	4,553
Business New Construction	9	$ -	(76)	(358,307)	9	$ 115,549	3,071	1,849
Compressed Air Efficiency	2	$ 10,317	(9)	(74,773)	-	$ -	-	-
Custom Efficiency	12	$ 32,632	-	(73,234)	10	$ 4,314	493	379
Data Center Efficiency	-	$ -	-	-	-	$ -	-	-
Efficiency Controls	-	$ -	-	-	-	$ -	-	-
Empower Facilities	-	$ -	-	-	-	$ -	-	-
Empower Intelligence	-	$ -	-	-	-	$ -	-	-
Foodservice Equipment	-	$ -	-	-	-	$ -	-	-
HVAC+R	39	$ -	(3)	(195,905)	38	$ 13,047	990	321
Lighting Efficiency	-	$ -	-	-	-	$ -	-	-
Load Strategy Analysis	-	$ -	-	-	-	$ -	-	-
Multi-Family Building Efficiency	-	$ -	-	-	-	$ -	-	-
Non-Profit Energy Savings Program	-	$ -	-	-	-	$ -	-	-
Process & Commercial Efficiency	5	$ 39,239	-	(13,315)	5	$ 3,262	197	152
Self-Direct	-	$ -	-	-	-	$ -	-	-
Business Segment Total	**133**	**$ 128,341**	**(88)**	**(1,114,995)**	**128**	**$ 288,460**	**10,667**	**7,254**
Affordable Efficient New Home Construction	-	$ -	-	-	-	$ -	-	-
Home Energy Savings Program	9	$ -	-	(58,719)	4	$ 25,485	159	(42)
Low Income Home Energy Squad	-	$ -	-	-	-	$ -	-	-
Low Income Multi-Family Building Efficiency	1	$ -	-	(6,089)	2	$ 231,673	89	68
Workforce Development & Education	-	$ -	-	-	-	$ -	-	-
Income Qualified Segment Total	**10**	**$ -**	**-**	**(64,808)**	**6**	**$ 257,158**	**247**	**26**
Commercial AC Control	-	$ -	-	-	-	$ -	-	-
Critical Peak Pricing	-	$ -	-	-	-	$ -	-	-
Electric Rate Savings	-	$ -	-	-	-	$ -	-	-
Peak Partner Rewards	-	$ -	-	-	-	$ -	-	-
Residential Demand Response	-	$ -	-	-	-	$ -	-	-
Demand Response Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Efficient Fuel Switching Training & Support	750	$ 2,160,000	-	-	-	$ -	-	-
Outdoor Equipment	550	$ 151,250	(4)	(54,251)	-	$ -	-	-
Efficient Fuel Switching Total	**1,300**	**$ 2,311,250**	**(4)**	**(54,251)**	**-**	**$ -**	**-**	**-**
Advertising & Promotion	-	$ -	-	-	-	$ -	-	-
Application Development & Maintenance	-	$ -	-	-	-	$ -	-	-
CIP Training	-	$ -	-	-	-	$ -	-	-
Community Energy Reporting	-	$ -	-	-	-	$ -	-	-
Electric Utility Infrastructure	-	$ -	-	-	-	$ -	-	-
Energy Benchmarking	-	$ -	-	-	-	$ -	-	-
Partners in Energy	-	$ -	-	-	-	$ -	-	-
Planning & Regulatory Affairs	-	$ -	-	-	-	$ -	-	-
Indirect Products & Services Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Market Research	-	$ -	-	-	-	$ -	-	-
Product Development	-	$ 541,032	-	-	-	$ 133,545	-	-
Research, Evaluations & Pilots Total	**-**	**$ 541,032**	**-**	**-**	**-**	**$ 133,545**	**-**	**-**
Portfolio Total	**4,340**	**$ 3,734,666**	**(116)**	**(8,311,654)**	**3,012**	**$ 3,389,110**	**74,032**	**46,249**
Minnesota Assessments	-	$ -	-	-	-	$ -	-	-
Minnesota Efficient Technology Accelerator	-	$ -	-	-	-	$ -	-	-
Assessments Segment Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
EnerChange	-	$ -	-	-	-	$ -	-	-
EnergySmart	-	$ -	-	-	-	$ -	-	-
One Stop Shop	-	$ -	-	-	-	$ -	-	-
Trillion BTU	-	$ -	-	-	-	$ -	-	-
Alternative Filings Total	**-**	**$ -**	**-**	**-**	**-**	**$ -**	**-**	**-**
Portfolio Total w Alternative Filings	**4,340**	**$ 3,734,666**	**(116)**	**(8,311,654)**	**3,012**	**$ 3,389,110**	**74,032**	**46,249**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

COMPLIANCE REQUIREMENTS

This section documents and summarizes the Company's compliance with relevant statutes and rules regarding the content of the 2024-2026 ECO Triennial Plan. Minn. R. 7690.0500 contains the requirements and procedures for ECO filings. Minn. Stat. §216B.2401, §216B.241, and §216B.2411 contain provisions the Company must meet in its ECO Plan. In addition, Minnesota Rule 7690.1200 lists the information which must be considered in determining whether a proposed program will result in reasonable investments in and expenditures for ECO. Information required for this determination is summarized in this section. Finally, this section includes compliance with the Deputy Commissioner's Decision on *Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities* issued on March 31, 2023. For additional clarity, we have also included Appendix 5: Compliance Matrix as a quick reference for compliance.

Compliance With Rules & Statues

On May 10, 2023, the Deputy Commissioner issued a timeline modification extending the deadline for ECO Plans to June 30, 2023 (Docket No. E, G002/CIP-23-92) to provide time for utilities to reflect statutory changes during the 2023 legislative session. Therefore, the 2024-2026 ECO Triennial Plan fulfills the Company's compliance with Minn. Stat. §216B.241, subd. 2(b). Additionally, in 2009, the Company received approval from the Department to file a combined gas and electric ECO Plan. We continue with this approach in this plan.

1. Statutory Requirements

Energy Savings Goals (Minn. Stat. §216B.241, subd. 1c (b))
Minnesota Statute requires utilities to file an ECO Plan with no less than 1.75 percent gross annual electric retail energy sales and no less than 1.0 percent gross annual natural gas retail energy sales. Additionally, Minnesota Rule 7690.1200 specifies that the source of the sales information used to demonstrate compliance is to be the utility's annual jurisdictional report. Table 11 shows our proposed natural gas and electric targets annually, as percent of the previous three-year (2020, 2021 & 2022) weather-normalized sales, adjusted for exempt customers as of June 2022. Should additional customers be approved for exemption from DSM, we may request to modify the baseline to incorporate the effect of those exemptions.

Table 11: Electric Energy Savings as a Percent of Retail Sales

Total weather-normalized energy (MWh)	2020[14]	28,141,222
	2021[15]	28,814,203
	2022[16]	28,994,858
Sales to Exempt Customers (MWh)	2020	1,409,110
	2021	1,405,123
	2022	1,449,066
Net weather-normalized energy sales (MWh) (total sales less exempt customers)	2020	26,732,112
	2021	27,409,079
	2022	27,545,792
Average weather-normalized energy sales		27,228,995
1.75% of Sales (MWh)		**476,507**
Proposed Energy Savings Targets	**2024**	**615,432**
	2025	**614,507**
	2026	**640,651**
Energy Savings Targets as a Percent of Average Retail Sales	**2024**	**2.26%**
	2025	**2.26%**
	2026	**2.35%**

[14] 2020 Electric Jurisdictional Annual Report, E,G999/PR-21-4, Sales & Degree Days Data, p. E-30.
[15] 2021 Electric Jurisdictional Annual Report, E,G999/PR-22-4, Sales & Degree Days Data, p. E-30.
[16] 2022 Electric Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree Days Data, p. E-30.

Table 12: Natural Gas Energy Savings as a Percent of Retail Sales[17]

Total weather-normalized energy (Dth)	2020	120,653,358
	2021	123,694,923
	2022	108,053,647
Sales to Exempt Customers (Dth)	2020	42,752,388
	2021	48,077,072
	2022	28,811,373
Net weather-normalized energy sales (Dth) (total sales less exempt customers)	2020	77,900,970
	2021	75,617,850
	2022	79,242,274
Average weather-normalized energy sales		77,587,032
1.00% of Sales		**775,870**
Proposed Energy Savings Targets	**2024**	**1,102,563**
	2025	**1,180,236**
	2026	**1,281,853**
Energy Savings Targets as a Percent of Retail Sales	**2024**	**1.42%**
	2025	**1.52%**
	2026	**1.65%**

Efficient Fuel-Switching (Minn. Stat. §216B.241, subd. 1c (g))

Minnesota Statute limits public utility spending on efficient fuel-switching improvements to 0.35 percent per year, averaged over three years of the public utility's gross annual retail energy sales. In the Deputy Commissioner's Decision issued on March 15, 2022, the Department of Commerce provided further guidance on this metric to include, "Consistent with other CIP spending caps and requirements, spending on EFS improvements must not exceed 0.35 percent per year, averaged over three years of the [investor-owned utility]'s gross operating revenue (GOR) from non-exempt customers. EFS spending in IOU plans is to be prorated for January 1 - June 30, 2026."[18]

[17] Gas energy savings figures include both energy efficiency savings and claimable savings from efficient fuel-switching (calculated as the net savings considering both reduced gas consumption and increased electric consumption).
[18] Decision, In the Matter of Technical Guidance for the Inclusion of Efficient Fuel-Switching, Load Management, and Pre-Weatherization Measures in CIP, Department of Commerce, March 15, 2022. (Page 32).

Table 13 illustrates the Company's compliance with the limit on EFS spending.

Table 13: Efficient Fuel-Switching Spending Caps (2024-2026)

	Electric	**Natural Gas**
Annual Gross Operating Revenues (GOR)		
2020[19]	$2,976,117,171	$433,259,717
2021[20]	$3,256,794,613	$537,419,688
2022[21]	$3,649,323,863	$877,181,979
CIP Exemptions		
2020	$98,206,837	$11,418,135
2021	$108,425,089	$12,014,285
2022	$128,824,695	$11,825,673
Adjusted Gross Operating Revenue		
2020	$2,976,117,171	$421,841,583
2021	$3,256,794,613	$525,405,403
2022	$3,649,323,863	$865,356,307
Average Gross Operating Revenues (GOR)	$3,294,078,549	$604,201,098
EFS Spending Cap (0.35% of GOR)	**$11,529,275**	**$2,144,933**
2024-2026 Proposed EFS Spending		
2024	$2,686,633	$1,029,405
2025	$3,108,046	$1,813,320
2026 (proposed)	$3,734,66	$1,553,570
2026 (pro-rated)	$1,867,333	$1,694,555
Three-year Average EFS Spending (2024, 2025, 2026 pro-rated)	$2,554,004	$1,512,427

Table 13 calculates the 0.35 percent cap amount using gross operating revenue from non-exempt customers averaged over three years, "consistent with other CIP spending caps." It then calculates the three-year average of the Company's proposed EFS spending, pro-rating spending in 2026 per the Deputy Commissioner's Decision. The resulting three-year average spending is below 0.35 percent of the three-year average of GOR.

[19] 2020 Gas Jurisdictional Annual Report, E,G999/PR-21-4, Sales & Degree E-39. 2020 Electric Jurisdictional Annual Report, E,G999/PR-21-4, Sales & Degree E-30.
[20] 2021 Gas Jurisdictional Annual Report, E,G999/PR-22-4, Sales & Degree E-39. 2021 Electric Jurisdictional Annual Report, E,G999/PR-22-4, Sales & Degree E-30.
[21] 2022 Gas Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree E-39. 2022 Electric Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree E-30.

Facilities Energy Efficiency (Minn. Stat. §216B.241, subd. 1f)

Minn. Stat. §216B.241, subd. 1f requires all utilities to include in their triennial plans programs that facilitate professional engineering verification to qualify a building as ENERGY STAR-labeled, Leadership in Energy and Environmental Design certified, or Green Globes-certified. Xcel Energy's Business New Construction and Business Energy Assessment programs satisfy this requirement.

R&D Spending Cap (Minn. Stat. §216B.241, subd. 2(e))

Minn. Stat. §216B.241, subd. 2(e) allows public utilities use up to ten percent of the total amount spent and invested on energy conservation improvements towards research and development projects that meet the definition of energy conservation improvements.

Research and Development (R&D) identifies, assesses, and develops new load management and energy efficiency products and services. This work allows the Company to identify and promote promising new energy saving opportunities for its customers. A narrative summary of R&D activities and the corresponding dollar amounts is provided in the Product Development section of this report.

Table 14: Research & Development Spending Cap

Year	Fuel Type	Total Portfolio Budget	EFS Spending	Conservation Improvement Spending (including Alternative Programs)	Maximum Conservation R&D Spending	Proposed Conservation R&D Budget
2024	**Electric**	$155,150,773	$2,686,633	$152,464,140	$15,246,414	$5,232,917
	Natural Gas	$29,820,687	$1,029,405	$28,791,282	$2,879,128	$198,051
2025	**Electric**	$163,096,354	$3,108,046	$19,988,308	$15,998,831	$5,320,694
	Natural Gas	$33,278,543	$1,813,320	$31,465,223	$3,146,522	$199,768
2026	**Electric**	$169,565,630	3,734,666	$165,921,954	$16,592,196	$5,410,319
	Natural Gas	$37,139,292	$3,389,110	$33,750,180	$3,375,018	$201,545

In addition, the Company intends to use approximately $500,000 of electric EFS spending and $130,000 of natural gas EFS spending per year towards research and development activities in support of EFS. These are not included as part of the requirement but instead falls under Minn. Stat. §216B.241, subd. 1c (g). EFS spending is identified as part of the Research, Evaluations and Pilots Segment detailed write-up.

Public Schools (Minn. Stat. §216B.241, subd. 2(i))

Minnesota Statute requires public utilities to include activities to improve energy efficiency in public schools served by the utility. As applicable to each public utility, at a minimum the activities must include programs to increase the efficiency of the school's lighting and heating and cooling systems, and to provide for building recommissioning, building operator training, and opportunities to educate students, teachers, and staff regarding energy efficiency measures implemented at the school.

The Company's extensive business portfolio provides several opportunities for public schools through our Business Lighting program, HVAC+R program, Energy Assessment programs, etc to participate in energy efficiency options. Our dedicated account management staff provides guidance to public schools regarding what program opportunities are available and may benefit the school's unique needs. Additionally, the Company has a School Kits program to help public schools engage students in energy efficiency in their homes, while providing content to teachers within their lessons.

Greenhouse Gas Emissions (Minn. Stat. §216B.241, subd. 2(k))
Public utilities filing an ECO plan including efficient-fuel switching must, as part of the filing, demonstrate that the eligibility requirements for EFS have been met through a comparison of greenhouse gas emissions between fuels, using a full fuel-cycled energy analysis. The Company's analysis demonstrating the eligibility of its proposed EFS measures is provided in Appendix 3: Efficient Fuel Switching Screening.

Efficient Lighting Program (Minn. Stat. §216B.241, subd. 5)
Electric utilities are required to invest in projects that encourage the use of energy efficient lighting and reclamation or recycling of spent fluorescent and high intensity discharge lamps. The Company meets this requirement through its business and residential lighting and lamp recycling programs.

Low-Income Spending Requirement (Minn. Stat. §216B.241, subd. 7(a))
Beginning in 2024, natural gas utilities must spend at least one percent, and electric utilities must spend at least 0.6 percent, of their gross operating revenues from residential customers on energy conservation and efficient fuel-switching programs for low-income households. The following table provides the calculation of Xcel Energy's minimum low-income spending requirement.

Table 15: Calculation of Minimum Low-Income Spending Requirement

	Electric	**Natural Gas**
2020 GOR from residential customers	$ 1,245,982,744	$254,094,509
2021 GOR from residential customers	$ 1,288,477,621	$319,552,401
2022 GOR from residential customers	$ 1,398,685,635	$515,210,371
Average Residential Gross Operating Revenues (GOR)	$ 1,311,048,667	$362,952,427
Minimum Spending Requirement		
1% Natural Gas		$ 3,629,524
0.6% Electric	$ 7,866,292	

Table 16 illustrates how the Company's proposed low-income spending compares to the minimum requirements. Table 16 includes both spending through dedicated programs in the Income Qualified segment as well as spending in other segments that include "hybrid" programs – programs for which there is no income-related eligibility requirement to participate, but which offer additional benefits (such as higher rebate amounts) for customers who do meet income eligibility criteria.

Table 16: 2024-2026 Triennial Proposal - Proposed Low-Income Spending per Segment

		Proposed Electric	% of GOR	Proposed Natural Gas	% of GOR
Income-Qualified Segment	**2024**	**$ 9,189,401**	**0.70%**	**$ 4,069,972**	**1.12%**
	2025	**$ 10,996,722**	**0.84%**	**$ 4,920,293**	**1.36%**
	2026	**$ 12,349,670**	**0.94%**	**$ 6,125,554**	**1.69%**
Residential Segment[22] (Hybrid Programs)	2024	$ 171,000	0.01%	$ 39,852	0.01%
	2025	$ 171,000	0.01%	$ 39,852	0.01%
	2026	$ 171,000	0.01%	$ 39,852	0.01%
Business Segment[23] (Hybrid Programs)	2024	$ 818,200	0.06%	$ 642,000	0.18%
	2025	$ 1,166,497	0.09%	$ 686,467	0.19%
	2026	$ 1,419,918	0.11%	$ 749,068	0.21%
Market Research (Hybrid Program)	2024	$ 150,000	0.01%	$ 75,000	0.02%
	2025	$ 150,000	0.01%	$ 75,000	0.02%
	2026	$ 150,000	0.01%	$ 75,000	0.02%
Total	2024	$ 10,328,601	0.79%	$ 4,826,824	1.33%
	2025	$ 12,484,219	0.95%	$ 5,721,612	1.58%
	2026	$ 14,090,588	1.07%	$ 6,989,474	1.93%

<u>Preweatherization Measures (Minn. Stat. §216B.241, subd. 7(f))</u>

Statute allows utilities to spend up 15 percent of their total low-income spending on pre-weatherization measures. The Company provides preweatherization measures as part of our income-qualified segment as discussed in the detailed program write-ups. Actual spending for preweatherization measures will be reported as part of our annual Status Report. Statute also permits utilities to contribute to the state's Healthy AIR (Asbestos Insulation Removal) account (§216B.241, subd. 7(h)); funds contributed count toward both the minimum low-income spending and the 15 percent cap on preweatherization spending. If the Company contributes to the Healthy AIR account during a given program year, the Company will report the amount in its annual Status Report.

<u>Assessments (Minn. Stat. §216B.241, subd. 8)</u>

Please see the Assessment Segment detailed segment write-up for further details regarding assessments made under this subdivision.

<u>Building Performance Standards (Minn. Stat. §216B.241, subd. 9(e))</u>

Utilities are required to develop and implement programs that are expressly designed to achieve energy efficiency goals consistent with the Sustainable Building 2030 performance standards. These

[22] Residential Hybrid Programs include School Education Kits. Further details regarding how low-income customers are identified can be found in the program write-ups.

[23] Commercial Hybrid Programs include the Non-Profit Energy Savings Program, Partners in Energy, and Building New Construction. Further details regarding how low-income customers are identified can be found in the program write-ups.

programs must include offerings of design assistance and modeling, financial incentives, and the verification of the proper installation of energy-efficient design components in new and substantially reconstructed buildings. A utility's design assistance program must consider the strategic planting of trees and shrubs around buildings as an energy conservation strategy for the designed project. The Company's plan supports achievement of the Sustainable Building 2030 performance standards through its Business New Construction program, which includes design assistance and modeling, performance-based incentives, and installation verification. Therefore, the Company's plan is compliant with this statutory requirement.

Programs for Efficient Fuel Switching; Electric and Natural Gas Utilities (Minn. Stat. §216B.241, subd. 11 & 12)

Programs and policies related to EFS are discussed in more detail within the detailed segment write-up for Efficient Fuel Switching. Compliance with the eligibility requirements related to EFS are detailed in Appendix 3: Efficient Fuel Switching.

Cost-effective Load Management Programs (Minn. Stat. §216B.241, subd. 13)

A public utility may propose load management programs that meet the criteria of statute and claim associated energy savings if these programs' primary purpose is energy efficiency. The Company proposes several load management (or demand response) programs in our plan and provides further details in our detailed program write-ups. Because the proposed programs result in a decrease in annual energy consumption, the Company believes it is reasonable to claim energy efficiency savings for them, consistent with prior practice. At this time, the Company is not proposing any programs intended to support load shifting (or other load management activity) with no reduction in annual energy consumption, though it may support individual customer projects through the custom rebate process and may propose such programs in future modifications.

Minnesota Efficient Technology Accelerator (Minn. Stat. §216B.241, subd. 14 (h))

Public utilities with more than 30,000 customers are required to contribute to the funding of the Minnesota Efficient Technology Accelerator (ETA) once that program is approved. The Deputy Commissioner approved a proposal from Center for Energy and Environment (CEE)[24]; the Company has included the contributions to ETA as provided by CEE in their December 21, 2023 Compliance Filing in Docket No. E002/CIP-23-92.

Distributed Energy Resources. (Minn. Stat. §216B.2411, subd. 1)

Public utilities may use five percent of the total amount to be spent on energy conservation improvements under section 216.241 for distributed energy projects. The Company is not proposing to do so within this Plan.

[24] Docket Number E,G999/CIP-21-548.

Other Compliance

<u>Combined Natural Gas and Electric DSM Plans</u>
Minn. R. 7690.0500, subp. 1, governs the submission of investor-owned electric and natural gas utilities' Conservation Improvement Programs. The Company requested a variance to Minn. R. 7690.0500 to allow for a combined natural gas and electric Plan. This variance was originally granted in the Commission's Decision in Docket Nos. E002/CIP-99-1057.03 and G002/98-723.02 dated December 21, 2001. On March 2, 2009, in Docket No. E, G002/CIP-09-198 we filed a variance request to submit a combined electric and natural gas plan on June 1, 2009 as well as with each subsequent annual status report. On May 13, 2009, the Director approved our request for all future Triennial Plans and Status Reports.

<u>Information Required by Minnesota Rules 7690.0500</u>
Minn. R. 7690.0500, subp. 2, governs the contents of each Triennial Plan. Each content component is addressed below.

A. **A comprehensive description of the proposed program, including a description of each project making up the program**;

Please see the description in each program and segment write-up.

B. **For each individual project, a completed project information sheet will be provided by the department. The project information sheet can be used to provide the information required in items E and F;**

The 2024, 2025 and 2026 program information sheets are included as a separate document filed alongside our Plan as Attachment B.

C. **For each project making up the program, a description of the expected effect of each project on peak demand and energy consumption with supporting assumptions, including a list of each conservation technology or process to be promoted and the energy – and demand – savings assumptions associated with each identified technology;**

Please see enclosed technical assumptions for each project as noted in the Technical Assumptions Section.

D. **For each electric utility that must submit an integrated resource plan to the Public Utilities Commission, an explanation of how its overall conservation improvement program enables the utility to meet the long-term demand-side management goals established in its most recent integrated resource plan;**

The proposed electric savings targets, while lower than the total commitment, still align with the Company's DSM commitments in our most recent Midwest Integrated Resource Plan (Docket No. E002/RP-19-368). Our ECO Triennial Plan includes the savings we can justifiably claim based on technical requirements approved by the Deputy Commissioner of Commerce. There are a portion of customer savings that are no longer or never claimed under the ECO umbrella – these include lighting technologies and cooling equipment that are efficient, but no longer over Minnesota State Energy code—or many energy-efficient appliances that are not rebated by the Company. We believe that our ECO Plan achievements plus "naturally occurring" savings will continue to meet our regulatory commitments and help us continue to lower our carbon footprint towards Minnesota's audacious targets. This is consistent with the discussion of program-driven and naturally occurring energy conservation found in Appendix G1 of the Company's Integrated Resource Plan (pp. 34-35).

E. An estimate of the expected cost-effectiveness of each project to the utility, to the project's participants, to the utility's ratepayers, and to society;

Cost-effectiveness for each individual segment and program and the overall ECO portfolio is summarized in Tables 30a – 32c.

F. For each project targeted at residential consumers, an estimate of the anticipated percentage of use of each project among a. Low-income participants; and b. Renters;

Anticipated low-income and renter participation estimates for each program, segment and overall ECO portfolio are provided below. Some of these programs are noted as NA, in these instances there may not be an ability to track income or renter details as part of the program. The Company will include further details regarding these programs within our annual Status Reports.

Table 17: Low Income Participation by Project (Electric), 2024-2026

Program	2024			2025			2026		
	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation
Business Segment									
Business New Construction	320		0.0%	258	3	1.2%	262	9	3.4%
Multi-Family Building Efficiency	7,920	-	0.0%	8,986		0.0%	1,098		0.0%
Non-Profit Energy Savings	210,924	190,000	90.1%	221,642	190,000	85.7%	232,898	190,000	81.6%
Subtotal	**219,164**	**190,000**	**86.7%**	**230,886**	**190,003**	**82.3%**	**234,258**	**190,009**	**81.1%**
Residential Segment Total									
Consumer Education	481,500		NA	481,500		NA	481,500		NA
Efficient New Home Con.	2,925	20	0.7%	3,211	22	0.7%	3,542	25	0.7%
Energy Efficient Showerheads	4,860	141	2.9%	4,950	144	2.9%	5,150	149	2.9%
Home Energy Audit	13,843	111	0.8%	15,607	125	0.8%	17,639	141	0.8%
Home Energy Insights	1,119,270		NA	1,073,690		NA	1,031,550		NA
Home Energy Squad	11,322	-	0.0%	12,455	-	0.0%	13,700	-	0.0%
Home Lighting	337,450		NA	281,406		NA	309,362		NA
Insulation Rebate Program	2,355	39	1.7%	2,588	43	1.7%	2,846	47	1.7%
Lamp Recycling	471,787		NA	452,816		NA	433,845		NA
Refrigerator & Freezer Recycling	7,000	116	1.7%	7,100	117	1.7%	7,200	119	1.7%
Residential Heating and Cooling	41,852	42	0.1%	42,532	43	0.1%	43,882	44	0.1%
School Education Kits	42,000	3,650	8.7%	42,920	3,742	8.7%	43,867	3,836	8.7%
Whole Home Efficiency	215	1	0.5%	282	1	0.5%	361	2	0.5%
Subtotal	**2,536,379**	**4,119**	**0%**	**2,421,057**	**4,237**	**0.2%**	**2,394,444**	**4,363**	**0.18%**
Income Qualified Segment									
Affordable Efficient New Home	25	25	100.0%	25	25	100.0%	25	25	100.0%
Home Energy Savings Program	4,864	4,864	100.0%	5,497	5,497	100.0%	6,150	6,150	100.0%
LI Home Energy Squad	2,521	2,521	100.0%	3,152	3,152	100.0%	3,939	3,939	100.0%
LI Multi-Family Building Eff.	3,691	3,691	100.0%	4,290	4,290	100.0%	4,883	4,883	100.0%
Workforce Development & Ed.	87	87	100.0%	104	104	100.0%	114	114	100.0%
Subtotal	**11,188**	**11,188**	**100.0%**	**13,067**	**13,067**	**100.0%**	**15,111**	**15,111**	**100.0%**
Demand Response Segment									
Residential Demand Response	824,430	10,718	1.3%	831,045	10,804	1.3%	836,160	10,870	1.3%
Subtotal	**824,430**	**10,718**	**1.3%**	**831,045**	**10,804**	**0.0%**	**836,160**	**10,870**	**1.3%**
TOTAL	**3,591,161**	**216,025**	**6.0%**	**3,496,595**	**218,651**	**6.3%**	**3,479,973**	**220,353**	**6.3%**

Table 18: Low Income Participation by Project (Natural Gas), 2024-2026

Program	2024			2025			2026		
	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation
Business Segment									
Business New Construction	32	-	0.0%	37	1	2.7%	42	7	16.7%
Multi-Family Building Efficiency	1,293	-	0.0%	1,428		0.0%	1,575		0.0%
Non-Profit Energy Savings Program	110,143	109,702	99.6%	116,233	115,652	99.5%	122,666	121,930	99.4%
Subtotal	**111,468**	**109,702**	**98.4%**	**117,698**	**115,653**	**98.3%**	**124,283**	**121,937**	**98.1%**
Residential Segment									
Consumer Education	321,000		NA	321,000		NA	321,000		NA
Efficient New Home Construction	1,630	33	2.0%	1,784	36	2.0%	1,962	39.24	2.0%
Energy Efficient Showerheads	6,840	458	6.7%	7,250	486	6.7%	7,425	497.475	6.7%
Home Energy Audit	5,105	327	6.4%	5,757	368	6.4%	6,511	416.704	6.4%
Home Energy Insights	277,060		NA	243,620		NA	212,540		NA
Home Energy Squad	4,160	-	0.0%	4,576	-	0.0%	5,034	-	0.0%
Home Lighting									
Insulation Rebate Program	2,313	60	2.6%	2,541	66	2.6%	2,796	72.696	2.6%
Lamp Recycling									
Refrigerator & Freezer Recycling									
Residential Heating and Cooling	25,958	441	1.7%	26,218	446	1.7%	26,738	454.546	1.7%
School Education Kits	21,500	2,197	10.2%	21,970	2,197	10.0%	22,453	2,245	10.0%
Whole Home Efficiency	202	1	0.5%	242	1	0.5%	288	1.44	0.5%
Subtotal	**665,768**	**3,517**	**1%**	**634,958**	**3,600**	**0.6%**	**606,747**	**3,727**	**1%**
Income Qualified Segment									
Affordable Efficient New Home Con	11	11	100.0%	11	11	100.0%	11	11	100.0%
Home Energy Savings Program	754	754	100.0%	874	874	100.0%	1,093	1092.72	100.0%
LI Home Energy Squad	945	945	100.0%	1,181	1,181	100.0%	1,477	1476.5625	100.0%
LI Multi-Family Building Eff.	1,126	1,126	100.0%	1,255	1,255	100.0%	1,384	1,384	100.0%
Workforce Development & Ed.	13	13	100.0%	16	16	100.0%	17	17.1666	100.0%
Subtotal	**2,849**	**2,849**	**100.0%**	**3,337**	**3,337**	**100.0%**	**3,982**	**3,982**	**100.0%**
Demand Response Segment									
Residential Demand Response									
Subtotal									
Efficient Fuel Switching									
Outdoor Equipment									
Subtotal									
TOTAL	**780,085**	**116,068**	**15%**	**755,993**	**122,590**	**16%**	**735,012**	**129,645**	**18%**

Table 19: Renter Participation by Project (Electric), 2024-2026

Program	2024			2025			2026		
	Participation Target	Renter Participation	Percent of Participation	Participation Target	Renter Participation	Percent of Participation	Participation Target	Renter Participation	Percent of Participation
Business Segment									
Business New Construction	320		NA	258		NA	262		NA
Multi-Family Building Efficiency	7,920	7,761	98.0%	8,986	8,806	98.0%	1,098	1,076	98.0%
Non-Profit Energy Savings Program	210,924		NA	221,642		NA	232,898		NA
Subtotal	**219,164**	**7,761**	**3.5%**	**230,886**	**8,806**	**3.8%**	**234,258**	**1,076**	**0.5%**
Residential Segment									
Consumer Education	481,500		NA	481,500		NA	481,500		NA
Efficient New Home Construction	2,925	44	1.5%	3,211	48	1.5%	3,542	53	1.5%
Energy Efficient Showerheads	4,860	1,115	23.0%	4,950	1,136	23.0%	5,150	1,182	23.0%
Home Energy Audit	13,843	803	5.8%	15,607	905	5.8%	17,639	1,023	5.8%
Home Energy Insights	1,119,270		NA	1,073,690		NA	1,031,550		NA
Home Energy Squad	11,322	345	3.1%	12,455	380	3.1%	13,700	418	3.1%
Home Lighting	337,450		NA	281,406		NA	309,362		NA
Insulation Rebate Program	2,355	37	1.6%	2,588	40	1.6%	2,846	44	1.6%
Lamp Recycling	471,787		NA	452,816		NA	433,845		NA
Refrigerator & Freezer Recycling	7,000	200	2.9%	7,100	202	2.9%	7,200	205	2.9%
Residential Heating and Cooling	41,852	837	2.0%	42,532	851	2.0%	43,882	878	2.0%
School Education Kits	42,000		NA	42,920		NA	43,867		NA
Whole Home Efficiency	215	1	0.5%	282	1	0.5%	361	2	0.5%
Subtotal	**2,536,379**	**3,382**	**0.1%**	**2,421,057**	**3,564**	**0.1%**	**2,394,444**	**3,805**	**0%**
Income Qualified Segment									
Affordable Efficient New Home Con	25	-	0.0%	25	0	43.8%	25	0	0.0%
Home Energy Savings Program	4,864	717	14.7%	5,497	814	14.8%	6,150	910	14.8%
LI Home Energy Squad	2,521	369	14.7%	3,152	~~3,152~~ 463	14.7%	3,939	~~3,939~~ 579	14.7%
LI Multi-Family Building Efficiency	3,691	3,691	100.0%	4,290	4,290	100.0%	4,883	4,883	100.0%
Workforce Development & Ed.	87		NA	104		NA	114		NA
Subtotal	**11,188**	**4,777**	**42.7%**	**12,964**	**5,567**	**42.9%**	**15,111**	**6,372**	**42.2%**
Demand Response Segment									
Residential Demand Response	824,430	21,023	2.6%	831,045	21,192	2.6%	836,160	21,322	2.6%
Subtotal	**824,430**	**21,023**	**2.6%**	**831,045**	**10,804**	**0.0%**	**836,160**	**21,322**	**2.6%**
Efficient Fuel Switching									
Outdoor Equipment									
Subtotal									
TOTAL	**3,579,973**	**36,943**	**1%**	**3,495,952**	**28,741**	**0.8%**	**3,479,973**	**32,575**	**0.9%**

Table 20: Renter Participation by Project (Electric), 2024-2026

Program	2024			2025			2026		
	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation	Participation Target	LI Participation	Percent of Participation
Business Segment									
Business New Construction	32		NA	37		NA	42		NA
Multi-Family Building Efficiency	1,293	1,239	96.0%	1,428	1,367	96.0%	1,575	1,506	96.0%
Non-Profit Energy Savings Program	110,143		NA	116,233		NA	122,666		NA
Subtotal	**111,468**	**1,239**	**1.1%**	**117,698**	**1,367**	**1.2%**	**124,283**	**1,506**	**1.2%**
Residential Segment									
Consumer Education	321,000		NA	321,000		NA	321,000		NA
Efficient New Home Construction	1,630	24	1.5%	1,784	26	1.5%	1,962	28.449	1.5%
Energy Efficient Showerheads	6,840	219	3.2%	7,250	232	3.2%	7,425	237.6	3.2%
Home Energy Audit	5,105	373	7.3%	5,757	420	7.3%	6,511	475.303	7.3%
Home Energy Insights	277,060		NA	243,620		NA	212,540		NA
Home Energy Squad	4,160	-	4.0%	4,576	-	4.0%	5,034	199	4.0%
Home Lighting									
Insulation Rebate Program	2,313	29	1.3%	2,541	32	1.3%	2,796	34.95	1.3%
Lamp Recycling									
Refrigerator & Freezer Recycling									
Residential Heating and Cooling	25,958	467	1.8%	26,218	472	1.8%	26,738	481.284	1.8%
School Education Kits	21,500		NA	21,970		NA	22,453		NA
Whole Home Efficiency	202	1	0.5%	242	1	0.5%	288	1.44	0.5%
Subtotal	**665,768**	**1,112**	**0.2%**	**634,958**	**1,183**	**0.2%**	**606,747**	**1,458**	**0%**
Income Qualified Segment									
Affordable Efficient New Home Con	11	-	0.0%	11	11	0.0%	11	11	0.0%
Home Energy Savings Program	754	393	52.1%	874	455	52.1%	1,093	991	52.1%
LI Home Energy Squad	945	181	19.2%	1,181	227	19.2%	1,477	284	19.2%
LI Multi-Family Building Efficiency	1,126	1,126	100.0%	1,255	1,255	100.0%	1,384	1,384	100.0%
Workforce Development & Ed.	13		NA	16		NA	17		NA
Subtotal	**2,849**	1,700	59.6%	**3,337**	1,948	58.3%	**3,982**	2,670	67%
Demand Response Segment									
Residential Demand Response									
Subtotal									
Efficient Fuel Switching									
Outdoor Equipment									
Subtotal									
TOTAL PROGRAM	**780,085**	**44,051**	**1%**	**755,993**	**4,498**	**1%**	**735,012**	**5,634**	**1%**

G. A detailed budget for each project for the next three years;

A detailed budget for each program, segment and overall CIP portfolio are provided in Tables 21-29.

Table 21: Detailed Budget (Electric, 2024)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$0	$197,500	$765,500	$0	$0	$0	$963,000
Efficient New Home Construction	$0	$603,178	$120,000	$0	$0	$951,027	$1,674,205
Energy Efficient Showerheads	$0	$90,142	$35,000	$0	$0	$21,286	$146,428
Home Energy Audit	$0	$2,226,758	$67,900	$0	$0	$0	$2,294,658
Home Energy Insights	$0	$1,292,724	$20,000	$0	$0	$0	$1,312,724
Home Energy Squad	$781,293	$750,769	$954,500	$0	$0	$828,126	$3,314,688
Home Lighting	$0	$754,250	$640,000	$0	$0	$5,117,969	$6,512,219
Insulation Rebates	$0	$40,935	$5,000	$2,000	$0	$259,101	$307,036
Lamp Recycling	$0	$326,986	$0	$0	$0	$0	$326,986
Refrigerator & Freezer Recycling	$0	$1,035,915	$150,000	$0	$0	$350,000	$1,535,915
Residential Heating & Cooling	$0	$531,744	$70,723	$28,977	$33,536	$9,466,651	$10,131,631
School Education Kits	$0	$824,832	$5,000	$0	$0	$874,927	$1,704,759
Whole Home Efficiency	$0	$9,123	$0	$0	$0	$73,101	$82,224
Residential Segment Total	**$781,293**	**$8,684,856**	**$2,833,623**	**$30,977**	**$33,536**	**$17,942,188**	**$30,306,472**
Business Education	$0	$84,000	$158,300	$0	$0	$0	$242,300
Business Energy Assessments	$3,580	$1,591,937	$29,832	$975	$446,903	$2,299,669	$4,372,896
Business New Construction	$0	$2,644,403	$18,677	$323,730	$622,558	$8,147,785	$11,757,153
Compressed Air Efficiency	$0	$242,258	$0	$0	$0	$736,925	$979,183
Custom Efficiency	$0	$611,097	$0	$24,499	$9,800	$516,795	$1,162,191
Data Center Efficiency	$3,333	$189,385	$89,331	$13,333	$26,666	$914,728	$1,236,777
Efficiency Controls	$0	$190,625	$0	$0	$0	$438,494	$629,119
Empower Facilities	$0	$978,728	$32,220	$0	($46,286)	$0	$964,662
Empower Intelligence	$0	$894,820	$5,900	$0	($361,203)	$0	$539,517
Foodservice Equipment	$0	$25,858	$12,150	$2,500	$2,600	$18,749	$61,857
HVAC+R	$0	$1,125,618	$144,000	$45,000	$252,871	$2,554,348	$4,121,836
Lighting Efficiency	$0	$2,325,084	$325,000	$75,000	$25,000	$9,201,741	$11,951,825
Load Strategy Analysis	$0	$337,773	$0	$0	$0	$407,490	$745,263
Multi-Family Building Efficiency	$0	$1,012,090	$10,800	$0	$492,591	$763,838	$2,279,319
Non-Profit Energy Savings Program	$0	$434,106	$134,000	$0	$0	$1,143,574	$1,711,680
Process & Commercial Efficiency	$99,686	$3,161,699	$59,812	$39,874	$79,749	$8,214,620	$11,655,440
Self-Direct	$0	$42,071	$0	$0	$0	$137,301	$179,372
Business Segment Total	**$106,599**	**$15,891,551**	**$1,020,021**	**$524,912**	**$1,551,250**	**$35,496,057**	**$54,590,390**
Affordable Efficient New Home Cons	$0	$12,048	$0	$0	$0	$402,730	$414,778
Home Energy Savings Program	$0	$600,835	$450,000	$42,000	$0	$1,807,656	$2,900,491
Low Income Home Energy Squad	$0	$262,861	$700,000	$0	$0	$174,853	$1,137,714
Low Income Multi-Family Building Efficiency	$0	$254,567	$82,400	$0	$135,877	$1,825,206	$2,298,051
Workforce Development & Education	$0	$1,841,668	$1,700	$0	$595,000	$0	$2,438,368
Income Qualified Segment Total	**$0**	**$2,971,980**	**$1,234,100**	**$42,000**	**$730,877**	**$4,210,444**	**$9,189,401**
Commercial AC Control	$0	$2,555,022	$200,000	$200,000	$0	$332,527	$3,287,549
Critical Peak Pricing	$5,000	$176,200	$10,000	$25,000	$0	$0	$216,200
Electric Rate Savings	$0	$763,696	$840	$0	$0	$0	$764,536
Peak Partner Rewards	$32,000	$507,236	$25,000	$10,000	$0	$780,880	$1,355,116
Residential Demand Response	$0	$9,501,273	$744,488	$125,000	$25,000	$2,126,475	$12,522,236
Demand Response Segment Total	**$37,000**	**$13,503,427**	**$980,328**	**$360,000**	**$25,000**	**$3,239,882**	**$18,145,637**
Efficient Fuel Switching Training	$0	$0	$0	$0	$0	$0	$0
Outdoor Equipment	$0	$0	$0	$0	$0	$0	$0
Efficient Fuel Switching Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Advertising & Promotion	$0	$1,599,403	$5,497,639	$0	$0	$0	$7,097,042
Application Development & Maintenance	$0	$3,485,264	$0	$0	$0	$0	$3,485,264
CIP Training	$0	$359,484	$0	$0	$0	$0	$359,484
Community Energy Reporting	$0	$40,858	$0	$0	$0	$0	$40,858
Electric Utility Infrastructure	$0	$0	$0	$0	$0	$0	$0
Energy Benchmarking	$0	$126,771	$0	$0	$0	$0	$126,771
Partners in Energy	$0	$1,321,371	$11,500	$0	$0	$0	$1,332,871
Planning & Regulatory Affairs	$0	$900,000	$0	$0	$0	$0	$900,000
Indirect Products & Services Total	**$0**	**$7,833,151**	**$5,509,139**	**$0**	**$0**	**$0**	**$13,342,290**
Market Research	$0	$650,974	$0	$1,495,313	$0	$0	$2,146,287
Product Development	$0	$5,057,917	$0	$150,000	$25,000	$0	$5,232,917
Research, Evaluations & Pilots Total	**$0**	**$5,708,891**	**$0**	**$1,645,313**	**$25,000**	**$0**	**$7,379,204**
Portfolio Total	**$924,892**	**$54,593,856**	**$11,577,211**	**$2,603,201**	**$2,365,663**	**$60,888,572**	**$132,953,394**
Minnesota Assessments	$0	$1,932,291	$0	$0	$0	$0	$1,932,291
MN Efficient Technology Accelerator	$0	$3,041,550	$0	$0	$0	$0	$3,041,550
Assessments Segment Total	**$0**	**$4,973,841**	**$0**	**$0**	**$0**	**$0**	**$4,973,841**
EnerChange	$0	$551,304	$0	$0	$0	$0	$551,304
EnergySmart	$0	$635,250	$0	$0	$0	$0	$635,250
One Stop Shop	$0	$5,670,813	$0	$0	$0	$7,507,811	$13,178,624
Trillion BTU	$0	$171,727	$0	$0	$0	$0	$171,727
Alternative Filings Total	**$0**	**$7,029,094**	**$0**	**$0**	**$0**	**$7,507,811**	**$14,536,905**
2024 Electric Portfolio Total	**$924,892**	**$66,596,791**	**$11,577,211**	**$2,603,201**	**$2,365,663**	**$68,396,383**	**$152,464,140**

Table 22: Detailed Budget (Natural Gas, 2024)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ 95,000	$ 547,000	$ -	$ -	$ -	$ 642,000
Efficient New Home Construction	$ -	$ 699,959	$ 280,000	$ -	$ -	$ 1,319,145	$ 2,299,104
Energy Efficient Showerheads	$ -	$ 135,527	$ 60,000	$ -	$ -	$ 49,115	$ 244,642
Home Energy Audit	$ -	$ 1,463,414	$ 55,300	$ -	$ -	$ -	$ 1,518,714
Home Energy Insights	$ -	$ 318,553	$ 10,000	$ -	$ -	$ -	$ 328,553
Home Energy Squad	$ 332,643	$ 249,146	$ 282,628	$ -	$ -	$ 156,296	$ 1,020,713
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ 41,350	$ 5,000	$ 2,000	$ -	$ 1,170,672	$ 1,219,022
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 393,234	$ 68,317	$ 11,090	$ 36,538	$ 4,883,886	$ 5,393,065
School Education Kits	$ -	$ 310,986	$ 2,500	$ -	$ -	$ 85,034	$ 398,520
Whole Home Efficiency	$ -	$ 34,812	$ -	$ -	$ -	$ 136,801	$ 171,612
Residential Segment Total	**$ 332,643**	**$ 3,741,980**	**$ 1,310,746**	**$ 13,090**	**$ 36,538**	**$ 7,800,948**	**$ 13,235,945**
Business Education	$ -	$ 11,800	$ 18,950	$ -	$ -	$ -	$ 30,750
Business Energy Assessments	$ -	$ 176,894	$ 17,190	$ 421	$ 31,487	$ 192,937	$ 418,929
Business New Construction	$ -	$ 232,517	$ 1,583	$ 21,111	$ 27,444	$ 275,242	$ 557,897
Compressed Air Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Custom Efficiency	$ -	$ 73,228	$ -	$ 3,000	$ 6,000	$ 120,008	$ 202,236
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ 9,960	$ -	$ -	$ -	$ 54,784	$ 64,744
Empower Facilities	$ -	$ 108,748	$ 3,580	$ -	$ (5,143)	$ -	$ 107,185
Empower Intelligence	$ -	$ 89,477	$ 590	$ -	$ (36,120)	$ -	$ 53,947
Foodservice Equipment	$ -	$ 42,472	$ 12,150	$ 8,000	$ 2,600	$ 29,527	$ 94,749
HVAC+R	$ -	$ 361,569	$ 74,623	$ 15,124	$ 71,638	$ 1,115,796	$ 1,638,749
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ 10,061	$ -	$ -	$ -	$ 20,856	$ 30,917
Multi-Family Building Efficiency	$ -	$ 602,935	$ 8,000	$ -	$ 176,231	$ 72,675	$ 859,841
Non-Profit Energy Savings Program	$ -	$ 139,705	$ 65,000	$ -	$ -	$ 717,944	$ 922,649
Process & Commercial Efficiency	$ 19,955	$ 573,864	$ 9,479	$ 15,964	$ 9,978	$ 786,181	$ 1,415,421
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 19,955**	**$ 2,433,230**	**$ 211,145**	**$ 63,620**	**$ 284,114**	**$ 3,385,950**	**$ 6,398,014**
Affordable Efficient New Home Construction	$ -	$ 11,344	$ -	$ -	$ -	$ 186,869	$ 198,213
Home Energy Savings Program	$ -	$ 473,503	$ 94,560	$ 9,954	$ -	$ 2,331,972	$ 2,909,990
Low Income Home Energy Squad	$ -	$ 89,930	$ 235,000	$ -	$ -	$ 39,053	$ 363,983
Low Income Multi-Family Building Efficiency	$ -	$ 58,281	$ 21,482	$ -	$ 13,079	$ 69,937	$ 162,778
Workforce Development & Education	$ -	$ 329,708	$ 300	$ -	$ 105,000	$ -	$ 435,008
Income Qualified Segment Total	**$ -**	**$ 962,765**	**$ 351,342**	**$ 9,954**	**$ 118,079**	**$ 2,627,832**	**$ 4,069,972**
Commercial AC Control	$ -	$ 23,000	$ -	$ 5,000	$ -	$ 4,765	$ 32,765
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ 23,000**	**$ -**	**$ 5,000**	**$ -**	**$ 4,765**	**$ 32,765**
Efficient Fuel Switching Training & Support	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outdoor Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient Fuel Switching Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Advertising & Promotion	$ -	$ 366,002	$ 1,244,481	$ -	$ -	$ -	$ 1,610,483
Application Development & Maintenance	$ -	$ 712,737	$ -	$ -	$ -	$ -	$ 712,737
CIP Training	$ -	$ 146,397	$ -	$ -	$ -	$ -	$ 146,397
Community Energy Reporting	$ -	$ 13,625	$ -	$ -	$ -	$ -	$ 13,625
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ 31,427	$ -	$ -	$ -	$ -	$ 31,427
Partners in Energy	$ -	$ 338,004	$ 2,500	$ -	$ -	$ -	$ 340,504
Planning & Regulatory Affairs	$ -	$ 350,000	$ -	$ -	$ -	$ -	$ 350,000
Indirect Products & Services Total	$ -	$ 1,958,192	$ 1,246,981	$ -	$ -	$ -	**$ 3,205,173**
Market Research	$ -	$ 216,173	$ -	$ 309,406	$ -	$ -	$ 525,579
Product Development	$ -	$ 163,051	$ -	$ 25,000	$ 10,000	$ -	$ 198,051
Research, Evaluations & Pilots Total	**$ -**	**$ 379,224**	**$ -**	**$ 334,406**	**$ 10,000**	**$ -**	**$ 723,630**
Portfolio Total	**$ 352,598**	**$ 9,498,392**	**$ 3,120,214**	**$ 426,070**	**$ 448,730**	**$ 13,819,495**	**$ 27,665,499**
Minnesota Assessments	$ -	$ 294,738	$ -	$ -	$ -	$ -	$ 294,738
Minnesota Efficient Technology Accelerator	$ -	$ 602,088	$ -	$ -	$ -	$ -	$ 602,088
Assessments Segment Total	$ -	$ 896,826	$ -	$ -	$ -	$ -	$ 896,826
EnerChange	$ -	$ 61,256	$ -	$ -	$ -	$ -	$ 61,256
EnergySmart	$ -	$ 46,725	$ -	$ -	$ -	$ -	$ 46,725
One Stop Shop	$ -	$ 36,577	$ -	$ -	$ -	$ 62,522	$ 99,099
Trillion BTU	$ -	$ 21,877	$ -	$ -	$ -	$ -	$ 21,877
Alternative Filings Total	**$ -**	**$ 166,435**	**$ -**	**$ -**	**$ -**	**$ 62,522**	**$ 228,957**
2024 Gas Portfolio Total	**$ 352,598**	**$ 10,561,653**	**$ 3,120,214**	**$ 426,070**	**$ 448,730**	**$ 13,882,017**	**$ 28,791,282**

Table 23: Detailed Budget (EFS, Combined Fuels, 2024)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Efficient Showerheads	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Audit	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Insights	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 59,583	$ 9,960	$ 1,933	$ 5,250	$ 768,233	$ 844,958
School Education Kits	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Whole Home Efficiency	$ -	$ 2,867	$ -	$ -	$ -	$ 11,300	$ 14,167
Residential Segment Total	**$ -**	**$ 62,450**	**$ 9,960**	**$ 1,933**	**$ 5,250**	**$ 779,533**	**$ 859,126**
Business Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Energy Assessments	$ 20	$ 37,879	$ 2,978	$ 74	$ 7,663	$ 42,431	$ 91,046
Business New Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Compressed Air Efficiency	$ -	$ 1,315	$ -	$ -	$ -	$ 4,000	$ 5,315
Custom Efficiency	$ -	$ 12,489	$ -	$ 501	$ 200	$ 11,407	$ 24,597
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Facilities	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Intelligence	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Foodservice Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
HVAC+R	$ -	$ 1,826	$ 377	$ 76	$ 362	$ 5,633	$ 8,275
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Multi-Family Building Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Profit Energy Savings Program	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Process & Commercial Efficiency	$ 359	$ 11,253	$ 210	$ 162	$ 274	$ 27,765	$ 40,023
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 379**	**$ 64,763**	**$ 3,565**	**$ 813**	**$ 8,499**	**$ 91,237**	**$ 169,256**
Affordable Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Savings Program	$ -	$ 2,202	$ 440	$ 46	$ -	$ 10,786	$ 13,475
Low Income Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Low Income Multi-Family Building Efficiency	$ -	$ 74,655	$ 27,518	$ -	$ 16,753	$ 15,664	$ 134,589
Workforce Development & Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Income Qualified Segment Total	**$ -**	**$ 76,857**	**$ 27,958**	**$ 46**	**$ 16,753**	**$ 26,450**	**$ 148,064**
Commercial AC Control	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Efficient Fuel Switching Training & Support	$ -	$ 600,000	$ 100,000	$ -	$ -	$ 1,000,000	$ 1,700,000
Outdoor Equipment	$ -	$ 50,000	$ 75,000	$ -	$ -	$ 61,250	$ 186,250
Efficient Fuel Switching Total	**$ -**	**$ 650,000**	**$ 175,000**	**$ -**	**$ -**	**$ 1,061,250**	**$ 1,886,250**
Advertising & Promotion	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Application Development & Maintenance	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CIP Training	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Community Energy Reporting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Partners in Energy	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Planning & Regulatory Affairs	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Indirect Products & Services Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Market Research	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Product Development	$ -	$ 618,842	$ -	$ 22,000	$ 12,500	$ -	$ 653,342
Research, Evaluations & Pilots Total	**$ -**	**$ 618,842**	**$ -**	**$ 22,000**	**$ 12,500**	**$ -**	**$ 653,342**
Portfolio Total	**$ 379**	**$ 1,472,912**	**$ 216,482**	**$ 24,792**	**$ 43,002**	**$ 1,958,470**	**$ 3,716,038**
Minnesota Assessments	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Minnesota Efficient Technology Accelerator	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Assessments Segment Total	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EnerChange	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EnergySmart	$ -	$ -	$ -	$ -	$ -	$ -	$ -
One Stop Shop	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Trillion BTU	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Alternative Filings Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
2024 EFS Portfolio Total	**$ 379**	**$ 1,472,912**	**$ 216,482**	**$ 24,792**	**$ 43,002**	**$ 1,958,470**	**$ 3,716,038**

Table 24: Detailed Budget (Electric, 2025)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$0	$207,375	$803,775	$0	$0	$0	$1,011,150
Efficient New Home Construction	$ -	$ 553,888	$ 120,000	$ -	$ -	$ 1,099,268	$ 1,773,156
Energy Efficient Showerheads	$ -	$ 94,095	$ 35,000	$ -	$ -	$ 23,034	$ 152,129
Home Energy Audit	$ -	$ 2,509,140	$ 71,295	$ -	$ -	$ -	$ 2,580,435
Home Energy Insights	$ -	$ 1,321,583	$ 20,000	$ -	$ -	$ -	$ 1,341,583
Home Energy Squad	$ 1,014,084	$ 835,049	$ 1,090,400	$ -	$ -	$ 756,359	$ 3,695,893
Home Lighting	$ -	$ 775,556	$ 640,000	$ -	$ -	$ 4,773,137	$ 6,188,693
Insulation Rebates	$ -	$ 41,852	$ 5,000	$ 2,000	$ -	$ 280,977	$ 329,829
Lamp Recycling	$ -	$ 314,829	$ -	$ -	$ -	$ -	$ 314,829
Refrigerator & Freezer Recycling	$ -	$ 1,061,689	$ 155,000	$ -	$ -	$ 355,000	$ 1,571,689
Residential Heating & Cooling	$ -	$ 550,275	$ 76,362	$ 31,415	$ 66,535	$ 9,824,168	$ 10,548,756
School Education Kits	$ -	$ 882,008	$ 5,000	$ -	$ -	$ 885,388	$ 1,772,397
Whole Home Efficiency	$ -	$ 9,641	$ -	$ -	$ -	$ 106,178	$ 115,819
Residential Segment Total	**$ 1,014,084**	**$ 9,156,980**	**$ 3,021,832**	**$ 33,415**	**$ 66,535**	**$ 18,103,510**	**$ 31,396,357**
Business Education	$ -	$ 88,200	$ 166,215	$ -	$ -	$ -	$ 254,415
Business Energy Assessments	$ 3,580	$ 1,650,788	$ 39,774	$ 974	$ 523,530	$ 3,033,230	$ 5,251,876
Business New Construction	$ -	$ 2,268,962	$ 15,164	$ 262,848	$ 485,258	$ 6,745,192	$ 9,777,425
Compressed Air Efficiency	$ -	$ 249,734	$ -	$ -	$ -	$ 845,033	$ 1,094,767
Custom Efficiency	$ -	$ 624,135	$ -	$ 24,407	$ 9,763	$ 551,637	$ 1,209,943
Data Center Efficiency	$ 3,225	$ 187,544	$ 86,430	$ 12,900	$ 25,800	$ 876,001	$ 1,191,899
Efficiency Controls	$ -	$ 194,230	$ -	$ -	$ -	$ 534,677	$ 728,907
Empower Facilities	$ -	$ 1,049,040	$ 32,220	$ -	$ (200,571)	$ -	$ 880,689
Empower Intelligence	$ -	$ 983,577	$ 6,490	$ -	$ (388,293)	$ -	$ 601,774
Foodservice Equipment	$ -	$ 26,749	$ 13,200	$ 2,500	$ 3,000	$ 16,929	$ 62,378
HVAC+R	$ -	$ 1,222,370	$ 158,000	$ 47,000	$ 255,000	$ 2,555,118	$ 4,237,488
Lighting Efficiency	$ -	$ 2,438,647	$ 325,000	$ 75,000	$ 25,000	$ 9,201,741	$ 12,065,388
Load Strategy Analysis	$ -	$ 366,262	$ -	$ -	$ -	$ 407,490	$ 773,752
Multi-Family Building Efficiency	$ -	$ 1,061,218	$ 12,000	$ -	$ 564,727	$ 903,355	$ 2,541,301
Non-Profit Energy Savings Program	$ -	$ 534,259	$ 138,000	$ -	$ -	$ 1,242,470	$ 1,914,729
Process & Commercial Efficiency	$ 99,648	$ 3,216,988	$ 59,789	$ 39,859	$ 79,719	$ 7,330,640	$ 10,826,644
Self-Direct	$ -	$ 44,525	$ -	$ -	$ -	$ 137,301	$ 181,826
Business Segment Total	**$ 106,453**	**$ 16,207,229**	**$ 1,052,282**	**$ 465,489**	**$ 1,382,932**	**$ 34,380,816**	**$ 53,595,201**
Affordable Efficient New Home Construction	$ -	$ 12,190	$ -	$ -	$ -	$ 402,500	$ 414,690
Home Energy Savings Program	$ -	$ 722,737	$ 320,000	$ 32,000	$ -	$ 2,218,484	$ 3,293,220
Low Income Home Energy Squad	$ -	$ 278,486	$ 700,000	$ -	$ -	$ 218,386	$ 1,196,872
Low Income Multi-Family Building Efficiency	$ -	$ 265,345	$ 86,000	$ -	$ 164,085	$ 2,304,328	$ 2,819,758
Workforce Development & Education	$ -	$ 2,590,481	$ 1,700	$ -	$ 680,000	$ -	$ 3,272,181
Income Qualified Segment Total	**$ -**	**$ 3,869,239**	**$ 1,107,700**	**$ 32,000**	**$ 844,085**	**$ 5,143,699**	**$ 10,996,722**
Commercial AC Control	$ -	$ 2,858,752	$ 200,000	$ 200,000	$ -	$ 491,756	$ 3,750,507
Critical Peak Pricing	$ 35,000	$ 236,500	$ 10,000	$ 25,000	$ -	$ -	$ 306,500
Electric Rate Savings	$ -	$ 734,947	$ 740	$ -	$ -	$ -	$ 735,687
Peak Partner Rewards	$ 52,000	$ 525,444	$ 25,000	$ 10,000	$ -	$ 853,490	$ 1,465,934
Residential Demand Response	$ -	$ 9,864,442	$ 744,488	$ 125,000	$ 25,000	$ 2,254,350	$ 13,013,280
Demand Response Segment Total	**$ 87,000**	**$ 14,220,084**	**$ 980,228**	**$ 360,000**	**$ 25,000**	**$ 3,599,596**	**$ 19,271,908**
Efficient Fuel Switching Training & Support	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outdoor Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient Fuel Switching Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Advertising & Promotion	$ -	$ 1,718,043	$ 6,099,353	$ -	$ -	$ -	$ 7,817,396
Application Development &	$ -	$ 3,853,415	$ -	$ -	$ 442,086	$ -	$ 4,295,501
CIP Training	$ -	$ 413,666	$ -	$ -	$ -	$ -	$ 413,666
Community Energy Reporting	$ -	$ 42,262	$ -	$ -	$ -	$ -	$ 42,262
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ 148,025	$ -	$ -	$ -	$ -	$ 148,025
Partners in Energy	$ -	$ 1,365,480	$ 11,600	$ -	$ -	$ -	$ 1,377,080
Planning & Regulatory Affairs	$ -	$ 931,500	$ -	$ -	$ -	$ -	$ 931,500
Indirect Products & Services Total	$ -	$ 8,472,390	$ 6,110,953	$ -	$ 442,086	$ -	$ 15,025,429
Market Research	$ -	$ 863,467	$ -	$ 1,470,078	$ -	$ -	$ 2,333,545
Product Development	$ -	$ 5,145,694	$ -	$ 150,000	$ 25,000	$ -	$ 5,320,694
Research, Evaluations & Pilots Total	**$ -**	**$ 6,009,161**	**$ -**	**$ 1,620,078**	**$ 25,000**	**$ -**	**$ 7,654,239**
Portfolio Total	**$ 1,207,537**	**$ 57,935,083**	**$ 12,272,995**	**$ 2,510,982**	**$ 2,785,638**	**$ 61,227,620**	**$ 137,939,856**
Minnesota Assessments	$ -	$ 1,932,291	$ -	$ -	$ -	$ -	$ 1,932,291
Minnesota Efficient Technology Accelerator	$ -	$ 5,493,115	$ -	$ -	$ -	$ -	$ 5,493,115
Assessments Segment Total	**$ -**	**$ 7,425,406**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 7,425,406**
EnerChange	$ -	$ 567,843	$ -	$ -	$ -	$ -	$ 567,843
EnergySmart	$ -	$ 672,735	$ -	$ -	$ -	$ -	$ 672,735
One Stop Shop	$ -	$ 5,683,660	$ -	$ -	$ -	$ 7,527,021	$ 13,210,681
Trillion BTU	$ -	$ 171,787	$ -	$ -	$ -	$ -	$ 171,787
Alternative Filings Total	$ -	$ 7,096,025	$ -	$ -	$ -	$ 7,527,021	**$ 14,623,046**
2025 Electric Portfolio Total	**$ 1,207,537**	**$ 72,456,514**	**$ 12,272,995**	**$ 2,510,982**	**$ 2,785,638**	**$ 68,754,641**	**$ 159,988,308**

Table 25: Detailed Budget (Natural Gas, 2025)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ 99,750	$ 574,350	$ -	$ -	$ -	$ 674,100
Efficient New Home Construction	$ -	$ 689,550	$ 280,000	$ -	$ -	$ 1,473,945	$ 2,443,495
Energy Efficient Showerheads	$ -	$ 140,379	$ 60,000	$ -	$ -	$ 53,853	$ 254,232
Home Energy Audit	$ -	$ 1,649,077	$ 58,065	$ -	$ -	$ -	$ 1,707,142
Home Energy Insights	$ -	$ 305,309	$ 10,000	$ -	$ -	$ -	$ 315,309
Home Energy Squad	$ 370,106	$ 271,713	$ 321,566	$ -	$ -	$ 167,756	$ 1,131,141
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ 42,281	$ 5,000	$ 2,000	$ -	$ 1,287,774	$ 1,337,055
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 369,267	$ 67,130	$ 10,859	$ 65,411	$ 4,885,702	$ 5,398,370
School Education Kits	$ -	$ 324,725	$ 2,500	$ -	$ -	$ 87,400	$ 414,624
Whole Home Efficiency	$ -	$ 35,632	$ -	$ -	$ -	$ 150,970	$ 186,602
Residential Segment Total	**$ 370,106**	**$ 3,927,683**	**$ 1,378,611**	**$ 12,859**	**$ 65,411**	**$ 8,107,400**	**$ 13,862,071**
Business Education	$ -	$ 13,000	$ 20,000	$ -	$ -	$ -	$ 33,000
Business Energy Assessments	$ -	$ 164,900	$ 19,368	$ 380	$ 31,836	$ 219,442	$ 435,924
Business New Construction	$ -	$ 264,383	$ 2,012	$ 33,540	$ 33,540	$ 369,024	$ 702,499
Compressed Air Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Custom Efficiency	$ -	$ 75,170	$ -	$ 3,000	$ 6,000	$ 120,008	$ 204,178
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ 10,325	$ -	$ -	$ -	$ 59,975	$ 70,300
Empower Facilities	$ -	$ 116,560	$ 3,580	$ -	$ (22,286)	$ -	$ 97,854
Empower Intelligence	$ -	$ 98,352	$ 6,149	$ -	$ (38,829)	$ -	$ 65,672
Foodservice Equipment	$ -	$ 43,935	$ 13,200	$ 9,500	$ 3,000	$ 26,022	$ 95,657
HVAC+R	$ -	$ 370,904	$ 83,942	$ 16,888	$ 74,504	$ 967,372	$ 1,513,609
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ 10,313	$ -	$ -	$ -	$ 20,856	$ 31,169
Multi-Family Building Efficiency	$ -	$ 632,379	$ 8,700	$ -	$ 240,649	$ 94,146	$ 975,874
Non-Profit Energy Savings Program	$ -	$ 239,882	$ 66,000	$ -	$ -	$ 767,482	$ 1,073,364
Process & Commercial Efficiency	$ 19,953	$ 587,080	$ 9,478	$ 15,963	$ 9,977	$ 756,573	$ 1,399,023
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 19,953**	**$ 2,627,184**	**$ 232,428**	**$ 79,270**	**$ 338,391**	**$ 3,400,899**	**$ 6,698,125**
Affordable Efficient New Home Construction	$ -	$ 11,461	$ -	$ -	$ -	$ 187,079	$ 198,540
Home Energy Savings Program	$ -	$ 603,383	$ 74,575	$ 9,943	$ -	$ 2,852,021	$ 3,539,922
Low Income Home Energy Squad	$ -	$ 94,639	$ 235,000	$ -	$ -	$ 48,996	$ 378,635
Low Income Multi-Family Building Efficiency	$ -	$ 72,358	$ 26,619	$ -	$ 15,839	$ 106,064	$ 220,880
Workforce Development & Education	$ -	$ 462,016	$ 300	$ -	$ 120,000	$ -	$ 582,316
Income Qualified Segment Total	**$ -**	**$ 1,243,857**	**$ 336,494**	**$ 9,943**	**$ 135,839**	**$ 3,194,161**	**$ 4,920,293**
Commercial AC Control	$ -	$ 25,000	$ -	$ 5,000	$ -	$ 8,140	$ 38,140
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ 25,000**	**$ -**	**$ 5,000**	**$ -**	**$ 8,140**	**$ 38,140**
Efficient Fuel Switching Training & Support	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outdoor Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient Fuel Switching Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Advertising & Promotion	$ -	$ 371,403	$ 1,343,929	$ -	$ -	$ -	$ 1,715,332
Application Development &	$ -	$ 774,219	$ -	$ -	$ -	$ -	$ 774,219
CIP Training	$ -	$ 167,856	$ -	$ -	$ -	$ -	$ 167,856
Community Energy Reporting	$ -	$ 14,093	$ -	$ -	$ -	$ -	$ 14,093
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ 40,832	$ -	$ -	$ -	$ -	$ 40,832
Partners in Energy	$ -	$ 350,379	$ 2,600	$ -	$ -	$ -	$ 352,979
Planning & Regulatory Affairs	$ -	$ 482,250	$ -	$ -	$ -	$ -	$ 482,250
Indirect Products & Services Total	**$ -**	**$ 2,201,033**	**$ 1,346,529**	**$ -**	**$ -**	**$ -**	**$ 3,547,562**
Market Research	$ -	$ 252,385	$ -	$ 298,451	$ -	$ -	$ 550,837
Product Development	$ -	$ 164,768	$ -	$ 25,000	$ 10,000	$ -	$ 199,768
Research, Evaluations & Pilots Total	**$ -**	**$ 417,153**	**$ -**	**$ 323,451**	**$ 10,000**	**$ -**	**$ 750,605**
Portfolio Total	**$ 390,060**	**$ 10,441,909**	**$ 3,294,062**	**$ 430,524**	**$ 549,640**	**$ 14,710,600**	**$ 29,816,796**
Minnesota Assessments	$ -	$ 294,738	$ -	$ -	$ -	$ -	$ 294,738
Minnesota Efficient Technology Accelerator	$ -	$ 1,119,468	$ -	$ -	$ -	$ -	$ 1,119,468
Assessments Segment Total	**$ -**	**$ 1,414,206**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,414,206**
EnerChange	$ -	$ 63,094	$ -	$ -	$ -	$ -	$ 63,094
EnergySmart	$ -	$ 50,085	$ -	$ -	$ -	$ -	$ 50,085
One Stop Shop	$ -	$ 36,577	$ -	$ -	$ -	$ 62,522	$ 99,099
Trillion BTU	$ -	$ 21,943	$ -	$ -	$ -	$ -	$ 21,943
Alternative Filings Total	**$ -**	**$ 171,699**	**$ -**	**$ -**	**$ -**	**$ 62,522**	**$ 234,221**
2025 Gas Portfolio Total	**$ 390,060**	**$ 12,027,814**	**$ 3,294,062**	**$ 430,524**	**$ 549,640**	**$ 14,773,122**	**$ 31,465,223**

Table 26: Detailed Budget (EFS, Combined Fuels, 2025)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Efficient Showerheads	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Audit	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Insights	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 117,305	$ 20,507	$ 3,976	$ 19,710	$ 1,546,566	$ 1,708,065
School Education Kits	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Whole Home Efficiency	$ -	$ 5,060	$ -	$ -	$ -	$ 21,500	$ 26,560
Residential Segment Total	**$ -**	**$ 122,365**	**$ 20,507**	**$ 3,976**	**$ 19,710**	**$ 1,568,066**	**$ 1,734,625**
Business Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Energy Assessments	$ 20	$ 57,351	$ 5,859	$ 116	$ 12,238	$ 76,130	$ 151,713
Business New Construction	$ -	$ 16,779	$ 128	$ 2,129	$ 2,129	$ 23,420	$ 44,584
Compressed Air Efficiency	$ -	$ 2,364	$ -	$ -	$ -	$ 8,000	$ 10,364
Custom Efficiency	$ -	$ 15,162	$ -	$ 593	$ 237	$ 15,905	$ 31,896
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Facilities	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Intelligence	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Foodservice Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
HVAC+R	$ -	$ 2,468	$ 558	$ 112	$ 496	$ 6,433	$ 10,068
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Multi-Family Building Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Profit Energy Savings Program	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Process & Commercial Efficiency	$ 398	$ 12,724	$ 233	$ 178	$ 305	$ 27,765	$ 41,604
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 419**	**$ 106,848**	**$ 6,778**	**$ 3,128**	**$ 15,404**	**$ 157,653**	**$ 290,229**
Affordable Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Savings Program	$ -	$ 3,439	$ 425	$ 57	$ -	$ 16,179	$ 20,100
Low Income Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Low Income Multi-Family Building Efficiency	$ -	$ 66,548	$ 24,481	$ -	$ 14,567	$ 15,729	$ 121,324
Workforce Development & Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Income Qualified Segment Total	**$ -**	**$ 69,987**	**$ 24,906**	**$ 57**	**$ 14,567**	**$ 31,908**	**$ 141,425**
Commercial AC Control	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Efficient Fuel Switching Training & Support	$ -	$ 630,000	$ 100,000	$ -	$ -	$ 1,200,000	$ 1,930,000
Outdoor Equipment	$ -	$ 40,000	$ 60,000	$ -	$ -	$ 61,250	$ 161,250
Efficient Fuel Switching Total	**$ -**	**$ 670,000**	**$ 160,000**	**$ -**	**$ -**	**$ 1,261,250**	**$ 2,091,250**
Advertising & Promotion	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Application Development &	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CIP Training	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Community Energy Reporting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Partners in Energy	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Planning & Regulatory Affairs	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Indirect Products & Services Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Market Research	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Product Development	$ -	$ 629,337	$ -	$ 22,000	$ 12,500	$ -	$ 663,837
Research, Evaluations & Pilots Total	**$ -**	**$ 629,337**	**$ -**	**$ 22,000**	**$ 12,500**	**$ -**	**$ 663,837**
Portfolio Total	**$ 419**	**$ 1,598,537**	**$ 212,192**	**$ 29,160**	**$ 62,181**	**$ 3,018,878**	**$ 4,921,366**
Minnesota Assessments	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Minnesota Efficient Technology Accelerator	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Assessments Segment Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
EnerChange	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EnergySmart	$ -	$ -	$ -	$ -	$ -	$ -	$ -
One Stop Shop	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Trillion BTU	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Alternative Filings Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
2025 EFS Portfolio Total	**$ 419**	**$ 1,598,537**	**$ 212,192**	**$ 29,160**	**$ 62,181**	**$ 3,018,878**	**$ 4,921,366**

Table 27: Detailed Budget (Electric, 2026)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$0	$217,744	$843,964	$0	$0	$0	$1,061,708
Efficient New Home Construction	$ -	$ 559,622	$ 120,000	$ -	$ -	$ 1,260,352	$ 1,939,974
Energy Efficient Showerheads	$ -	$ 100,158	$ 35,000	$ -	$ -	$ 25,134	$ 160,292
Home Energy Audit	$ -	$ 2,834,235	$ 74,860	$ -	$ -	$ -	$ 2,909,095
Home Energy Insights	$ -	$ 1,342,227	$ 20,000	$ -	$ -	$ -	$ 1,362,227
Home Energy Squad	$ 1,253,820	$ 931,410	$ 1,173,940	$ -	$ -	$ 693,967	$ 4,053,136
Home Lighting	$ -	$ 796,703	$ 640,000	$ -	$ -	$ 4,764,301	$ 6,201,004
Insulation Rebates	$ -	$ 42,800	$ 5,000	$ 2,000	$ -	$ 303,937	$ 353,737
Lamp Recycling	$ -	$ 302,681	$ -	$ -	$ -	$ -	$ 302,681
Refrigerator & Freezer Recycling	$ -	$ 1,090,175	$ 160,000	$ -	$ -	$ 360,000	$ 1,610,175
Residential Heating & Cooling	$ -	$ 563,712	$ 81,867	$ 33,641	$ 129,544	$ 10,535,240	$ 11,344,004
School Education Kits	$ -	$ 942,330	$ 5,000	$ -	$ -	$ 895,697	$ 1,843,027
Whole Home Efficiency	$ -	$ 10,362	$ -	$ -	$ -	$ 144,384	$ 154,746
Residential Segment Total	**$ 1,253,820**	**$ 9,734,159**	**$ 3,159,631**	**$ 35,641**	**$ 129,544**	**$ 18,983,012**	**$ 33,295,807**
Business Education	$ -	$ 92,750	$ 175,000	$ -	$ -	$ -	$ 267,750
Business Energy Assessments	$ 3,569	$ 1,707,926	$ 39,657	$ 972	$ 571,295	$ 2,981,892	$ 5,305,310
Business New Construction	$ -	$ 2,358,550	$ 15,786	$ 273,618	$ 505,140	$ 7,186,367	$ 10,339,461
Compressed Air Efficiency	$ -	$ 258,604	$ -	$ -	$ -	$ 893,070	$ 1,151,675
Custom Efficiency	$ -	$ 638,938	$ -	$ 24,366	$ 9,746	$ 586,582	$ 1,259,632
Data Center Efficiency	$ 2,500	$ 162,553	$ 67,000	$ 10,000	$ 20,000	$ 634,037	$ 896,090
Efficiency Controls	$ -	$ 197,030	$ -	$ -	$ -	$ 621,220	$ 818,250
Empower Facilities	$ -	$ 989,978	$ 32,220	$ -	$ (476,357)	$ -	$ 545,840
Empower Intelligence	$ -	$ 1,081,210	$ 7,139	$ -	$ (417,415)	$ -	$ 670,933
Foodservice Equipment	$ -	$ 27,671	$ 14,150	$ 2,500	$ 3,800	$ 16,115	$ 64,236
HVAC+R	$ -	$ 1,281,951	$ 167,000	$ 51,000	$ 260,000	$ 2,555,873	$ 4,315,824
Lighting Efficiency	$ -	$ 2,579,233	$ 325,000	$ 75,000	$ 25,000	$ 9,201,741	$ 12,205,974
Load Strategy Analysis	$ -	$ 379,002	$ -	$ -	$ -	$ 401,242	$ 780,244
Multi-Family Building Efficiency	$ -	$ 1,112,761	$ 12,000	$ -	$ 618,637	$ 1,031,571	$ 2,774,969
Non-Profit Energy Savings Program	$ -	$ 534,427	$ 142,000	$ -	$ -	$ 1,345,949	$ 2,022,376
Process & Commercial Efficiency	$ 99,630	$ 3,274,836	$ 59,778	$ 39,852	$ 79,704	$ 6,961,335	$ 10,515,135
Self-Direct	$ -	$ 47,997	$ -	$ -	$ -	$ 137,301	$ 185,298
Business Segment Total	**$ 105,699**	**$ 16,725,417**	**$ 1,056,729**	**$ 477,307**	**$ 1,199,550**	**$ 34,554,296**	**$ 54,118,999**
Affordable Efficient New Home Construction	$ -	$ 12,337	$ -	$ -	$ -	$ 401,406	$ 413,743
Home Energy Savings Program	$ -	$ 759,705	$ 320,000	$ 33,000	$ -	$ 2,685,730	$ 3,798,435
Low Income Home Energy Squad	$ -	$ 284,133	$ 700,000	$ -	$ -	$ 272,654	$ 1,256,787
Low Income Multi-Family Building Efficiency	$ -	$ 276,636	$ 86,000	$ -	$ 191,770	$ 2,710,746	$ 3,265,152
Workforce Development & Education	$ -	$ 2,848,854	$ 1,700	$ -	$ 765,000	$ -	$ 3,615,554
Income Qualified Segment Total	**$ -**	**$ 4,181,665**	**$ 1,107,700**	**$ 33,000**	**$ 956,770**	**$ 6,070,536**	**$ 12,349,670**
Commercial AC Control	$ -	$ 2,922,630	$ 200,000	$ 200,000	$ -	$ 666,368	$ 3,988,997
Critical Peak Pricing	$ 35,000	$ 237,000	$ 10,000	$ 25,000	$ -	$ -	$ 307,000
Electric Rate Savings	$ -	$ 706,630	$ 630	$ -	$ -	$ -	$ 707,260
Peak Partner Rewards	$ 62,000	$ 543,889	$ 25,000	$ 10,000	$ -	$ 926,100	$ 1,566,989
Residential Demand Response	$ -	$ 10,228,072	$ 744,488	$ 125,000	$ 25,000	$ 2,307,225	$ 13,429,785
Demand Response Segment Total	**$ 97,000**	**$ 14,638,221**	**$ 980,118**	**$ 360,000**	**$ 25,000**	**$ 3,899,693**	**$ 20,000,031**
Efficient Fuel Switching Training & Support	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outdoor Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient Fuel Switching Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Advertising & Promotion	$ -	$ 1,740,145	$ 6,730,238	$ -	$ -	$ -	$ 8,470,383
Application Development &	$ -	$ 4,362,657	$ -	$ -	$ -	$ -	$ 4,362,657
CIP Training	$ -	$ 478,064	$ -	$ -	$ -	$ -	$ 478,064
Community Energy Reporting	$ -	$ 43,714	$ -	$ -	$ -	$ -	$ 43,714
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ 174,396	$ -	$ -	$ -	$ -	$ 174,396
Partners in Energy	$ -	$ 1,410,877	$ 11,700	$ -	$ -	$ -	$ 1,422,577
Planning & Regulatory Affairs	$ -	$ 964,103	$ -	$ -	$ -	$ -	$ 964,103
Indirect Products & Services Total	**$ -**	**$ 9,173,955**	**$ 6,741,938**	**$ -**	**$ -**	**$ -**	**$ 15,915,893**
Market Research	$ -	$ 917,986	$ -	$ 1,551,207	$ -	$ -	$ 2,469,193
Product Development	$ -	$ 5,235,319	$ -	$ 150,000	$ 25,000	$ -	$ 5,410,319
Research, Evaluations & Pilots Total	**$ -**	**$ 6,153,305**	**$ -**	**$ 1,701,207**	**$ 25,000**	**$ -**	**$ 7,879,512**
Portfolio Total	**$ 1,456,519**	**$ 60,606,720**	**$ 13,046,116**	**$ 2,607,155**	**$ 2,335,864**	**$ 63,507,537**	**$ 143,559,913**
Minnesota Assessments	$ -	$ 1,932,291	$ -	$ -	$ -	$ -	$ 1,932,291
Minnesota Efficient Technology Accelerator	$ -	$ 5,690,186	$ -	$ -	$ -	$ -	$ 5,690,186
Assessments Segment Total	**$ -**	**$ 7,622,477**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 7,622,477**
EnerChange	$ -	$ 584,878	$ -	$ -	$ -	$ -	$ 584,878
EnergySmart	$ -	$ 714,525	$ -	$ -	$ -	$ -	$ 714,525
One Stop Shop	$ -	$ 5,705,880	$ -	$ -	$ -	$ 7,562,441	$ 13,268,321
Trillion BTU	$ -	$ 171,850	$ -	$ -	$ -	$ -	$ 171,850
Alternative Filings Total	$ -	$ 7,177,133	$ -	$ -	$ -	$ 7,562,441	**$ 14,739,574**
2026 Electric Portfolio Total	**$ 1,456,519**	**$ 75,406,330**	**$ 13,046,116**	**$ 2,607,155**	**$ 2,335,864**	**$ 71,069,978**	**$ 165,921,964**

Table 28: Detailed Budget (Natural Gas, 2026)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ 104,737	$ 603,067	$ -	$ -	$ -	$ 707,804
Efficient New Home Construction	$ -	$ 691,197	$ 280,000	$ -	$ -	$ 1,660,933	$ 2,632,130
Energy Efficient Showerheads	$ -	$ 145,448	$ 60,000	$ -	$ -	$ 59,238	$ 264,686
Home Energy Audit	$ -	$ 1,863,853	$ 60,969	$ -	$ -	$ -	$ 1,924,822
Home Energy Insights	$ -	$ 292,989	$ 10,000	$ -	$ -	$ -	$ 302,989
Home Energy Squad	$ 408,564	$ 296,519	$ 348,730	$ -	$ -	$ 182,760	$ 1,236,574
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ 43,244	$ 5,000	$ 2,000	$ -	$ 1,420,691	$ 1,470,935
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 311,937	$ 59,533	$ 9,500	$ 104,852	$ 4,888,297	$ 5,374,118
School Education Kits	$ -	$ 339,930	$ 2,500	$ -	$ -	$ 89,009	$ 431,439
Whole Home Efficiency	$ -	$ 36,740	$ -	$ -	$ -	$ 166,185	$ 202,925
Residential Segment Total	**$ 408,564**	**$ 4,126,595**	**$ 1,429,799**	**$ 11,500**	**$ 104,852**	**$ 8,467,113**	**$ 14,548,423**
Business Education	$ -	$ 14,050	$ 21,000	$ -	$ -	$ -	$ 35,050
Business Energy Assessments	$ -	$ 153,205	$ 18,323	$ 359	$ 32,507	$ 239,529	$ 443,922
Business New Construction	$ -	$ 249,762	$ 1,903	$ 31,721	$ 31,721	$ 380,077	$ 695,185
Compressed Air Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Custom Efficiency	$ -	$ 77,180	$ -	$ 3,000	$ 6,000	$ 120,008	$ 206,188
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ 10,485	$ -	$ -	$ -	$ 65,620	$ 76,105
Empower Facilities	$ -	$ 109,998	$ 3,580	$ -	$ (52,929)	$ -	$ 60,649
Empower Intelligence	$ -	$ 108,117	$ 6,764	$ -	$ (41,742)	$ -	$ 73,140
Foodservice Equipment	$ -	$ 45,451	$ 14,150	$ 10,200	$ 3,800	$ 24,605	$ 98,206
HVAC+R	$ -	$ 466,910	$ 91,190	$ 19,824	$ 76,322	$ 814,511	$ 1,468,757
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ 10,565	$ -	$ -	$ -	$ 27,104	$ 37,669
Multi-Family Building Efficiency	$ -	$ 663,269	$ 9,000	$ -	$ 270,898	$ 111,701	$ 1,054,868
Non-Profit Energy Savings Program	$ -	$ 245,064	$ 68,000	$ -	$ -	$ 820,567	$ 1,133,631
Process & Commercial Efficiency	$ 19,953	$ 600,811	$ 9,478	$ 15,963	$ 9,977	$ 756,573	$ 1,412,754
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 19,953**	**$ 2,754,866**	**$ 243,387**	**$ 81,067**	**$ 336,554**	**$ 3,360,297**	**$ 6,796,124**
Affordable Efficient New Home Construction	$ -	$ 11,582	$ -	$ -	$ -	$ 188,082	$ 199,664
Home Energy Savings Program	$ -	$ 629,576	$ 84,543	$ 9,946	$ -	$ 4,005,419	$ 4,729,485
Low Income Home Energy Squad	$ -	$ 100,167	$ 235,000	$ -	$ -	$ 61,574	$ 396,741
Low Income Multi-Family Building Efficiency	$ -	$ 17,514	$ 6,274	$ -	$ 3,686	$ 129,107	$ 156,582
Workforce Development & Education	$ -	$ 507,782	$ 300	$ -	$ 135,000	$ -	$ 643,082
Income Qualified Segment Total	**$ -**	**$ 1,266,621**	**$ 326,117**	**$ 9,946**	**$ 138,686**	**$ 4,384,183**	**$ 6,125,554**
Commercial AC Control	$ -	$ 28,000	$ -	$ 5,000	$ -	$ 8,307	$ 41,307
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ 28,000**	**$ -**	**$ 5,000**	**$ -**	**$ 8,307**	**$ 41,307**
Efficient Fuel Switching Training & Support	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outdoor Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient Fuel Switching Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Advertising & Promotion	$ -	$ 377,242	$ 1,450,771	$ -	$ -	$ -	$ 1,828,013
Application Development &	$ -	$ 785,777	$ -	$ -	$ -	$ -	$ 785,777
CIP Training	$ -	$ 193,333	$ -	$ -	$ -	$ -	$ 193,333
Community Energy Reporting	$ -	$ 14,578	$ -	$ -	$ -	$ -	$ 14,578
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ 51,759	$ -	$ -	$ -	$ -	$ 51,759
Partners in Energy	$ -	$ 363,054	$ 2,700	$ -	$ -	$ -	$ 365,754
Planning & Regulatory Affairs	$ -	$ 499,129	$ -	$ -	$ -	$ -	$ 499,129
Indirect Products & Services Total	**$ -**	**$ 2,284,872**	**$ 1,453,471**	**$ -**	**$ -**	**$ -**	**$ 3,738,343**
Market Research	$ -	$ 266,623	$ -	$ 307,925	$ -	$ -	$ 574,548
Product Development	$ -	$ 166,545	$ -	$ 25,000	$ 10,000	$ -	$ 201,545
Research, Evaluations & Pilots Total	**$ -**	**$ 433,168**	**$ -**	**$ 332,925**	**$ 10,000**	**$ -**	**$ 776,093**
Portfolio Total	**$ 428,518**	**$ 10,894,122**	**$ 3,452,774**	**$ 440,438**	**$ 590,092**	**$ 16,219,900**	**$ 32,025,844**
Minnesota Assessments	$ -	$ 294,738	$ -	$ -	$ -	$ -	$ 294,738
Minnesota Efficient Technology Accelerator	$ -	$ 1,191,107	$ -	$ -	$ -	$ -	$ 1,191,107
Assessments Segment Total	**$ -**	**$ 1,485,845**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,485,845**
EnerChange	$ -	$ 64,986	$ -	$ -	$ -	$ -	$ 64,986
EnergySmart	$ -	$ 52,395	$ -	$ -	$ -	$ -	$ 52,395
One Stop Shop	$ -	$ 36,577	$ -	$ -	$ -	$ 62,522	$ 99,099
Trillion BTU	$ -	$ 22,011	$ -	$ -	$ -	$ -	$ 22,011
Alternative Filings Total	**$ -**	**$ 175,969**	**$ -**	**$ -**	**$ -**	**$ 62,522**	**$ 238,491**
2026 Gas Portfolio Total	**$ 428,518**	**$ 12,555,936**	**$ 3,452,774**	**$ 440,438**	**$ 590,092**	**$ 16,282,422**	**$ 33,750,180**

Table 29: Detailed Budget (EFS, Combined Fuels, 2026)

Program	Customer Services	Utility Administration	Advertising & Promotion	Measurement & Verification	Other	Incentives	Total Budget
Consumer Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Efficient Showerheads	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Audit	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Insights	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Lighting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insulation Rebates	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Lamp Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refrigerator & Freezer Recycling	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Heating & Cooling	$ -	$ 215,945	$ 39,600	$ 7,609	$ 68,828	$ 3,092,233	$ 3,424,215
School Education Kits	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Whole Home Efficiency	$ -	$ 7,176	$ -	$ -	$ -	$ 32,600	$ 39,776
Residential Segment Total	**$ -**	**$ 223,120**	**$ 39,600**	**$ 7,609**	**$ 68,828**	**$ 3,124,833**	**$ 3,463,990**
Business Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Energy Assessments	$ 31	$ 70,618	$ 7,021	$ 139	$ 16,792	$ 103,842	$ 198,443
Business New Construction	$ -	$ 41,514	$ 316	$ 5,273	$ 5,273	$ 63,174	$ 115,549
Compressed Air Efficiency	$ -	$ 2,317	$ -	$ -	$ -	$ 8,000	$ 10,317
Custom Efficiency	$ -	$ 16,620	$ -	$ 634	$ 254	$ 19,437	$ 36,945
Data Center Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Efficiency Controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Facilities	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Empower Intelligence	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Foodservice Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -
HVAC+R	$ -	$ 4,149	$ 810	$ 176	$ 678	$ 7,233	$ 13,047
Lighting Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Load Strategy Analysis	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Multi-Family Building Efficiency	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Profit Energy Savings Program	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Process & Commercial Efficiency	$ 417	$ 13,569	$ 244	$ 185	$ 319	$ 27,765	$ 42,500
Self-Direct	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Business Segment Total	**$ 448**	**$ 148,787**	**$ 8,391**	**$ 6,407**	**$ 23,316**	**$ 229,452**	**$ 416,801**
Affordable Efficient New Home Construction	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Home Energy Savings Program	$ -	$ 3,402	$ 457	$ 54	$ -	$ 21,572	$ 25,485
Low Income Home Energy Squad	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Low Income Multi-Family Building Efficiency	$ -	$ 127,655	$ 45,726	$ -	$ 26,869	$ 31,423	$ 231,673
Workforce Development & Education	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Income Qualified Segment Total	**$ -**	**$ 131,057**	**$ 46,183**	**$ 54**	**$ 26,869**	**$ 52,995**	**$ 257,158**
Commercial AC Control	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Critical Peak Pricing	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Rate Savings	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Peak Partner Rewards	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Residential Demand Response	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Demand Response Segment Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Efficient Fuel Switching Training & Support	$ -	$ 660,000	$ 100,000	$ -	$ -	$ 1,400,000	$ 2,160,000
Outdoor Equipment	$ -	$ 40,000	$ 50,000	$ -	$ -	$ 61,250	$ 151,250
Efficient Fuel Switching Total	**$ -**	**$ 700,000**	**$ 150,000**	**$ -**	**$ -**	**$ 1,461,250**	**$ 2,311,250**
Advertising & Promotion	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Application Development &	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CIP Training	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Community Energy Reporting	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electric Utility Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Benchmarking	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Partners in Energy	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Planning & Regulatory Affairs	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Indirect Products & Services Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Market Research	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Product Development	$ -	$ 640,077	$ -	$ 22,000	$ 12,500	$ -	$ 674,577
Research, Evaluations & Pilots Total	**$ -**	**$ 640,077**	**$ -**	**$ 22,000**	**$ 12,500**	**$ -**	**$ 674,577**
Portfolio Total	**$ 448**	**$ 1,843,041**	**$ 244,175**	**$ 36,070**	**$ 131,512**	**$ 4,868,531**	**$ 7,123,776**
Minnesota Assessments	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Minnesota Efficient Technology Accelerator	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Assessments Segment Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
EnerChange	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EnergySmart	$ -	$ -	$ -	$ -	$ -	$ -	$ -
One Stop Shop	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Trillion BTU	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Alternative Filings Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
2026 EFS Portfolio Total	**$ 448**	**$ 1,843,041**	**$ 244,175**	**$ 36,070**	**$ 131,512**	**$ 4,868,531**	**$ 7,123,776**

H. A description of the utility's ratemaking treatment and cost-recovery method;

The ratemaking and cost-recovery procedures for this Plan follow those currently approved by the Public Utilities Commission.

I. An estimate of participation in each project;

Estimate participation can be found in the program information sheets (Attachment B) and in the Executive Summaries.

J. An explanation of how the proposed projects provide for the involvement of community energy organizations, when appropriate;

Please see individual program descriptions with the detailed program summaries.

K. An outline of the proposed plan for evaluating the effectiveness of each proposed project;

Please see program descriptions as well as the Research, Evaluations, and Pilots Segment for a schedule of planned program evaluations. The Measurement and Verification policy is included within this segment.

L. For each renewable energy project, an estimate of the net energy and capacity to be produced by each project and the projected reliability of the technology that would be used; and

There are no planned or proposed renewable energy projects for the Company's ECO portfolio in 2021-2023.

M. Additional information that the Department determines is necessary as a result of its review or evaluation of previous projects of the particular utility.

The Company previewed proposed changes with the Department on May 1, 2023. In addition, a stakeholder meeting for interested parties was conducted virtually on May 15, 2023.

Information Required by Minnesota Rules 7690.1200

Minnesota Rules 7690.1200 lists the information which must be considered in determining whether a proposed program will result in reasonable investments in and expenditures for energy conservation improvements. The information required is listed here and summarized where not provided earlier in this section.

A. Compliance with statutory spending requirement;

See spending details above in the Compliance Section.

B. Impact of the program on energy consumption and peak demand;

Proposed targets including energy consumption and peak demand can be found in the attached program information sheets (Attachment B) and in the Executive Summary Tables found in the Executive Summary of this Plan.

C. The cost-effectiveness of the program, as calculated from the utility, ratepayer, participant, and societal perspectives;

Tables 30a -32c show the cost-effectiveness for each individual program, segment and overall ECO portfolio. We have additionally included the Minnesota Test as required by the Deputy Commissioner's Decision on *Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities* issued on March 31, 2023.

Table 30a. Program Benefits/Cost Ratios, 2024 Electric

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	5.06	2.37	0.41	1.63	3.13
Energy Efficient Showerheads	132.30	3.33	0.31	9.25	4.22
Home Energy Insights	-	3.59	0.39	4.58	4.58
Home Energy Squad	14.31	1.75	0.33	1.92	2.34
Home Lighting	12.38	4.35	0.36	3.05	5.84
Insulation Rebates	0.72	1.65	0.73	0.67	1.99
Refrigerator & Freezer Recycling	24.14	1.66	0.31	1.90	2.09
Residential Heating & Cooling	2.33	2.85	1.04	1.91	3.43
School Education Kits	17.90	3.11	0.45	3.44	3.96
Whole Home Efficiency	3.11	2.37	0.36	1.16	3.10
Residential Segment Total	**7.70**	**2.79**	**0.45**	**2.25**	**3.59**
Business Energy Assessments	4.66	3.47	0.48	2.03	4.52
Business New Construction	4.07	3.97	0.53	2.14	5.23
Compressed Air Efficiency	7.73	4.03	0.47	2.91	5.38
Custom Efficiency	5.14	3.19	0.46	4.27	4.21
Data Center Efficiency	4.01	4.71	0.42	1.93	6.38
Efficiency Controls	3.56	4.23	0.37	1.61	5.71
Empower Intelligence	5.24	1.19	0.28	0.98	1.58
Foodservice Equipment	9.87	2.87	0.47	3.17	3.76
HVAC+R	5.37	4.56	0.52	2.52	5.90
Lighting Efficiency	5.16	4.84	0.52	2.55	6.38
Load Strategy Analysis	6.90	3.86	0.41	2.53	5.15
Multi-Family Building Efficiency	10.02	0.58	0.25	0.97	0.74
Non-Profit Energy Savings Program	22.32	2.92	0.32	3.11	3.96
Process & Commercial Efficiency	5.91	5.52	0.53	3.06	7.22
Self-Direct	3.23	3.82	0.50	1.71	4.90
Business Segment Total	**5.21**	**4.32**	**0.50**	**2.58**	**5.68**
Affordable Efficient New Home Con.	-	0.04	0.04	1.00	0.05
Home Energy Savings Program	2.40	0.32	0.18	0.64	0.41
Low Income Home Energy Squad	23.94	1.07	0.29	1.43	1.43
Low Income MFBE	3.35	0.53	0.24	0.89	0.67
Income Qualified Segment Total	**3.99**	**0.37**	**0.20**	**0.69**	**0.48**
Commercial AC Control	10.08	1.75	0.91	1.88	1.96
Critical Peak Pricing	-	11.26	10.48	11.27	11.27
Electric Rate Savings	-	6.13	1.60	6.37	6.37
Peak Partner Rewards	-	1.56	1.53	2.14	1.56
Residential Demand Response	71.14	2.07	1.42	2.44	2.30
Demand Response Segment Total	**33.24**	**2.25**	**1.40**	**2.58**	**2.46**
Portfolio Total	**5.72**	**2.94**	**0.50**	**2.27**	**3.79**

Table 30b. Program Benefits/Cost Ratios, 2024 Natural Gas

Program Name	Participant Test	Utility Test	Gas Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	1.77	1.43	0.49	1.42	2.76
Energy Efficient Showerheads	66.79	2.37	0.57	16.37	4.29
Home Energy Insights	-	2.81	0.59	1.33	4.77
Home Energy Squad	13.63	1.56	0.51	1.26	2.82
Insulation Rebates	1.14	1.66	0.52	1.20	3.12
Residential Heating & Cooling	1.95	2.67	0.59	1.37	5.08
School Education Kits	101.82	4.88	0.65	4.97	8.83
Whole Home Efficiency	2.32	1.54	0.51	1.96	2.94
Residential Segment Total	**2.47**	**1.96**	**0.55**	**1.26**	**3.69**
Business Energy Assessments	5.84	4.18	0.69	1.16	7.97
Business New Construction	1.63	5.45	0.71	0.58	10.50
Custom Efficiency	7.31	5.85	0.72	3.10	11.23
Efficiency Controls	1.20	5.05	0.70	0.78	9.29
Empower Intelligence	927.69	0.04	0.04	0.01	0.07
Foodservice Equipment	3.62	3.02	0.64	3.26	5.56
HVAC+R	3.64	3.66	0.67	2.10	6.94
Load Strategy Analysis	2.52	6.36	0.73	0.69	11.82
Multi-Family Building Efficiency	9.11	2.70	0.63	2.06	5.20
Non-Profit Energy Savings Program	46.81	6.24	0.68	15.04	11.42
Process & Commercial Efficiency	3.50	5.49	0.71	1.53	10.24
Business Segment Total	**5.94**	**4.62**	**0.69**	**1.64**	**8.68**
Affordable Efficient New Home Construction	-	0.21	0.16	0.64	0.41
Home Energy Savings Program	1.44	0.23	0.18	0.69	0.44
Low Income Home Energy Squad	18.75	0.90	0.41	0.78	1.63
Low Income Multi-Family Building Efficiency	6.81	5.09	0.70	0.96	9.80
Income Qualified Segment Total	**2.32**	**0.54**	**0.32**	**0.61**	**1.02**
Commercial AC Control	8.39	0.95	0.44	0.02	1.71
Demand Response Segment Total	**8.39**	**0.95**	**0.44**	**0.00**	**1.71**
Portfolio Total	**3.74**	**2.26**	**0.58**	**1.10**	**4.25**

Table 30c. Program Benefits/Cost Ratios, 2024 Efficient Fuel Switching

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Gas Rate Impact Test	Societal Test	Minnesota Test
Residential Heating & Cooling	0.83	0.70	1.94	0.52	0.91	1.12
Whole Home Efficiency	0.40	0.57	2.35	0.56	0.55	0.84
Residential Segment Total	**0.81**	**0.70**	**1.96**	**0.52**	**0.90**	**1.11**
Business Energy Assessments	0.56	0.98	1.97	0.60	0.81	1.63
Compressed Air Efficiency	1.49	-	1.29	-	1.87	2.27
Custom Efficiency	1.60	0.28	0.64	0.72	1.40	2.01
HVAC+R	0.24	0.63	1.85	0.72	0.41	0.89
Process & Commercial Efficiency	1.13	0.37	0.45	0.69	0.83	0.68
Business Segment Total	**0.54**	**0.68**	**1.52**	**0.64**	**0.75**	**1.35**
Home Energy Savings Program	0.49	0.21	2.28	0.27	0.50	0.33
Low Income Multi-Family Building Efficiency	1.27	0.03	2.25	0.03	0.15	0.05
Income Qualified Segment Total	**0.72**	**0.06**	**2.28**	**0.06**	**0.23**	**0.10**
Efficient Fuel Switching Training & Support	-	-	-	-	0.59	-
Outdoor Equipment	3.27	-	0.25	-	1.67	2.02
Efficient Fuel Switching Total	**10.59**	**-**	**0.03**	**-**	**0.75**	**0.23**
Portfolio Total	**1.04**	**0.31**	**0.69**	**0.49**	**0.74**	**0.65**

Table 31a. Program Benefits/Cost Ratios, 2025 Electric

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	5.07	2.51	0.42	1.67	3.28
Energy Efficient Showerheads	134.71	3.53	0.31	9.56	4.37
Home Energy Insights	-	4.52	0.47	5.25	5.25
Home Energy Squad	13.39	1.50	0.32	1.68	1.98
Home Lighting	12.46	4.63	0.36	3.11	6.11
Insulation Rebates	0.71	1.71	0.75	0.67	2.05
Refrigerator & Freezer Recycling	24.55	1.69	0.31	1.88	2.06
Residential Heating & Cooling	2.02	2.81	1.02	1.73	3.37
School Education Kits	18.18	3.11	0.45	3.42	3.91
Whole Home Efficiency	2.92	2.48	0.35	1.08	3.19
Residential Segment Total	**7.08**	**2.82**	**0.46**	**2.16**	**3.56**
Business Energy Assessments	4.66	3.99	0.49	2.12	5.11
Business New Construction	4.61	4.30	0.54	2.35	5.62
Compressed Air Efficiency	8.22	4.35	0.48	3.07	5.72
Custom Efficiency	5.13	3.27	0.47	4.26	4.25
Data Center Efficiency	3.99	4.77	0.42	1.92	6.36
Efficiency Controls	3.68	4.60	0.38	1.68	6.06
Empower Intelligence	5.25	1.17	0.29	0.94	1.50
Foodservice Equipment	10.23	2.69	0.46	3.06	3.47
HVAC+R	5.46	4.56	0.52	2.52	5.82
Lighting Efficiency	5.24	4.91	0.52	2.56	6.38
Load Strategy Analysis	7.01	3.86	0.42	2.52	5.06
Multi-Family Building Efficiency	9.99	0.65	0.27	1.03	0.82
Non-Profit Energy Savings Program	21.54	2.87	0.33	3.01	3.84
Process & Commercial Efficiency	6.10	5.46	0.53	3.06	7.04
Self-Direct	3.29	3.85	0.50	1.71	4.87
Business Segment Total	**5.40**	**4.40**	**0.50**	**2.62**	**5.71**
Affordable Efficient New Home Con.	-	0.04	0.04	1.00	0.05
Home Energy Savings Program	2.40	0.34	0.19	0.67	0.43
Low Income Home Energy Squad	24.35	1.28	0.31	1.66	1.69
Low Income MFBE	3.35	0.55	0.25	0.90	0.70
Income Qualified Segment Total	**4.00**	**0.39**	**0.21**	**0.70**	**0.51**
Commercial AC Control	7.51	1.73	0.94	1.82	1.93
Critical Peak Pricing	-	13.46	12.35	13.46	13.46
Electric Rate Savings	-	5.40	1.56	5.61	5.61
Peak Partner Rewards	-	1.65	1.62	2.23	1.65
Residential Demand Response	72.19	2.00	1.39	2.37	2.22
Demand Response Segment Total	**24.99**	**2.23**	**1.43**	**2.54**	**2.43**
Portfolio Total	**5.78**	**2.90**	**0.50**	**2.24**	**3.68**

Table 31b. Program Benefits/Cost Ratios, 2025 Natural Gas

Program Name	Participant Test	Utility Test	Gas Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	1.81	1.51	0.50	1.46	2.90
Energy Efficient Showerheads	67.67	2.57	0.58	17.05	4.62
Home Energy Insights	-	2.93	0.60	1.33	5.01
Home Energy Squad	13.78	1.55	0.51	1.23	2.78
Insulation Rebates	1.16	1.70	0.52	1.23	3.19
Residential Heating & Cooling	1.99	2.73	0.59	1.38	5.18
School Education Kits	103.20	4.97	0.66	4.98	8.93
Whole Home Efficiency	2.35	1.60	0.51	1.86	3.03
Residential Segment Total	**2.52**	**1.98**	**0.55**	**1.28**	**3.72**
Business Energy Assessments	5.99	4.43	0.69	1.14	8.42
Business New Construction	1.63	6.03	0.72	0.85	11.59
Custom Efficiency	7.41	5.94	0.72	3.07	11.35
Efficiency Controls	1.23	5.29	0.71	0.78	9.67
Empower Intelligence	1,030.57	0.03	0.03	0.01	0.06
Foodservice Equipment	3.87	2.72	0.63	3.27	4.98
HVAC+R	3.83	3.72	0.67	2.02	6.99
Load Strategy Analysis	2.58	6.47	0.73	0.68	11.97
Multi-Family Building Efficiency	9.02	3.25	0.65	2.43	6.23
Non-Profit Energy Savings Program	39.94	6.58	0.69	14.22	12.07
Process & Commercial Efficiency	3.46	5.57	0.71	1.59	10.36
Business Segment Total	**5.81**	**4.91**	**0.69**	**1.78**	**9.21**
Affordable Efficient New Home Construction	-	0.22	0.17	0.65	0.42
Home Energy Savings Program	1.43	0.23	0.18	0.71	0.43
Low Income Home Energy Squad	19.08	1.11	0.45	0.93	1.99
Low Income Multi-Family Building Efficiency	6.31	4.40	0.68	0.87	8.43
Income Qualified Segment Total	**2.25**	**0.52**	**0.31**	**0.60**	**0.98**
Commercial AC Control	8.92	1.48	0.53	0.03	2.66
Demand Response Segment Total	**8.92**	**1.48**	**0.53**	**0.01**	**2.66**
Portfolio Total	**3.76**	**2.31**	**0.59**	**1.14**	**4.34**

Table 31c. Program Benefits/Cost Ratios, 2025 Efficient Fuel Switching

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Gas Rate Impact Test	Societal Test	Minnesota Test Ratio
Residential Heating & Cooling	0.84	0.71	1.93	0.52	0.92	1.14
Whole Home Efficiency	0.40	0.57	2.31	0.56	0.55	0.85
Residential Segment Total	**0.82**	**0.71**	**1.95**	**0.52**	**0.91**	**1.13**
Business Energy Assessments	0.56	1.22	2.27	0.64	0.89	1.96
Business New Construction	1.29	0.60	1.61	0.59	1.83	0.95
Compressed Air Efficiency	1.50	-	1.29	-	1.89	2.30
Custom Efficiency	1.27	0.46	1.27	0.73	1.52	3.09
HVAC+R	0.25	0.63	1.82	0.71	0.43	0.90
Process & Commercial Efficiency	1.13	0.37	0.44	0.69	0.82	0.67
Business Segment Total	**0.72**	**0.80**	**1.73**	**0.65**	**1.05**	**1.60**
Home Energy Savings Program	0.49	0.22	2.25	0.28	0.50	0.34
Low Income Multi-Family Building Efficiency	0.89	0.03	2.22	0.03	0.16	0.06
Income Qualified Segment Total	**0.60**	**0.08**	**2.25**	**0.08**	**0.27**	**0.13**
Outdoor Equipment	3.29	-	0.29	-	1.86	2.32
Efficient Fuel Switching Total	**12.02**	**-**	**0.03**	**-**	**0.77**	**0.21**
Portfolio Total	**0.96**	**0.44**	**0.99**	**0.52**	**0.85**	**0.84**

Table 32a. Program Benefits/Cost Ratios, 2026 Electric

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	11.61	4.29	0.38	2.89	5.63
Energy Efficient Showerheads	136.34	3.61	0.31	9.76	4.46
Home Energy Squad	12.43	1.30	0.31	1.48	1.70
Home Lighting	12.33	4.78	0.36	3.12	6.28
Insulation Rebates	0.71	1.76	0.77	0.68	2.11
Refrigerator & Freezer Recycling	24.98	1.67	0.30	1.85	2.03
Residential Heating & Cooling	1.62	2.69	0.98	1.47	3.23
School Education Kits	18.46	3.07	0.44	3.38	3.85
Whole Home Efficiency	2.92	2.53	0.34	1.06	3.24
Residential Segment Total	**6.63**	**2.87**	**0.45**	**2.07**	**3.63**
Business Energy Assessments	4.64	3.77	0.49	2.07	4.82
Business New Construction	5.74	4.92	0.55	2.80	6.42
Compressed Air Efficiency	8.35	4.42	0.48	3.09	5.79
Custom Efficiency	5.13	3.30	0.47	4.25	4.27
Data Center Efficiency	3.96	4.72	0.41	1.89	6.28
Efficiency Controls	3.69	4.69	0.38	1.68	6.16
Empower Intelligence	5.38	1.12	0.28	0.90	1.42
Foodservice Equipment	10.24	2.41	0.45	2.87	3.11
HVAC+R	5.55	4.52	0.52	2.51	5.75
Lighting Efficiency	5.33	4.90	0.52	2.56	6.35
Load Strategy Analysis	7.23	3.86	0.41	2.54	5.05
Multi-Family Building Efficiency	10.49	0.75	0.29	1.14	0.93
Non-Profit Energy Savings Program	20.93	2.91	0.32	3.01	3.88
Process & Commercial Efficiency	6.25	5.40	0.52	3.07	6.93
Self-Direct	3.34	3.80	0.50	1.70	4.79
Business Segment Total	**5.68**	**4.48**	**0.50**	**2.70**	**5.80**
Affordable Efficient New Home Con	-	0.04	0.04	1.00	0.05
Home Energy Savings Program	2.39	0.35	0.19	0.68	0.44
Low Income Home Energy Squad	24.77	1.51	0.32	1.91	2.00
Low Income MFBE	3.61	0.61	0.25	0.94	0.77
Income Qualified Segment Total	**4.17**	**0.44**	**0.21**	**0.75**	**0.56**
Commercial AC Control	6.11	1.81	0.98	1.87	2.01
Critical Peak Pricing	-	19.11	16.94	19.12	19.12
Electric Rate Savings	-	4.56	1.50	4.75	4.75
Peak Partner Rewards	-	1.74	1.71	2.33	1.74
Residential Demand Response	72.62	1.92	1.34	2.29	2.14
Demand Response Segment Total	**19.65**	**2.24**	**1.46**	**2.53**	**2.44**
Portfolio Total	**5.92**	**2.92**	**0.50**	**2.25**	**3.70**

Table 32b. Program Benefits/Cost Ratios, 2026 Natural Gas

Program Name	Participant Test	Utility Test	Gas Rate Impact Test	Societal Test	Minnesota Test
Efficient New Home Construction	2.04	1.74	0.53	1.63	3.33
Energy Efficient Showerheads	68.27	2.75	0.59	17.38	4.91
Home Energy Insights	-	3.02	0.60	1.31	5.15
Home Energy Squad	13.99	1.57	0.51	1.24	2.81
Insulation Rebates	1.18	1.74	0.53	1.25	3.24
Residential Heating & Cooling	2.04	2.79	0.60	1.37	5.26
School Education Kits	104.73	4.95	0.66	4.92	8.84
Whole Home Efficiency	2.38	1.64	0.52	1.77	3.10
Residential Segment Total	**2.61**	**2.02**	**0.55**	**1.30**	**3.77**
Business Energy Assessments	5.89	4.61	0.70	1.15	8.70
Business New Construction	2.33	7.19	0.74	1.13	13.74
Custom Efficiency	7.52	5.89	0.72	3.02	11.21
Efficiency Controls	1.27	5.39	0.71	0.79	9.78
Empower Intelligence	1,150.01	0.03	0.03	0.01	0.06
Foodservice Equipment	4.13	2.63	0.63	3.34	4.79
HVAC+R	4.10	3.55	0.67	1.92	6.60
Load Strategy Analysis	2.40	5.73	0.72	0.68	10.54
Multi-Family Building Efficiency	9.16	3.44	0.66	2.55	6.56
Non-Profit Energy Savings Program	35.79	7.04	0.70	13.83	12.89
Process & Commercial Efficiency	3.54	5.55	0.71	1.64	10.27
Business Segment Total	**6.36**	**5.21**	**0.70**	**1.93**	**9.72**
Affordable Efficient New Home Construction	-	0.22	0.17	0.66	0.42
Home Energy Savings Program	1.39	0.23	0.18	0.76	0.43
Low Income Home Energy Squad	19.44	1.34	0.48	1.11	2.40
Low Income Multi-Family Building Efficiency	5.98	5.78	0.71	0.81	11.00
Income Qualified Segment Total	**2.08**	**0.50**	**0.30**	**0.64**	**0.93**
Commercial AC Control	9.08	1.41	0.52	0.03	2.52
Demand Response Segment Total	**9.08**	**1.41**	**0.52**	**0.01**	**2.52**
Portfolio Total	**3.92**	**2.37**	**0.59**	**1.19**	**4.41**

Table 32c. Program Benefits/Cost Ratios, 2026 Efficient Fuel Switching

Program Name	Participant Test	Utility Test	Electric Rate Impact Test	Gas Rate Impact Test	Societal Test	Minnesota Test
Residential Heating & Cooling	0.85	0.73	1.96	0.53	0.94	1.17
Whole Home Efficiency	0.41	0.59	2.33	0.57	0.57	0.87
Residential Segment Total	**0.83**	**0.72**	**1.97**	**0.53**	**0.93**	**1.16**
Business Energy Assessments	0.57	1.22	2.24	0.64	0.90	1.97
Business New Construction	1.29	0.62	1.63	0.60	1.85	0.98
Compressed Air Efficiency	1.50	-	1.31	-	1.92	2.34
Custom Efficiency	1.33	0.58	1.52	0.73	1.70	3.77
HVAC+R	0.27	0.63	1.83	0.70	0.44	0.91
Process & Commercial Efficiency	1.14	0.37	0.44	0.69	0.82	0.67
Business Segment Total	**0.84**	**0.80**	**1.75**	**0.64**	**1.23**	**1.56**
Home Energy Savings Program	0.43	0.21	2.29	0.29	0.48	0.32
Low Income Multi-Family Building Efficiency	1.62	0.03	2.24	0.03	0.18	0.06
Income Qualified Segment Total	**0.70**	**0.07**	**2.28**	**0.07**	**0.26**	**0.12**
Efficient Fuel Switching Training & Support	-	-	-	-	0.65	-
Outdoor Equipment	3.31	-	0.31	-	1.96	2.50
Efficient Fuel Switching Total	**13.42**	**-**	**0.02**	**-**	**0.79**	**0.19**
Portfolio Total	**0.93**	**0.53**	**1.26**	**0.53**	**0.92**	**0.96**

D. The total number of low-income and rental customers affected by the program;

Tables 17-18 shows expected low-income customer participation by program. Tables 19-20 shows expected rental customer participation by project. Determination of low-income and rental customer goals is discussed in the various detailed program descriptions.

E. The total number of customers within a customer class expected to participate in the program, expressed as a percentage of total number of customers within that customer class in a utilities service area; and

F. The customer classes expected to participate in the program.

Table 33 shows total customers by class. The participation totals reflect in our Executive Summaries reflect the fact that the same customer can participate in multiple programs and participation expressed as a percentage of total customer count is thus not a meaningful figure; the Company does not have an accurate method to estimate participation by unique customers across the portfolio.

Table 33: Total Number of Customers

		Total # of Customers (2022)
Electric Only + Combination Customers[25]	Residential	1,204,220
	Commercial and Industrial	136,739
Natural Gas Only + Combination Customers[26]	Residential	444,425
	Commercial and Industrial	35,980

G. Other facts and circumstances concerning a particular utility that are relevant to determining the overall importance of the investment in energy conservation improvements

None.

[25] 2022 Electric Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree Days Data, p. E-29.
[26] 2022 Gas Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree E-39. 2022 Electric Jurisdictional Annual Report, E,G999/PR-23-4, Sales & Degree E-36-37.

Cost-Effectiveness Details

The Deputy Commissioner has required several items new to the Triennial Plan regarding cost-effectiveness. The Company includes compliance to these items below.

Docket No. E,G999/CIP-21-287 issued on March 15, 2022 has the following requirements as part of the EFS/Load Management Technical Guidance.

A. Alternative EFS/Load Management Cost-Benefit Analyses

The Company declined to create an alternative to the EFS or Load Management technical guidance provided by the Department. Instead, the Company utilized *Appendix A* as defined in Technical Guidance. We provide further details regarding EFS Screening and Cost Benefit Analysis in Appendix 2 and 3.

B. Spending Cap Calculation

The Company provides calculations not to exceed 0.35 percent per year, averaged over three years of our gross operating revenue from non-except customers as defined above. Additionally, EFS spending has been prorated for January 1- June 30, 2026 based on the Department's guidance.

C. Load Management Requirements

The Department requires the following for load management programs.

1. *Utilities should assess and file for approval stand-alone load management programs using custom versions of the Societal (primary), Utility, Participant, and Ratepayer Impact cost-effectiveness tests.*

The Company has filed a separate segment for load management/demand response programs as part of our Plan and provides the cost benefit analysis in the Appendix.

2. *For programs that combine load management features with other features ("multi-feature" – energy conservation, EFS, etc.), to the greatest degree possible, the cost effectiveness analysis should combine the components into a program-based cost effectiveness evaluation for approval.*

The Company has complied with this requirement and has include load shifting options in many of our business programs. Load Shifting does not appear in our load management/demand response segment as it is a measure within larger energy conservation programs.

3. *For reporting purposes, utilities should aim to separate the energy and demand savings for load management, EFS, and energy conservation embedded within multi-feature programs, but not double-count results*

All demand response programs have been separated into a new segment except for demand as part of our load shifting option which is a custom measure being reviewed under the conservation programs. To the extent possible, the Company will provide breakouts of load shifting as part of future Status Report filings.

4. *Like energy conservation measures, load management program cost-effectiveness will be reviewed at the program level and approved as part of a cost-effective segment (residential, commercial, industrial, etc.)*

The Company has filed a separate segment for load management/demand response programs as part of our Plan and provides the cost benefit analysis in the Appendix.

D. Addition of Preweatherization Measures

See Statutory Compliance (above) for additional information regarding preweatherization measures offered as part of our ECO portfolio.

Docket No. E,G999/CIP-23-46 issued on March 31, 2023 has the following requirements as part of the Cost-Effectiveness Methodologies.

A. Cost-Effectiveness Results

The Deputy Commissioner must present the following as part of their Triennial Plans.

- *Describe the cost-effectiveness results by program using the Minnesota Test,*
- *Describe any key cost-effectiveness issues that were considered in program design, and*
- *Describe any programs where secondary tests played a role in decision making.*

The Company provides the results of the Minnesota Test as part of Tables 30a-32c. Additionally, we provide the secondary tests for review. The Company considers all tests during program design, particularly the participant test as it shows whether the customer would benefit from participating. For programs with low participant tests, the Company may consider abandoning the program idea or adjusting incentive levels to make the program more attractive. For the Plan, the Company did not alter any program designs based on secondary tests, but did adjust some rebate amounts (e.g., the significantly increased rebate amounts for residential air-sealing and insulation) where doing so could enhance the participant test result without excessively reducing the utility or Minnesota test.

B. Cost-Effectiveness Test Impacts for Secondary Tests

The Deputy Commissioner provides the following list of cost-effectiveness impacts. Where impacts are not quantified or do not have an approved methodology, utilities should outline the assumptions and methodology details.

The Company complied to the methodologies provided by the Deputy Commissioner as identified in the March 31, 2023 Decision.

C. Marginal Energy Data

The Deputy Commissioner will allow electric IOUs to use internally provided marginal energy data, presumed to be the most up-to-date forecasts that would be used for Resource Plan modeling. The Deputy Commissioner requires that as part of their 2024-2026 triennial plan filings, the electric IOUs should: 1) describe the methods used to estimate their avoided marginal energy cost values; 2) share avoided marginal energy cost data in a form that is not considered Trade Secret (e.g. monthly, seasonal, or annual values, by day type and season, etc.), AND/OR provide a clear and simplified way for interested parties to receive the Trade Secret avoided marginal energy cost data (e.g. through a non-disclosure agreement with the utility).

The Company provided further detail regarding Marginal Energy as part of our Appendix 1: Electric Utility System Impacts.

D. Reporting

The Deputy Commissioner requires that utilities run cost-effectiveness tests based on the MCT, SCT, UCT, RIM and PCT and report at the program, segment, and portfolio level.

Please see Tables 30a-32c.

The filing should (either in the main body of the filing or part of the technical appendix) clearly show where and how the Company incorporated the required cost-effectiveness impacts and methods in their cost-effectiveness calculations.

The Company provided further detail regarding incorporation of the cost-effectiveness impacts in the Appendix.

As noted in Appendix L of the Decision, it is recommended here that utilities report the following in their Triennial Plans and Annual Status Reports.

Utility Type	*How to Report EFS Programs in EFS Segment*	*How to Report EFS Segment in Overall CIP Portfolio*
Electric	• *BTU Savings* • *BTU Savings converted to kWh* • *Actual kWh Impacts*	• *BTU Savings* • *BTU Savings converted to kWh* • *GHG Reduction*
Gas	• *BTU Savings*	• *BTU Savings* • *BTU Savings converted to therms*

The Company provides these details in the following tables.

Table 34: 2024 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - First Year

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(1,554,594)	15,417	-	-	-	(5,809,720)	15,417,393	-	-	-	-	9,608	658
Whole Home Efficiency	(78,986)	441	-	-	-	(295,182)	441,471	-	-	-	-	146	7
Residential Segment Total	**(1,633,580)**	**15,859**	**-**	**-**	**-**	**(6,104,903)**	**15,858,864**	**-**	**-**	**-**	**-**	**9,754**	**665**
Business Energy Assessments	(117,135)	1,873	-	-	-	(431,603)	1,873,400	-	-	-	-	1,442	100
Business New Construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air Efficiency	(34,620)	-	-	4,158	-	(127,563)	-	-	380,632	-	74,170	-	15
Custom Efficiency	(12,330)	99	820	-	-	(45,432)	98,600	98,639	-	-	22,252	76	11
HVAC+R	(169,156)	866	-	-	-	(623,284)	866,003	-	-	-	-	243	6
Process & Commercial Efficiency	(12,330)	197	-	-	-	(45,432)	197,200	-	-	-	-	152	11
Business Segment Total	**(345,571)**	**3,035**	**820**	**4,158**	**-**	**(1,273,314)**	**3,035,203**	**98,639**	**380,632**	**-**	**96,422**	**1,912**	**142**
Home Energy Savings Program	(23,205)	79	-	-	-	(86,720)	79,278	-	-	-	-	(7)	(2)
Low Income Multi-Family Building Efficiency	(5,559)	44	-	-	-	(20,776)	44,372	-	-	-	-	24	1
Income Qualified Segment Total	**(28,764)**	**124**	**-**	**-**	**-**	**(107,496)**	**123,650**	**-**	**-**	**-**	**-**	**16**	**(0)**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(49,970)	-	12,105	-	-	(185,105)	-	1,456,062	-	-	372,496	-	102
Efficient Fuel Switching Total	**(49,970)**	**-**	**12,105**	**-**	**-**	**(185,105)**	**-**	**1,456,062**	**-**	**-**	**372,496**	**-**	**102**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(2,057,886)**	**19,018**	**12,925**	**4,158**	**-**	**(7,670,817)**	**19,017,718**	**1,554,701**	**380,632**	**-**	**468,918**	**11,682**	**909**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(2,057,886)**	**19,018**	**12,925**	**4,158**	**-**	**(7,670,817)**	**19,017,718**	**1,554,701**	**380,632**	**-**	**468,918**	**11,682**	**909**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 35: 2024 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(25,804,591)	256,455	-	-	-	(96,435,119)	256,454,919	-	-	-	-	160,020	14,782
Whole Home Efficiency	(1,332,668)	7,435	-	-	-	(4,980,354)	7,435,372	-	-	-	-	2,455	323
Residential Segment Total	**(27,137,259)**	**263,890**	**-**	**-**	**-**	**(101,415,473)**	**263,890,291**	**-**	**-**	**-**	**-**	**162,475**	**15,106**
Business Energy Assessments	(2,342,700)	37,468	-	-	-	(8,632,065)	37,468,000	-	-	-	-	28,836	2,398
Business New Construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air Efficiency	(519,300)	-	-	62,370	-	(1,913,447)	-	-	5,709,475	-	1,112,552	-	297
Custom Efficiency	(246,600)	1,972	16,401	-	-	(908,638)	1,972,000	1,972,787	-	-	445,038	1,518	269
HVAC+R	(3,250,402)	17,011	-	-	-	(11,976,643)	17,011,059	-	-	-	-	5,034	700
Process & Commercial Efficiency	(246,600)	3,944	-	-	-	(908,638)	3,944,000	-	-	-	-	3,035	252
Business Segment Total	**(6,605,602)**	**60,395**	**16,401**	**62,370**	**-**	**(24,339,432)**	**60,395,059**	**1,972,787**	**5,709,475**	**-**	**1,557,590**	**38,423**	**3,918**
Home Energy Savings Program	(391,279)	1,189	-	-	-	(1,462,259)	1,189,169	-	-	-	-	(273)	21
Low Income Multi-Family Building Efficiency	(100,066)	799	-	-	-	(373,960)	798,705	-	-	-	-	425	42
Income Qualified Segment Total	**(491,345)**	**1,988**	**-**	**-**	**-**	**(1,836,219)**	**1,987,873**	**-**	**-**	**-**	**-**	**152**	**62**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(499,700)	-	121,050	-	-	(1,851,049)	-	14,560,620	-	-	3,724,962	-	1,096
Efficient Fuel Switching Total	**(499,700)**	**-**	**121,050**	**-**	**-**	**(1,851,049)**	**-**	**14,560,620**	**-**	**-**	**3,724,962**	**-**	**1,096**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(34,733,905)**	**326,273**	**137,451**	**62,370**	**-**	**(129,442,172)**	**326,273,223**	**16,533,408**	**5,709,475**	**-**	**5,282,552**	**201,050**	**20,181**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(34,733,905)**	**326,273**	**137,451**	**62,370**	**-**	**(129,442,172)**	**326,273,223**	**16,533,408**	**5,709,475**	**-**	**5,282,552**	**201,050**	**20,181**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 36: 2024 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - First Year

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(1,702,732)	15,417	-	-	-	(8,423,087)	15,417,393	-	-	-	-	6,994	658
Whole Home Efficiency	(86,513)	441	-	-	-	(436,845)	441,471	-	-	-	-	5	7
Residential Segment Total	**(1,789,245)**	**15,859**	**-**	**-**	**-**	**(8,859,932)**	**15,858,864**	**-**	**-**	**-**	**-**	**6,999**	**665**
Business Energy Assessments	(126,496)	1,873	-	-	-	(651,337)	1,873,400	-	-	-	-	1,222	100
Business New Construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air Efficiency	(37,387)	-	-	4,158	-	(194,104)	-	-	380,632	-	54,668	-	15
Custom Efficiency	(13,315)	99	820	-	-	(68,562)	98,600	98,639	-	-	18,862	64	11
HVAC+R	(182,674)	866	-	-	-	(946,191)	866,003	-	-	-	-	(80)	6
Process & Commercial Efficiency	(13,315)	197	-	-	-	(68,562)	197,200	-	-	-	-	129	11
Business Segment Total	**(373,187)**	**3,035**	**820**	**4,158**	**-**	**(1,928,756)**	**3,035,203**	**98,639**	**380,632**	**-**	**73,530**	**1,335**	**142**
Home Energy Savings Program	(25,416)	79	-	-	-	(128,996)	79,278	-	-	-	-	(50)	(2)
Low Income Multi-Family Building Efficiency	(6,089)	44	-	-	-	(30,904)	44,372	-	-	-	-	13	1
Income Qualified Segment Total	**(31,505)**	**124**	**-**	**-**	**-**	**(159,900)**	**123,650**	**-**	**-**	**-**	**-**	**(36)**	**(0)**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(54,251)	-	12,105	-	-	(293,692)	-	1,456,062	-	-	340,671	-	102
Efficient Fuel Switching Total	**(54,251)**	**-**	**12,105**	**-**	**-**	**(293,692)**	**-**	**1,456,062**	**-**	**-**	**340,671**	**-**	**102**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(2,248,188)**	**19,018**	**12,925**	**4,158**	**-**	**(11,242,281)**	**19,017,718**	**1,554,701**	**380,632**	**-**	**414,202**	**8,298**	**909**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(2,248,188)**	**19,018**	**12,925**	**4,158**	**-**	**(11,242,281)**	**19,017,718**	**1,554,701**	**380,632**	**-**	**414,202**	**8,298**	**909**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 37: 2024 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(28,263,517)	256,455	-	-	-	(122,646,340)	256,454,919	-	-	-	-	133,809	14,782
Whole Home Efficiency	(1,459,658)	7,435	-	-	-	(6,432,838)	7,435,372	-	-	-	-	1,003	323
Residential Segment Total	**(29,723,175)**	**263,890**	**-**	**-**	**-**	**(129,079,178)**	**263,890,291**	**-**	**-**	**-**	**-**	**134,811**	**15,106**
Business Energy Assessments	(2,529,914)	37,468	-	-	-	(11,184,245)	37,468,000	-	-	-	-	26,284	2,398
Business New Construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air Efficiency	(560,799)	-	-	62,370	-	(2,533,972)	-	-	5,709,475	-	930,687	-	297
Custom Efficiency	(266,307)	1,972	16,401	-	-	(1,177,289)	1,972,000	1,972,787	-	-	405,669	1,383	269
HVAC+R	(3,510,153)	17,011	-	-	-	(15,626,719)	17,011,059	-	-	-	-	1,384	700
Process & Commercial Efficiency	(266,307)	3,944	-	-	-	(1,177,289)	3,944,000	-	-	-	-	2,767	252
Business Segment Total	**(7,133,479)**	**60,395**	**16,401**	**62,370**	**-**	**(31,699,514)**	**60,395,059**	**1,972,787**	**5,709,475**	**-**	**1,336,356**	**31,818**	**3,918**
Home Energy Savings Program	(428,564)	1,189	-	-	-	(1,896,276)	1,189,169	-	-	-	-	(707)	21
Low Income Multi-Family Building Efficiency	(109,601)	799	-	-	-	(485,366)	798,705	-	-	-	-	313	42
Income Qualified Segment Total	**(538,165)**	**1,988**	**-**	**-**	**-**	**(2,381,642)**	**1,987,873**	**-**	**-**	**-**	**-**	**(394)**	**62**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(542,511)	-	121,050	-	-	(2,542,135)	-	14,560,620	-	-	3,522,416	-	1,096
Efficient Fuel Switching Total	**(542,511)**	**-**	**121,050**	**-**	**-**	**(2,542,135)**	**-**	**14,560,620**	**-**	**-**	**3,522,416**	**-**	**1,096**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(37,937,331)**	**326,273**	**137,451**	**62,370**	**-**	**(165,702,469)**	**326,273,223**	**16,533,408**	**5,709,475**	**-**	**4,858,772**	**166,236**	**20,181**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(37,937,331)**	**326,273**	**137,451**	**62,370**	**-**	**(165,702,469)**	**326,273,223**	**16,533,408**	**5,709,475**	**-**	**4,858,772**	**166,236**	**20,181**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 38: 2025 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - First Year

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(3,121,177)	30,948	-	-	-	(11,664,246)	30,948,441	-	-	-	-	19,284	1,675
Whole Home Efficiency	(149,249)	831	-	-	-	(557,764)	831,064	-	-	-	-	273	32
Residential Segment Total	**(3,270,426)**	**31,780**	**-**	**-**	**-**	**(12,222,010)**	**31,779,504**	**-**	**-**	**-**	**-**	**19,557**	**1,707**
Business Energy Assessments	(295,920)	4,733	-	-	-	(1,090,366)	4,732,800	-	-	-	-	3,642	282
Business New Construction	(123,138)	1,130	-	-	-	(453,722)	1,129,929	-	-	-	-	676	56
Compressed Air Efficiency	(69,240)	-	-	8,316	-	(255,126)	-	-	761,263	-	148,340	-	36
Custom Efficiency	(43,155)	296	2,460	-	-	(159,012)	295,800	295,918	-	-	60,098	228	37
HVAC+R	(175,282)	928	-	-	-	(645,856)	927,803	-	-	-	-	282	34
Process & Commercial Efficiency	(12,330)	197	-	-	-	(45,432)	197,200	-	-	-	-	152	12
Business Segment Total	**(719,065)**	**7,284**	**2,460**	**8,316**	**-**	**(2,649,514)**	**7,283,532**	**295,918**	**761,263**	**-**	**208,438**	**4,980**	**457**
Home Energy Savings Program	(34,807)	119	-	-	-	(130,080)	118,917	-	-	-	-	(11)	2
Low Income Multi-Family Building Efficiency	(11,118)	44	-	-	-	(41,551)	44,372	-	-	-	-	3	1
Income Qualified Segment Total	**(45,926)**	**163**	**-**	**-**	**-**	**(171,631)**	**163,289**	**-**	**-**	**-**	**-**	**(8)**	**3**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(49,970)	-	12,105	-	-	(185,105)	-	1,456,062	-	-	372,496	-	106
Efficient Fuel Switching Total	**(49,970)**	**-**	**12,105**	**-**	**-**	**(185,105)**	**-**	**1,456,062**	**-**	**-**	**372,496**	**-**	**106**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(4,085,387)**	**39,226**	**14,565**	**8,316**	**-**	**(15,228,259)**	**39,226,326**	**1,751,980**	**761,263**	**-**	**580,934**	**24,529**	**2,273**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(4,085,387)**	**39,226**	**14,565**	**8,316**	**-**	**(15,228,259)**	**39,226,326**	**1,751,980**	**761,263**	**-**	**580,934**	**24,529**	**2,273**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 39: 2025 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(51,792,858)	514,683	-	-	-	(193,556,662)	514,682,801	-	-	-	-	321,126	30,241
Whole Home Efficiency	(2,515,969)	13,937	-	-	-	(9,402,505)	13,936,935	-	-	-	-	4,534	628
Residential Segment Total	**(54,308,827)**	**528,620**	**-**	**-**	**-**	**(202,959,167)**	**528,619,736**	**-**	**-**	**-**	**-**	**325,661**	**30,869**
Business Energy Assessments	(5,918,400)	94,656	-	-	-	(21,807,323)	94,656,000	-	-	-	-	72,849	6,119
Business New Construction	(2,462,757)	22,599	-	-	-	(9,074,435)	22,598,575	-	-	-	-	13,524	1,322
Compressed Air Efficiency	(1,038,600)	-	-	124,740	-	(3,826,893)	-	-	11,418,949	-	2,225,104	-	608
Custom Efficiency	(863,100)	5,916	49,202	-	-	(3,180,235)	5,916,000	5,918,362	-	-	1,201,959	4,553	799
HVAC+R	(3,311,662)	17,629	-	-	-	(12,202,366)	17,629,059	-	-	-	-	5,427	774
Process & Commercial Efficiency	(246,600)	3,944	-	-	-	(908,638)	3,944,000	-	-	-	-	3,035	255
Business Segment Total	**(13,841,119)**	**144,744**	**49,202**	**124,740**	**-**	**(50,999,890)**	**144,743,635**	**5,918,362**	**11,418,949**	**-**	**3,427,063**	**99,388**	**9,877**
Home Energy Savings Program	(586,918)	1,784	-	-	-	(2,193,388)	1,783,753	-	-	-	-	(410)	38
Low Income Multi-Family Building Efficiency	(200,132)	799	-	-	-	(747,920)	798,705	-	-	-	-	51	27
Income Qualified Segment Total	**(787,050)**	**2,582**	**-**	**-**	**-**	**(2,941,309)**	**2,582,458**	**-**	**-**	**-**	**-**	**(359)**	**65**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(499,700)	-	121,050	-	-	(1,851,049)	-	14,560,620	-	-	3,724,962	-	1,106
Efficient Fuel Switching Total	**(499,700)**	**-**	**121,050**	**-**	**-**	**(1,851,049)**	**-**	**14,560,620**	**-**	**-**	**3,724,962**	**-**	**1,106**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(69,436,697)**	**675,946**	**170,252**	**124,740**	**-**	**(258,751,414)**	**675,945,828**	**20,478,982**	**11,418,949**	**-**	**7,152,026**	**424,690**	**41,918**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(69,436,697)**	**675,946**	**170,252**	**124,740**	**-**	**(258,751,414)**	**675,945,828**	**20,478,982**	**11,418,949**	**-**	**7,152,026**	**424,690**	**41,918**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 40: 2025 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - First Year

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(3,418,595)	30,948	-	-	-	(15,582,287)	30,948,441	-	-	-	-	15,366	1,675
Whole Home Efficiency	(163,471)	831	-	-	-	(739,536)	831,064	-	-	-	-	92	32
Residential Segment Total	**(3,582,066)**	**31,780**	**-**	**-**	**-**	**(16,321,823)**	**31,779,504**	**-**	**-**	**-**	**-**	**15,458**	**1,707**
Business Energy Assessments	(319,568)	4,733	-	-	-	(1,540,588)	4,732,800	-	-	-	-	3,192	282
Business New Construction	(132,978)	1,130	-	-	-	(641,067)	1,129,929	-	-	-	-	489	56
Compressed Air Efficiency	(74,773)	-	-	8,316	-	(363,358)	-	-	761,263	-	116,619	-	36
Custom Efficiency	(46,604)	296	2,460	-	-	(224,669)	295,800	295,918	-	-	49,102	200	37
HVAC+R	(189,290)	928	-	-	-	(844,394)	927,803	-	-	-	-	83	34
Process & Commercial Efficiency	(13,315)	197	-	-	-	(64,191)	197,200	-	-	-	-	133	12
Business Segment Total	**(776,528)**	**7,284**	**2,460**	**8,316**	**-**	**(3,678,268)**	**7,283,532**	**295,918**	**761,263**	**-**	**165,721**	**4,097**	**457**
Home Energy Savings Program	(38,124)	119	-	-	-	(171,468)	118,917	-	-	-	-	(53)	2
Low Income Multi-Family Building Efficiency	(12,178)	44	-	-	-	(54,772)	44,372	-	-	-	-	(10)	1
Income Qualified Segment Total	**(50,302)**	**163**	**-**	**-**	**-**	**(226,240)**	**163,289**	**-**	**-**	**-**	**-**	**(63)**	**3**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(54,251)	-	12,105	-	-	(282,552)	-	1,456,062	-	-	343,936	-	106
Efficient Fuel Switching Total	**(54,251)**	**-**	**12,105**	**-**	**-**	**(282,552)**	**-**	**1,456,062**	**-**	**-**	**343,936**	**-**	**106**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(4,463,147)**	**39,226**	**14,565**	**8,316**	**-**	**(20,508,883)**	**39,226,326**	**1,751,980**	**761,263**	**-**	**509,657**	**19,492**	**2,273**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(4,463,147)**	**39,226**	**14,565**	**8,316**	**-**	**(20,508,883)**	**39,226,326**	**1,751,980**	**761,263**	**-**	**509,657**	**19,492**	**2,273**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 41: 2025 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(56,728,213)	514,683	-	-	-	(244,124,505)	514,682,801	-	-	-	-	270,558	30,241
Whole Home Efficiency	(2,755,717)	13,937	-	-	-	(12,067,010)	13,936,935	-	-	-	-	1,870	628
Residential Segment Total	**(59,483,929)**	**528,620**	**-**	**-**	**-**	**(256,191,514)**	**528,619,736**	**-**	**-**	**-**	**-**	**272,428**	**30,869**
Business Energy Assessments	(6,391,361)	94,656	-	-	-	(27,992,014)	94,656,000	-	-	-	-	66,664	6,119
Business New Construction	(2,659,565)	22,599	-	-	-	(11,648,001)	22,598,575	-	-	-	-	10,951	1,322
Compressed Air Efficiency	(1,121,598)	-	-	124,740	-	(5,017,268)	-	-	11,418,949	-	1,876,225	-	608
Custom Efficiency	(932,073)	5,916	49,202	-	-	(4,082,169)	5,916,000	5,918,362	-	-	1,050,907	4,166	799
HVAC+R	(3,576,309)	17,629	-	-	-	(15,774,788)	17,629,059	-	-	-	-	1,854	774
Process & Commercial Efficiency	(266,307)	3,944	-	-	-	(1,166,334)	3,944,000	-	-	-	-	2,778	255
Business Segment Total	**(14,947,213)**	**144,744**	**49,202**	**124,740**	**-**	**(65,680,574)**	**144,743,635**	**5,918,362**	**11,418,949**	**-**	**2,927,132**	**86,413**	**9,877**
Home Energy Savings Program	(642,845)	1,784	-	-	-	(2,820,716)	1,783,753	-	-	-	-	(1,037)	38
Low Income Multi-Family Building Efficiency	(219,203)	799	-	-	-	(962,739)	798,705	-	-	-	-	(164)	27
Income Qualified Segment Total	**(862,048)**	**2,582**	**-**	**-**	**-**	**(3,783,455)**	**2,582,458**	**-**	**-**	**-**	**-**	**(1,201)**	**65**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(542,511)	-	121,050	-	-	(2,488,032)	-	14,560,620	-	-	3,538,273	-	1,106
Efficient Fuel Switching Total	**(542,511)**	**-**	**121,050**	**-**	**-**	**(2,488,032)**	**-**	**14,560,620**	**-**	**-**	**3,538,273**	**-**	**1,106**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(75,835,702)**	**675,946**	**170,252**	**124,740**	**-**	**(328,143,576)**	**675,945,828**	**20,478,982**	**11,418,949**	**-**	**6,465,405**	**357,640**	**41,918**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(75,835,702)**	**675,946**	**170,252**	**124,740**	**-**	**(328,143,576)**	**675,945,828**	**20,478,982**	**11,418,949**	**-**	**6,465,405**	**357,640**	**41,918**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 42: 2026 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - First Year

Program Name	Actual impacts					kBTU impacts					Net Impacts		GHGs
	Net Gen kWh Savings	Dth Savings	Gasoline Savings	Propane Savings	Diesel Savings	Net Gen kWh Savings	Dth Savings	Gasoline Savings	Propane Savings	Diesel Savings	Net Gen kWh Savings	Dth Savings	GHG Savings
Residential Heating & Cooling	(6,240,436)	61,863	-	-	-	(23,321,321)	61,862,808	-	-	-	-	38,541	3,391
Whole Home Efficiency	(221,412)	1,255	-	-	-	(827,447)	1,254,730	-	-	-	-	427	48
Residential Segment Total	**(6,461,848)**	**63,118**	**-**	**-**	**-**	**(24,148,768)**	**63,117,538**	**-**	**-**	**-**	**-**	**38,969**	**3,439**
Business Energy Assessments	(369,900)	5,916	-	-	-	(1,362,958)	5,916,000	-	-	-	-	4,553	355
Business New Construction	(331,793)	3,071	-	-	-	(1,222,545)	3,071,287	-	-	-	-	1,849	155
Compressed Air Efficiency	(69,240)	-	-	8,316	-	(255,126)	-	-	761,263	-	148,340	-	37
Custom Efficiency	(67,815)	493	4,100	-	-	(249,876)	493,000	493,197	-	-	104,602	379	62
HVAC+R	(181,408)	990	-	-	-	(668,428)	989,603	-	-	-	-	321	34
Process & Commercial Efficiency	(12,330)	197	-	-	-	(45,432)	197,200	-	-	-	-	152	12
Business Segment Total	**(1,032,486)**	**10,667**	**4,100**	**8,316**	**-**	**(3,804,365)**	**10,667,090**	**493,197**	**761,263**	**-**	**252,942**	**7,254**	**654**
Home Energy Savings Program	(53,611)	159	-	-	-	(200,350)	158,556	-	-	-	-	(42)	1
Low Income Multi-Family Building Efficiency	(5,559)	89	-	-	-	(20,776)	88,745	-	-	-	-	68	5
Income Qualified Segment Total	**(59,170)**	**247**	**-**	**-**	**-**	**(221,125)**	**247,301**	**-**	**-**	**-**	**-**	**26**	**6**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(49,970)	-	12,105	-	-	(185,105)	-	1,456,062	-	-	372,496	-	107
Efficient Fuel Switching Total	**(49,970)**	**-**	**12,105**	**-**	**-**	**(185,105)**	**-**	**1,456,062**	**-**	**-**	**372,496**	**-**	**107**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(7,603,474)**	**74,032**	**16,205**	**8,316**	**-**	**(28,359,363)**	**74,031,928**	**1,949,259**	**761,263**	**-**	**625,438**	**46,249**	**4,206**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(7,603,474)**	**74,032**	**16,205**	**8,316**	**-**	**(28,359,363)**	**74,031,928**	**1,949,259**	**761,263**	**-**	**625,438**	**46,249**	**4,206**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 43: 2026 Efficient Fuel Switching Site-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(103,560,773)	1,028,923	-	-	-	(387,020,107)	1,028,922,643	-	-	-	-	641,903	60,879
Whole Home Efficiency	(3,723,973)	20,881	-	-	-	(13,916,974)	20,881,457	-	-	-	-	6,964	961
Residential Segment Total	**(107,284,747)**	**1,049,804**	**-**	**-**	**-**	**(400,937,082)**	**1,049,804,100**	**-**	**-**	**-**	**-**	**648,867**	**61,840**
Business Energy Assessments	(7,398,000)	118,320	-	-	-	(27,259,153)	118,320,000	-	-	-	-	91,061	7,692
Business New Construction	(6,627,227)	61,279	-	-	-	(24,419,114)	61,279,288	-	-	-	-	36,860	3,629
Compressed Air Efficiency	(1,038,600)	-	-	124,740	-	(3,826,893)	-	-	11,418,949	-	2,225,104	-	613
Custom Efficiency	(1,356,300)	9,860	82,004	-	-	(4,997,511)	9,860,000	9,863,936	-	-	2,092,034	7,588	1,351
HVAC+R	(3,372,922)	18,247	-	-	-	(12,428,088)	18,247,059	-	-	-	-	5,819	823
Process & Commercial Efficiency	(246,600)	3,944	-	-	-	(908,638)	3,944,000	-	-	-	-	3,035	256
Business Segment Total	**(20,039,649)**	**211,650**	**82,004**	**124,740**	**-**	**(73,839,399)**	**211,650,348**	**9,863,936**	**11,418,949**	**-**	**4,317,139**	**144,364**	**14,365**
Home Energy Savings Program	(912,170)	2,378	-	-	-	(3,408,897)	2,378,337	-	-	-	-	(1,031)	34
Low Income Multi-Family Building Efficiency	(100,066)	1,597	-	-	-	(373,960)	1,597,409	-	-	-	-	1,223	101
Income Qualified Segment Total	**(1,012,236)**	**3,976**	**-**	**-**	**-**	**(3,782,857)**	**3,975,747**	**-**	**-**	**-**	**-**	**193**	**135**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(499,700)	-	121,050	-	-	(1,851,049)	-	14,560,620	-	-	3,724,962	-	1,111
Efficient Fuel Switching Total	**(499,700)**	**-**	**121,050**	**-**	**-**	**(1,851,049)**	**-**	**14,560,620**	**-**	**-**	**3,724,962**	**-**	**1,111**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(128,836,332)**	**1,265,430**	**203,054**	**124,740**	**-**	**(480,410,386)**	**1,265,430,194**	**24,424,556**	**11,418,949**	**-**	**8,042,101**	**793,424**	**77,451**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(128,836,332)**	**1,265,430**	**203,054**	**124,740**	**-**	**(480,410,386)**	**1,265,430,194**	**24,424,556**	**11,418,949**	**-**	**8,042,101**	**793,424**	**77,451**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 44: 2026 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - First Year

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(6,835,088)	61,863	-	-	-	(29,456,505)	61,862,808	-	-	-	-	32,406	3,391
Whole Home Efficiency	(242,511)	1,255	-	-	-	(1,055,885)	1,254,730	-	-	-	-	199	48
Residential Segment Total	**(7,077,599)**	**63,118**	**-**	**-**	**-**	**(30,512,390)**	**63,117,538**	**-**	**-**	**-**	**-**	**32,605**	**3,439**
Business Energy Assessments	(399,460)	5,916	-	-	-	(1,867,206)	5,916,000	-	-	-	-	4,049	355
Business New Construction	(358,307)	3,071	-	-	-	(1,674,846)	3,071,287	-	-	-	-	1,396	155
Compressed Air Efficiency	(74,773)	-	-	8,316	-	(350,222)	-	-	761,263	-	120,469	-	37
Custom Efficiency	(73,234)	493	4,100	-	-	(342,321)	493,000	493,197	-	-	89,823	337	62
HVAC+R	(195,905)	990	-	-	-	(867,185)	989,603	-	-	-	-	122	34
Process & Commercial Efficiency	(13,315)	197	-	-	-	(62,240)	197,200	-	-	-	-	135	12
Business Segment Total	**(1,114,995)**	**10,667**	**4,100**	**8,316**	**-**	**(5,164,022)**	**10,667,090**	**493,197**	**761,263**	**-**	**210,292**	**6,040**	**654**
Home Energy Savings Program	(58,719)	159	-	-	-	(254,502)	158,556	-	-	-	-	(96)	1
Low Income Multi-Family Building Efficiency	(6,089)	89	-	-	-	(26,391)	88,745	-	-	-	-	62	5
Income Qualified Segment Total	**(64,808)**	**247**	**-**	**-**	**-**	**(280,893)**	**247,301**	**-**	**-**	**-**	**-**	**(34)**	**6**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(54,251)	-	12,105	-	-	(276,786)	-	1,456,062	-	-	345,626	-	107
Efficient Fuel Switching Total	**(54,251)**	**-**	**12,105**	**-**	**-**	**(276,786)**	**-**	**1,456,062**	**-**	**-**	**345,626**	**-**	**107**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(8,311,654)**	**74,032**	**16,205**	**8,316**	**-**	**(36,234,090)**	**74,031,928**	**1,949,259**	**761,263**	**-**	**555,918**	**38,612**	**4,206**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(8,311,654)**	**74,032**	**16,205**	**8,316**	**-**	**(36,234,090)**	**74,031,928**	**1,949,259**	**761,263**	**-**	**555,918**	**38,612**	**4,206**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

Table 45: 2026 Efficient Fuel Switching Source-Based Fuel Nuetral Energy Analysis - Lifetime

	Actual impacts					kBTU impacts					Net Impacts		GHGs
Program Name	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**Gasoline Savings**	**Propane Savings**	**Diesel Savings**	**Net Gen kWh Savings**	**Dth Savings**	**GHG Savings**
Residential Heating & Cooling	(113,429,105)	1,028,923	-	-	-	(486,664,836)	1,028,922,643	-	-	-	-	542,258	60,879
Whole Home Efficiency	(4,078,832)	20,881	-	-	-	(17,844,945)	20,881,457	-	-	-	-	3,037	961
Residential Segment Total	**(117,507,937)**	**1,049,804**	**-**	**-**	**-**	**(504,509,781)**	**1,049,804,100**	**-**	**-**	**-**	**-**	**545,294**	**61,840**
Business Energy Assessments	(7,989,201)	118,320	-	-	-	(34,755,979)	118,320,000	-	-	-	-	83,564	7,692
Business New Construction	(7,156,833)	61,279	-	-	-	(31,135,514)	61,279,288	-	-	-	-	30,144	3,629
Compressed Air Efficiency	(1,121,598)	-	-	124,740	-	(4,989,720)	-	-	11,418,949	-	1,884,299	-	613
Custom Efficiency	(1,464,687)	9,860	82,004	-	-	(6,371,929)	9,860,000	9,863,936	-	-	1,872,315	6,964	1,351
HVAC+R	(3,642,464)	18,247	-	-	-	(16,049,376)	18,247,059	-	-	-	-	2,198	823
Process & Commercial Efficiency	(266,307)	3,944	-	-	-	(1,158,533)	3,944,000	-	-	-	-	2,785	256
Business Segment Total	**(21,641,090)**	**211,650**	**82,004**	**124,740**	**-**	**(94,461,051)**	**211,650,348**	**9,863,936**	**11,418,949**	**-**	**3,756,614**	**125,655**	**14,365**
Home Energy Savings Program	(999,090)	2,378	-	-	-	(4,379,265)	2,378,337	-	-	-	-	(2,001)	34
Low Income Multi-Family Building Efficiency	(109,601)	1,597	-	-	-	(480,566)	1,597,409	-	-	-	-	1,117	101
Income Qualified Segment Total	**(1,108,692)**	**3,976**	**-**	**-**	**-**	**(4,859,831)**	**3,975,747**	**-**	**-**	**-**	**-**	**(884)**	**135**
Demand Response Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Outdoor Equipment	(542,511)	-	121,050	-	-	(2,456,779)	-	14,560,620	-	-	3,547,433	-	1,111
Efficient Fuel Switching Total	**(542,511)**	**-**	**121,050**	**-**	**-**	**(2,456,779)**	**-**	**14,560,620**	**-**	**-**	**3,547,433**	**-**	**1,111**
Indirect Products & Services Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Research, Evaluations & Pilots Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total	**(140,800,230)**	**1,265,430**	**203,054**	**124,740**	**-**	**(606,287,441)**	**1,265,430,194**	**24,424,556**	**11,418,949**	**-**	**7,304,047**	**670,065**	**77,451**
Assessments Segment Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Alternative Filings Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Portfolio Total w Alternative Filings	**(140,800,230)**	**1,265,430**	**203,054**	**124,740**	**-**	**(606,287,441)**	**1,265,430,194**	**24,424,556**	**11,418,949**	**-**	**7,304,047**	**670,065**	**77,451**

Tables are in terms of energy savings. Negative numbers indicate increases in energy consumption.

RESIDENTIAL SEGMENT

Overview

The Residential Segment reflects the diverse population across electric and natural gas customers. This segment is assembled to provide educational resources on how to understand and reduce residential energy bills, rebates, and incentives to remove barriers to investing in energy-efficiency equipment, and financial and trade resource support to enable the installation of conservation measures in customer's homes.

For the 2024-2026 ECO triennial filing, the Company proposes to continue many of our successful programs. We also propose the addition of new incentives, marketing efforts specifically targeted to our residential customers, and additional tools to manage energy as we shift from simple low-cost measures (such as a lightbulb) to more expensive and impactful measures – many of which are aimed towards beneficial electrification. Additionally, with the passing of the Inflation Reduction Act (IRA), the Company anticipates a role in providing customers and contractors with education on the incentives and tax credits available, which may include collaboration with IRA implementation.

Programs

The Residential Segment proposes a comprehensive set of program offerings including prescriptive rebates for heating and cooling equipment, home lighting, whole house solutions for new or existing homes, lessons on energy efficiency to school-aged children, energy savings through behavior change, and refrigerator recycling.

Targets

The Residential Segment portfolio is designed to provide all residential customers with an opportunity to lower their energy costs. With a portfolio of 13 programs, the residential segment accounts for roughly 23 percent of our total electric energy savings and 40 percent of our total natural gas savings. The following tables present the Company's targets for 2024-2026:

Table 46a: 2024 Residential Segment

	Electric				Natural Gas		
2024	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Consumer Education	481,500	$963,000	-	-	321,000	$642,000	-
Efficient New Home Construction	2,925	$1,674,205	1,208	4,317,702	1,630	$2,299,104	39,905
Energy Efficient Showerheads	4,860	$146,428	118	1,440,811	6,840	$244,642	13,004
Home Energy Audit	13,843	$2,294,658	-	-	5,105	$1,518,714	-
Home Energy Insights	1,119,270	$1,312,724	5,604	28,289,302	277,060	$328,553	63,598
Home Energy Squad	11,322	$3,314,688	1,417	8,289,858	4,160	$1,020,713	33,827
Home Lighting	337,450	$6,512,219	7,733	68,000,679	-	-	-
Insulation Rebates	2,355	$307,036	292	221,656	2,313	$1,219,022	32,321
Lamp Recycling	471,787	$326,986	-	-	-	-	-
Refrigerator & Freezer Recycling	7,000	$1,535,915	866	7,414,303	-	-	-
Residential Heating & Cooling	41,862	$10,131,631	15,604	9,586,628	25,968	$5,393,065	205,540
School Education Kits	42,000	$1,704,759	2,189	7,885,093	21,500	$398,520	51,598
Whole Home Efficiency	215	$82,224	52	302,054	202	$171,612	3,685
Residential Segment Total	**2,536,389**	**$30,306,724**	**35,083**	**135,748,086**	**665,778**	**$13,235,945**	**443,477**

Table 46b: 2025 Residential Segment

	Electric				Natural Gas		
2025	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Consumer Education	481,500	$1,011,150	-	-	321,000	$674,100	-
Efficient New Home Construction	3,211	$1,773,156	1,331	4,749,959	1,784	$2,443,495	43,764
Energy Efficient Showerheads	4,950	$152,129	128	1,568,872	7,250	$254,232	14,285
Home Energy Audit	15,607	$2,580,435	-	-	5,757	$1,707,142	-
Home Energy Insights	1,073,690	$1,341,583	6,027	29,698,787	243,620	$315,309	64,366
Home Energy Squad	12,455	$3,695,893	1,345	7,604,384	4,576	$1,131,141	35,882
Home Lighting	281,406	$6,188,693	7,949	66,138,029	-	-	-
Insulation Rebates	2,588	$329,829	321	236,271	2,541	$1,337,055	35,470
Lamp Recycling	452,816	$314,829	-	-	-	-	-
Refrigerator & Freezer Recycling	7,100	$1,571,689	879	7,520,222	-	-	-
Residential Heating & Cooling	42,552	$10,548,756	16,660	9,845,805	26,238	$5,398,370	205,540
School Education Kits	42,920	$1,772,397	2,223	7,988,977	21,970	$414,624	52,930
Whole Home Efficiency	282	$115,819	71	472,182	242	$186,602	4,035
Residential Segment Total	**2,421,077**	**$31,396,357**	**35,935**	**135,820,489**	**634,978**	**$13,862,071**	**456,271**

Table 46c: 2025 Residential Segment

	Electric				Natural Gas		
2026	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Consumer Education	481,500	$1,061,708	-	-	321,000	$707,804	-
Efficient New Home Construction	3,542	$1,939,974	2,289	12,427,389	1,962	$2,632,130	53,554
Energy Efficient Showerheads	5,150	$160,292	139	1,709,662	7,425	$264,686	15,695
Home Energy Audit	17,639	$2,909,095	-	-	6,511	$1,924,822	-
Home Energy Insights	1,031,550	$1,362,227	6,101	29,893,776	212,540	$302,989	63,285
Home Energy Squad	13,700	$4,053,136	1,297	7,005,339	5,034	$1,236,574	38,808
Home Lighting	309,362	$6,201,004	8,166	69,741,372	-	-	-
Insulation Rebates	2,846	$ 353,737	353	252,647	2,796	$1,470,935	39,026
Lamp Recycling	433,845	$ 302,681	-	-	-	-	-
Refrigerator & Freezer Recycling	7,200	$1,610,175	891	7,626,140	-	-	-
Residential Heating & Cooling	43,922	$11,344,004	15,770	10,351,846	26,778	$5,374,118	205,540
School Education Kits	43,867	$1,843,027	2,260	8,091,666	22,453	$431,439	53,956
Whole Home Efficiency	361	$154,746	94	670,717	288	$202,925	4,403
Residential Segment Total	**2,397,484**	**$33,295,807**	**37,360**	**147,770,554**	**606,787**	**$14,548,423**	**474,266**

Market Analysis

The Residential Segment reflects the primary market opportunities for residential energy savings in four areas: energy efficiency incentives, education and behavioral change, residential heating and cooling, and whole home and building envelope.

- *Energy Efficiency Equipment:* The Company supports energy-saving measures focused on the low cost/no cost measures that allow customers to easily participate in our rebate programs without high upfront costs through such programs as Home Energy Squad, Home Lighting and Lamp Recycling and Energy Efficient Showerheads.
- *Education and Behavioral Change:* Through Home Energy Insights, customers gain understanding into their own energy use, receive suggestions for steps to reduce their bills, and learn about additional programs that are available to help with the cost of more expensive measures. School Education Kits provide easy-to-install savings measures along

with information intended to foster market transformation by enhancing students' understanding of energy.

- *Residential Heating and Cooling*: The Company offers products focused on quality installation of new units and replacement of inefficient existing heating and cooling systems. New in this plan, we propose to offer incentives for dual fuel heat pumps and heat pump water heaters as now allowed by the ECO Act.
- *Whole Home and Building Envelope*: Rather than addressing specific measures, this category of programs helps residential customers pursue broad energy efficiency opportunities in new or existing homes. Offerings in this category include holistic programs such as Whole Home Efficiency and Efficient New Home Construction, as well as programs supporting measures that affect multiple end-uses, such as Insulation Rebates.

Marketing/Advertising/Promotion
Trade allies, end-use equipment vendors, energy services companies, the Company's call center representatives and marketing team are the primary drivers for realization of the planned achievements in the Residential Program. The Company uses newsletters, customer events, direct mail, telemarketing, email communications, and awareness advertising to reach customers. A challenge in marketing energy efficiency is that it is not a topic on the top of customers' minds. Customers tend to focus on purchase price (or "upfront costs") rather than lifetime costs and are unlikely to replace equipment prior to failure. Customers may also not be aware of energy efficient equipment options available to them when the need arises to make purchase decisions.

To overcome this challenge, the Company employs an integrated approach to marketing communications, where the tactics are designed to work in concert with each other and reinforce key messages over time. When communicating with customers, the Company will use several overarching key messages including reduced consumption, lower operating costs, decreased utility bills, and environmental impact through carbon reduction.

Policies
The Residential Segment does not have any unique, segment-based policies. Each program will enforce its participation and equipment eligibility rules and requirements; however, they may be modified when warranted and within guidance outlined by the Minnesota Department of Commerce.

Involvement with Interested Individuals and Entities
The Company continues to regularly meet with many organizations to refine existing programs, shape new programs, and discuss partnership opportunities. These organizations include but are not limited to local advocates and partners such as Center for Energy and Environment, trade allies, and contracted program implementers; regional and national experts such as the American Council for Energy Efficient Economy and the Midwest Energy Efficiency Alliance; other Minnesota electric and gas utilities; and representatives of the cities and counties in which the Company operates.

1. CONSUMER EDUCATION

Program Description

The Consumer Education program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium.

The Consumer Education program is an indirect-impact program that provides residential customers with information and resources to reduce their energy usage. Because the residential segment is demographically varied, the Company employs a variety of resources to communicate the energy conservation message. For the Plan, the Company will focus on renewing existing partnerships and building new relationships. In addition, the program employs digital media strategies to drive active engagement in energy efficiency. By continuing to diversify the communication channels, the program increases residential customers' knowledge base and provides a greater variety of resource options and services.

Program Details

The program's communication strategies include the following:

- Customer outreach via annual sponsorships and local community events with on-site activations and highly visible direct messaging opportunities;
- Digital media;
- Direct mail marketing to communicate energy conservation messages;
- Print and/or digital advertising in conservation publications;
- Publication of reference materials; and
- Sponsorship of seminars and conferences supporting residential conservation and energy efficiency.

The program will use engaging event activations to provide information and resources that help residential customers reduce their energy usage at home. The common theme in the messaging conveys the importance of everyone's role in becoming more energy efficient. The program will target a variety of high-traffic events throughout the year to reach a wide-ranging demographic of Xcel Energy customers. Events include professional and regional sports games, county fairs, arts and cultural festivals and a variety of other community events.

Program Changes

The Company is not proposing any changes to the Consumer Education program.

Budget, Participation and Target Considerations

Program budgets were developed through identification of customer segments, costs to produce materials, event and sponsorship costs and staffing.

The main budget drivers include the following:

- Utility Administration: This category represents the labor needed for program planning and implementation.
- Advertising & Promotion: This budget includes funds for printed materials, community outreach events, sponsorships, and digital advertising.

Participation targets were established through the review of historical data from targeted, successful outreach to customer segments and use of multiple channels for delivery of energy efficiency messaging. Participation for the program is defined as any time a customer engages with the program via impression or touch point, whether it be an in-person event interaction or a digital impression.

Stakeholder Involvement
Not Applicable.

2. EFFICIENT NEW HOME CONSTRUCTION

Program Description
Efficient New Home Construction was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Efficient New Home Construction is designed to target home builders of residential single-family, duplex, triplex, fourplex, town homes, and condominium units that have individual heating systems and residential meters for Xcel Energy natural gas and/or electric service. The Company will provide financial incentives for building homes at least 10 percent better than established in the State energy code (better than code, or BTC) with incentives increasing with higher levels of building efficiency. These efficiency projects may pertain to improvements in building envelopes, heating and cooling systems, water heat, appliances, and other permanent energy consuming devices. Savings are determined by energy models built on data collected by Home Energy Rating System (HERS) certified HERS Raters (Raters) by comparing the energy use of the as-built home to an identical home that is built to the minimum energy code.

For the Plan, the Company is proposing to add tiered Rater incentives and bonus incentives for high performance building certifications. We detail these more specifically below.

Additionally, the Company plans to add a component to support energy code compliance once the State residential energy code advances. The Company plans to proactively support jurisdictions to comply with the latest building codes within the residential new construction sector. The Company, in coordination with peer gas and electric utilities throughout the state, will give those communities the tools to improve compliance with updated codes and ultimately help them reach their energy performance and economic development goals. This support will be designed to address current gaps in code adoption across the state including: a lack of resources, lack of knowledge, and opposition to increasing code standards.

Eligibility/Qualification for Participation
To qualify for rebates, homes must be built in the Company's service territory and have the Company's gas or electric service. Homes that heat with natural gas or exclusively with electricity provided by the Company are eligible for full incentives. Homes with electric service from the Company but do not have exclusively electric heat are eligible for electric-only homes prescriptive rebates. Homes must be entirely new construction; additions and 'gut remodels' do not qualify. Communities statewide are eligible to receive support from the Company, and its peer utilities that elect to participate, in complying with advancing residential energy code minimums.

Qualifying Upgrades/Measures

Qualifications are based on the type and scope of service provided by Xcel Energy:

- Homes with heating fuel provided by the Company must be at least 10 percent BTC to qualify for performance-based incentives. Homes built more than 10 percent BTC with electric service from the company and heating fuel from another provider are eligible for a flat incentive.
- Additional prescriptive rebates are available for refrigerators, radon fans, clothes washers and dryers, AC Rewards-eligible thermostats, and heat pump water heaters if the fuel provided matches the fuel saved. Prescriptive rebates are in addition to performance rebates; to be eligible, homes still must be at least 10 percent BTC.
- Homes that meet either ENERGY STAR® version 3.2 or ENERGY STAR NextGen requirements are eligible for a bonus incentive.

Energy Codes:

The Company will directly support code compliance services in its natural gas and electric service territories. Code compliance support will be offered to all participants in building trades who could benefit. Examples include designers, architects, builders, and trades, and code officials. Support will be delivered in various channels. These include webinars, recorded sessions, classroom sessions, on-site trainings, one-on-ones, and other trainings as needed.

Rebates

Rebates will be paid according to upgrade type and cost in the schedule below:

Measure	Rebate amount
Homes with Xcel Energy electric service (without electric Electric-only home without electric primary heat	$100
10-14.999% BTC	$500
15-19.999% BTC	$1,000
20-24.999% BTC	$1,500
25-29.999% BTC	$2,000
30-34.999% BTC	$3,000
35% BTC or greater	$4,000
ENERGY STAR Refrigerator	$15
ENERGY STAR Radon Fan	$20
ENERGY STAR Electric clothes dryer with electric water heat	$40
ENERGY STAR Clothes washers with gas water heat and electric dryer	$20
ENERGY STAR Clothes washers with electric water heat and electric dryer	$40
AC Rewards-eligible smart thermostats	$125
Electric heat pump water heater without CTA-2045 communications port	$400
Electric heat pump water heater with CTA-2045 communications port	$500
ENERGY STAR version 3.2	$250
ENERGY STAR NextGen	$500

Trade Partner Incentives

To encourage participating Raters to consult with their builders to improve build quality, the Company proposes to incentivize Raters based on the home's resulting BTC performance.

Xcel Energy will provide scaled Home Energy Rating System (HERS) rater incentives based on the following table:

Performance Tier	Rater Incentive
<30% BTC	$125
≥30% BTC	$250

Currently, less than one percent of projects in the program receive 30 percent better than code. An incentive will help encourage this better performance. We believe performance BTC is very difficult to game because of modeling software requirements, however the Company will monitor for unusual achievement and perform additional field verification as necessary.

Quality Assurance

Program administrators will perform field reviews of 5 percent of program homes, verifying the information provided by the HERS raters. This includes a full duplication of the HERS rating to ensure consistency and compliance with Program expectations. Program administrators will also perform desk reviews of an additional 10 percent of program homes, or more if individual participating Rating firms warrant additional scrutiny.

Program Changes

Change	Rationale
Increase performance-based rebate amounts	Provide consistent experience throughout Company gas and electric service territory
Increase Rater incentives	Ensure that incentives are consistent with the administrative costs of program support
Remove water conservation measures	Negligible participation
Add tiered Rater incentives	Incentivize Raters to engage builders in the design phase to improve home performance
Add ENERGY STAR v3.2 bonus	Promote the newest ENERGY STAR Homes standard
Add ENERGY STAR NextGen bonus	Promote the newest beneficial electrification and decarbonization ENERGY STAR standard
Add energy codes advancement & compliance support	As the energy code advances, compliance can be accelerated with direct utility support

Budget, Participation and Target Considerations

The program's budgets and electric and gas energy savings targets were determined by cost estimates based on historical program expenses and forecasted participation rates. The main budget drivers include the following:

- Utility Administration: This category funds project planning and implementation along with program management. This includes the payment for the data aggregator serving the program.

- Advertising & Promotion: The program's direct promotion through mass market promotion, energy efficient building practice training, and sales support materials are supported with these funds.
    - New for this Plan will be an opportunity for a builder to be fully reimbursed for training for advanced energy efficiency certifications. Reimbursement will be granted to a building company after completing a home to the certification for which training was received.
- Participant Incentives: These funds cover builder and HERS rater rebates.

The Efficient New Home Construction program defines a participant as a new home that achieves rated building performance that qualifies for an incentive under the program. In cases where a new home is built with multiple dwelling units (e.g., duplexes), the number of participants will equal the number of dwelling units. Participation estimates are based on historical market participation and build volume. The Company's ability to achieve the proposed participation, savings, and budget estimates will be heavily driven by the health of the residential new construction market.

Stakeholder Involvement
The Company will be partnering with numerous stakeholders at the state and local levels to move energy codes forward and drive improved code compliance after advancement.

3. ENERGY EFFICIENT SHOWERHEADS

Program Description
The Energy Efficient Showerheads program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in 2024-2026 triennium. The Energy Efficient Showerhead program provides free 1.5-gallon-per-minute (GPM) high efficiency showerheads, bathroom faucet aerators, and kitchen faucet aerators to help reduce energy costs and water use. The Plan includes the addition of one measure.

<u>Eligibility/Qualification for Participation</u>
The program is available to residential customers who receive natural gas or combination service with Xcel Energy. The program is specifically marketed to single-family homes through email, social media, and direct mail.

<u>Qualifying Upgrades/Measures</u>
The main program offerings are described below.

- Customers who have two bathrooms and have not yet participated in the program or participated more than ten years ago are eligible to receive a kit containing:
    - Two 1.5 GPM high efficiency showerheads;
    - One 1.5 GPM kitchen aerator; and
    - Two 1.0 GPM bathroom aerators.
- Customers who have one bathroom and have not yet participated in the program or participated more than six years ago are eligible to receive a kit containing:
    - One 1.5 GPM high efficiency showerhead;
    - One 1.5 GPM kitchen aerator; and
    - One 1.0 GPM bathroom aerator.

Rebates

Eligible customers are contacted and offered a free kit, valued between $14 and $20 depending on the specific combination of measures. The kit is shipped to customers who respond to the offer within the promotional period. Kit contents may include a combination of showerheads, kitchen and bath aerators, Teflon tape and illustrated installation instructions. Eligible customers may also purchase showerheads and aerators at a discounted rate from the Xcel Energy Store.

Customers responding to the promotional offer must indicate if they have one or two bathrooms in their home and what fuel serves their water heater (gas, electric or unknown).

Trade Partner Incentives

Not applicable.

Quality Assurance

The Company contracts with a third-party vendor to manage all customer responses and distribute the energy-efficient showerheads and aerators. The vendor is a recognized distributor of energy efficiency-related products in the United States. Customer responses are tracked by the provider, given to us following the distribution, and kept in a tracking system to calculate savings.

Program Changes

Change	Rationale
Addition of an in-line shower flow restrictor 1.5GPM	An in-line flow restrictor effectively reduces the flow to an existing showerhead to 1.5gpm allowing customers the option of keeping their existing hardware.

Budget, Participation and Target Considerations

The program budget was developed based upon the expected participation level. Using past program performance as a guide, the cost of the measures, fulfillment, postage, and all necessary marketing efforts were included to develop the budgets.

The main budget drivers include the following:

- Utility Administration – This covers the costs of external fulfillment, web development, rebate costs, project planning, and implementation.
- Advertising & Promotion – The program uses direct mail and email to attract customers. Additional channels may be used.

Each participating customer is counted as one participation. We anticipate an increase in participation as part of our Plan for 2024-2026.

Stakeholder Involvement

Not applicable.

4. HOME ENERGY AUDIT

Program Description

The Home Energy Audit program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Home Energy Audit program is designed to target residential customers and provide a financial incentive by offering an energy audit at a substantially discounted fee.

Eligibility/Qualification for Participation

The Home Energy Audit program is available to the Company's residential customers. The program aims to identify energy efficiency upgrade opportunities and improve energy savings by influencing homeowners' and renters' behaviors through conservation education. The Home Energy Audit program is cross promoted with other programs in the Company's portfolio to increase customer opportunities for energy savings. The program is implemented by a third-party vendor and customers may receive a Home Energy Audit every three years, or upgrade from the Walkthrough audit to a Standard audit within the three-year period.

Customers are asked at the beginning of their visit whether their household income falls below the income guidelines used for the Company's dedicated income-qualified programs. If customers self-identify as meeting these requirements, audit fees are waived.

Qualifying Upgrades/Measures

The program's primary offerings include the following two tiers of audits: (1) Home Walkthrough, and (2) Standard Audit.

Home Walkthrough

The Home Walkthrough begins with the auditor's review and analysis of the customer's billing history and a discussion surrounding any concerns or questions the customer may have regarding home energy usage and related comfort. Next the auditor assesses the home's interior and exterior and provides a review of the top recommendations to the homeowner. This option is a $30 fee to customers; however, an electronic personalized audit report is emailed to the customer highlighting the top recommendations and providing rebate program information.

Standard Audit

The Standard Audit includes all components of the Home Walkthrough audit plus a blower door test and a combustion appliance zone (CAZ) test. The blower door test is conducted in every home and determines how much air a home loses each hour. High rates of air leakage lead to higher volumes of incoming air that must be heated or cooled, increasing energy usage. The CAZ test is performed when atmospherically vented appliances are present. If applicable, the Standard Audit visit will include an infrared scan of walls and ceilings to help evaluate internal structures such as drywall and insulation. This test may show temperature differences to see where insulation is present, missing, or not working effectively. The infrared scan is effective when certain indoor and outdoor temperature differences are met. To qualify for the Home Energy Audit program, a customer must have a single-family home or a 4-unit or less multi-unit building and be a natural gas and/or electric customer. There is a $60 fee for this option.

Rebates

Not applicable.

Trade Partner Incentives
Not applicable.

Quality Assurance
Third-party implementer is responsible for ensuring audit analysis.

Program Changes
The Company is not proposing any changes to the Home Energy Audit program.

Budget, Participation and Target Considerations
The number of customers who complete an audit in the program determines program participation. Historical participation data was used to determine future participation targets and expenses.

The main budget drivers include the following:

- Utility Administration: The budget includes the costs of internal labor and external contract labor to support the program.
- Customer Services: This category represents the costs of the third-party auditors, as well as the payments made by customers for their audits.
- Advertising & Promotion: The program includes a modest promotional budget to steer customers to the audits.

Stakeholder Involvement
The Company partners with CenterPoint Energy to provide Home Energy Audit services to shared customers. In addition, the Company and its third-party vendor engage with local community organizations and leadership to drive awareness and increase adoption of the Home Energy Audit service.

5. HOME ENERGY INSIGHTS

Program Description
The Home Energy Insights (HEI) program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this product as described below in the 2024-2026 triennium.

Home Energy Insights is a free service offered to influence the everyday actions of residential customers in a manner that will help them save energy and money. The program is a behavioral conservation program that consists of several measures that inform customers of how and when they use energy, enabling customers to make behavioral changes that ultimately reduce their utility bill. For the Plan, the Company is proposing to continue to grow HEI and adjust the program to foster further customer knowledge and insight into how they use energy as well as how that energy is impacting costs and the environment. The HEI program utilizes the Departments recommended average savings method for behavioral savings.[27]

[27] Decision, In the Matter of Inclusion of Behavioral Project Savings in Energy Conservation Improvement Programs and Shared Savings Demand-Side Management Financial Incentive Calculations, Docket No. E,G999/CI-08-133, April 26, 2012.

Eligibility/Qualification for Participation

- Home Energy Reports requires participants to have lived in their current residence for at least 12 months. They may also be excluded from the program if they have electrical usage outside the norm, such as solar or EV charging.
- My Energy Portal is available to all residential customers.
- High Bill Alerts is an opt-out program available to all residential electric and gas customers.[28]

Qualifying Upgrades/Measures

The measures within HEI are differentiated by the types of insights delivered to customers and how those insights are delivered. A multi-channel approach to providing information to customers enables the Company to broaden the reach and impact of the program while laying the foundation for future innovation. This enables the Company to continue to offer new and effortless methods for customers to engage with the utility, gain insights into how and when they use energy and be directed to other programs that will benefit them. Home Energy Insights includes three different measures targeted at residential customers. We briefly explain these below.

Home Energy Reports

Recipients for Home Energy Reports are selected from Xcel Energy Minnesota residential customers and may "opt out" of the program at any time upon request. Customers who remain in the program are encouraged to answer a series of questions about their home that enables the Company to provide a more accurate assessment of how energy is used on their premise. Participants receive free monthly emails or quarterly printed reports. The individualized reports provide:

- The customer's energy use compared to other customers within the same geographic region who had similar usage profiles and home characteristics (occupancy, heating fuel, square footage, etc.) prior to program enrollment. We are currently working to include solar and electric vehicle (EV) data in the matrix.
- Targeted efficiency recommendations based on home profile data provided by the customer; and
- Other information such as consumption graphs or year-to-year bill comparisons.

Savings are quantified by comparing the energy consumption of the recipient group to that of a non-participating control group. Through the duration of this Plan, the Company may add additional customers to the treatment group as needed to maintain participation levels and achieve energy saving targets.

My Energy Portal

This feature is accessed through customers' Xcel Energy online account and is made available to all residential customers for whom sufficient historical information is available. Through My Energy Portal, customers can:

- Compare their usage to customers in the same geographic region.
- See graphs showing energy consumption by fuel type.
- Earn rewards redeemable for gift cards for energy savings activities.

[28] Customers who are moved to a natural gas AMR meter will be ineligible to receive natural gas alerts. The Company has accounted for this change within our participation numbers for the program.

- Complete a Home Energy Assessment which provides insight into how energy is used in the home as well as more accurate and actionable energy saving recommendations.

In addition, customers with Advanced Meter Infrastructure or "smart" meters can view 15-minute interval data and customers without advanced meters can view usage by bill period.

Savings are quantified by comparing the energy consumption of customers who access the portal to a control group. Due to the opt-in nature of the My Energy Portal, the control group is not drawn from the non-participant population (which would introduce selection bias into the comparison) but is instead composed of customers who opt into the treatment (by accessing the portal) later in the program year. Participants are any residential account holders who have accessed the My Energy Portal website.

High Bill Alerts (HBA)
High Bill Alerts is an opt-out program available to all residential electric and gas customers. This measure notifies customers before the end of a billing cycle that their bill is trending higher than historically normal allowing the customer time to adapt their energy usage or prepare financially for the additional costs.

The Company began replacing natural gas Cellnet meters in Minnesota with natural gas AMR meters in 2023 and will go through the end of 2025. This change in meter type prevents the Company from receiving daily meter readings required to run the projection calculations for the Gas High Bill Alerts. As customers are moved to a natural gas AMR meter, they will be ineligible to receive natural gas alerts. The Company will be sunsetting the Gas High Bill Alerts at the end of 2025 in line with this change. This has no impact on the electric program.

Savings for HBA are deemed. Customers participating in the Home Energy Report measure will be able to receive HBAs. The savings for Home Energy Report will be adjusted to account for those claimed for HBA.

<u>Rebates</u>
Not applicable.

<u>Quality Assurance</u>
Not applicable.

Program Changes

Change	Rationale
Updates will be made to the Home Energy Reports that will include additional electrical usage information.	More data will assist the customer in making informed choices about energy usage.
A new control group will be set up for comparison purposes.	The existing control group has been in the process for several years and is due for retirement and replenishment.
Home Energy Reports will begin to provide a solar and electric vehicle specific report to customers with either rooftop solar or EVs.	Energy usage for EV and solar customers is different than non-solar/EV customers. Incorporating the data allows for a more accurate report and increases the overall distribution to those customers who are currently excluded from the report.
Home Energy Reports will incorporate additional data from AMI meters to enhance the report data when available.	Improved and individualized data will increase customer acceptance and aid in decision making about electrical usage.
Utilization of new communications channels as they become available or are deemed acceptable for the program.	Adapt to new technology and communications channels to improve the customer experience.

Budget, Participation and Target Considerations
The main budget driver for the program is for our third-party service providers. A customer is counted as a participant when they interact with any of the programs. A customer who participates in multiple programs will be counted multiple times. This is accounted for in the algorithm provided by the contracted service provider when calculating savings.

Stakeholder Involvement
Not applicable.

6. HOME ENERGY SQUAD

Program Description
The Home Energy Squad program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Home Energy Squad program offers installation services to electric and gas customers who seek to improve their homes' energy efficiency and comfort as well as lower their utility usage. The program directly installs several moderate-impact, low-cost measures for combination gas and electric customers and for electric-only customers who are natural gas customers of CenterPoint Energy. In addition, and where cost-effective, the program installs fuel-appropriate measures in Xcel Energy electric-only and gas-only territories where the operations vendor has identified potential customers. In addition to the installation of measures, the program offers an enhanced visit type that includes the installation of low-cost measures plus an energy efficiency audit. The program seeks to assist customers' efforts to overcome barriers related to making energy improvements, including customer confusion about product choices, varying costs, and locating qualified installers.

When appropriate, information regarding efficient fuel switching options will be provided to customers to highlight additional option for larger energy efficiency upgrades in their homes.

The Company proposes to modify the measures offered and expand the service to more customers by increasing third-party resources and increasing marketing outreach.

Eligibility/Qualification for Participation

To qualify for the Home Energy Squad program, participants must be a natural gas and electric customer in the Company's service area or an electric-only customer who is a natural gas customer of CenterPoint Energy. Where cost-effective, the program installs fuel-appropriate measures in Xcel Energy electric-only and gas-only territories where the operations vendor has identified potential customers.

Qualifying Upgrades/Measures

Offerings include the following (optional measures are italicized):

Potential Measures
LEDs bulbs -variety styles and wattages
Weather stripping for doors or Attic hatch
Programmable thermostat installed & optimized
Programming of existing thermostat
Smart thermostat with AC Rewards enrollment
High efficiency showerhead(s)
High efficiency faucet aerators
Water heater pipe insulation
Demand response retrofit devices for existing electric resistance water heater
Water heater temperature assessment and setback
Optional measures for customer purchase
Weather stripping for additional doors
Additional Programmable thermostat installed & optimized
Premium Smart thermostat installed & optimized
Advanced Power Strip
Installation of energy efficient dehumidifier

Rebates

The program currently charges a flat fee of around $70 and allows customers to choose from a suite of energy-saving measures as noted above. The program is marketed primarily within the metro area and larger out-state cities.

Quality Assurance

Third-party implementer is responsible for ensuring audit analysis.

Program Changes

The Company is assessing the program for implementation, marketing and outreach changes to drive participation in the program, respond to customer feedback, and encourage larger energy efficiency upgrades.

Change	Rationale
Water Heater Pipe Insulation	Additional energy savings for customers.

Budget, Participation and Target Considerations

The program's budgets were developed based on historical data and future cost estimates. Targets were developed based on historical savings data, attrition, market evaluation, and customer feedback. The main divers of cost include:

- Utility Administration: This category funds program administration costs through third-party vendors and third-party labor for installing supplied energy-efficient measures in customers' homes.
- Promotion & Advertising: This category covers print, broadcast, and interactive advertising, phone and street canvassing, and event promotion.

Participants for the program are customers who have a Home Energy Squad visit or enhanced visit that includes an energy audit.

Stakeholder Involvement

The Company partners with CenterPoint Energy to provide Home Energy Squad services to shared customers. In addition, the Company and its third-party vendor engage with local community organizations and leadership to drive awareness and increase adoption of the Home Energy Squad service.

7. HOME LIGHTING

Program Description

The Home Lighting Program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Home Lighting is designed to target residential and/or small business electric customers and provide financial incentives for energy-efficiency LEDs. The Home Lighting program offers customers discounted prices on high efficiency Light Emitting Diode lamps (LEDs) at participating retailers. LEDs are an easy, low-cost way for customers to save energy and reduce their monthly electric bills.

Home Lighting has historically been the largest contributor to our energy efficiency portfolio, but due to the new Federal legislation[29] that requires general service lamps to have a minimum of 45 lumens per watt, the savings potential for the most popular bulbs in the program has dropped dramatically. To counteract the savings, drop due to the new 45 lumens per watt baseline, the Company is proposing to expand the qualifying bulb list to include nightlights, connected bulbs,

[29] Federal legislation includes the 2007 Energy Independence and Security Act (EISA) that adjusted baselines for lighting technologies.

holiday lights, and new fixtures to help make up for some of the savings lost. The program remains to be cost-effective even with the new baseline.

Eligibility/Qualification for Participation

The Company motivates customers to purchase LEDs by offering in-store retail discounts. The discounts are provided through collaboration with bulb manufacturers and retailers. The discount varies depending on the type of bulb as well as the manufacturer/retailer partner. There is no mail-in rebate form, making it easy to participate. Incentives are paid upstream, and the discounts are passed on to the customer at the point of sale. The Company partners with retailers such as Home Depot, Walmart, Costco, Ace Hardware, Lowe's, Dollar Tree and Salvation Army. The Company also offers discounts through our online marketplace option.

The Company uses a Request for Proposal (RFP) process to select participating retailers and to enable partnerships with a variety of retailers (including big box, mass merchandiser, hardware stores and discount stores) which helps to ensure optimal pricing and reduces free ridership. The Company uses a third-party to implement the RFP and to help manage the program. The implementer is primarily responsible for tracking product sales details, including the location, types and quantities of bulbs sold each year and calculating the energy savings.

Qualifying upgrades/measures

- LED General Service Lamps (GSL): This category includes the bulbs as defined by the Department of Energy's 10CFR Part 430 Energy Conservation Program definition for General Service Lamps.
- LED General Service Lamps - Specialty: This category includes bulbs that are not defined as a "regular" GSL per the Department of Energy's definition mentioned above.
- LED Fixtures: This category includes retrofit kits and other fixtures.
- LED Connected Bulbs: This category includes smart standard and reflector bulbs.
- TLED: This category includes LED linear tubes.
- LED Nightlight: This category includes LED nightlights.
- LED Holiday Lights: This category includes holiday light strings.

Rebates

Rebates will be paid according to upgrade type and cost in the schedule below:

Measure	Average Rebate Amount
LED General Service Lamps	$1.37
LED General Service Lamps - Specialty	$1.50
LED Linear Tubes (TLEDs)	$2.50
LED Nightlights	$2.00
LED Holiday Lights	$2.00
LED Fixtures	$2.07
LED Connected Bulbs	$2.00

The rebate discount varies depending on the type of bulb as well as the manufacturer/retailer partner and can change throughout the year.

Quality Assurance
Not applicable.

Program Changes

Change	Rationale
The new TRM baseline of 45 lumens per watt has been applied to the technical assumptions for the bulbs affected.	Implement the MN TRM (and federal) guidelines.
Added nightlights, connected bulbs, holiday lights MR, R20, and fixtures to the product mix.	Include additional energy savings options in the portfolio.

Budget, Participation and Target Considerations
The energy savings, participants and budget target for the product was derived by reviewing the market potential and historical sales data, while considering new technologies, available retail channels and participating customer segments.

The main budget drivers include the following:

- Participant Incentives: includes the discounts offered at retail stores as well as bulbs distributed at community/sporting events
- Advertising & Promotion: includes costs for home lighting specific advertising campaign as well in store signage displays and fees for participating in community/sporting events
- Utility Administration: includes program administrator labor to manage the program

Stakeholder Involvement
Not applicable.

8. INSULATION REBATE

Program Description
The Insulation Rebate program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Insulation Rebate program offers prescriptive electric and natural gas rebates to customers who upgrade insulation and air-sealing in their homes. The program captures electric and natural gas savings on existing single-family and eligible multi-unit homes that professionally install insulation and air-sealing measures. Customers must select a contractor who is registered for the residential insulation rebate program. In recognition of the importance of weatherization measures in reducing heating and cooling load of a home, the Company proposes changes to both requirements and rebate levels to increase program participation.

Eligibility/Qualification for Participation
Xcel Energy electric-only customers must use electricity as their main heating source to qualify for the electric only portion of the rebate.

Participating customers must contract for insulation services with a contractor who is registered in the insulation rebate program. Requirements for becoming a registered contractor are:

- Complete an online profile at the trade partner resource center on the Company's website.
- Submit a completed contractor agreement (provided by Xcel Energy)
- Have at least one technician hold at least one of the following certifications:
  - Building Performance Institute (BPI) – Residential Building Envelope Whole Home Air Leakage Control Installer (RBEWHALCI);
  - BPI – Air Leakage Control Installer (ALC); or
  - Xcel Energy approved training.

Air sealing and weather stripping must follow industry-accepted practices for mitigating air leakage. Air sealing must be done in conjunction with attic and wall insulation. Program excludes new residential construction, new additions, insulation of doors, garages, sheds, workshops, basements, mobile homes and other below grade installations. Contractor must conduct pre-job blower door test and a post job blower door test. The results must be included on the front of this form along with pre and post insulation (measured by R-values). The program looks for airtightness, as measured by how many cubic feet of air is being exhausted from the home every minute (denotated as CFM50). A reduction of at least 15 percent in CFM50 must be achieved to receive the air-sealing rebate amount. Homes that do not achieve a 15 percent reduction in CFM50 may not receive the air-sealing rebate, but may receive insulation rebates according to program rules.

Qualifying Upgrades/Measures
The program's main offerings include prescriptive rebates for attic insulation and air-sealing, wall insulation and air-sealing, and airtightness.

Rebates

Rebate	Upgrade Requirements	Rebate Amount
Air Sealing Rebate	Reduce CFM50 by at least 15 percent	40 percent of project cost up to $600
Attic Insulation Rebate	Pre-job R-value of 19 or less and a post-job R-value of 49 or greater	40 percent of project cost up to $1,200
Wall Insulation Rebate	Pre-job must be an empty wall cavity and post-job R-value of 11 or greater	40 percent of project cost up to $1,200

Additionally, the Company will begin to offer a bonus rebate of $600 for customers who install insulation and air sealing first, followed by installation of a qualifying heat pump within two years of installation of the insulation. The bonus will be paid at the same time as the heat pump rebate. Providing this bonus and requiring the completion of the measures in this order promotes best practices for minimizing the heating load of the home, which minimizes upfront costs and bill impacts for the customer, as well as saving energy and peak demand for the utility. The two-year period is intended to allow for time for customers and contractors to address challenges such as availability of funds, equipment, and labor.

Trade Partner Incentives
Not applicable.

Quality Assurance
As noted above, insulation trade partners are required to have BPI certification. BPI certification verifies installers have knowledge of industry standards and best practices.

Program Changes
The Company is proposing the following changes:

Change	Rationale
Increased rebates for Attic Insulation, Wall Insulation and Air Sealing measures	Supports identified need by Stakeholders to increase the efficiency of homes
Bonus rebate for participation in envelope measures and heat pumps within two years	Supports efficient homes and equipment sizing for heat pumps.
Air Sealing requirement with attic or wall insulation	Air Sealing when combined with insulation maximizes comfort and savings in a home.

Budget, Participation and Target Considerations
The program's budgets and electric and gas energy savings targets were determined based on historical program performance and an estimate of market potential.
Participation is based on number of homes served as part of the program.
Marketing dollars focus on cross-marketing opportunities with other programs and social media, and other proven cost-effective strategies for this program.

The main budget drivers include the following:

- Utility Administration: This category funds program planning and implementation, channel management and rebate processing.
- Advertising & Promotion: The program utilizes social media, contractor training and cross-utility marketing to promote the program and uses direct and indirect promotions such as community outreach events in partnership with other electric and natural gas rebate programs.
- Participant Rebates: These funds cover the costs of customer rebates.
- Measurement & Verification: The program uses these funds to perform verification of submitted paperwork.

Stakeholder Involvement
The Company is a member of the Minnesota Building Performance Association and the MN Blue Flame Natural Gas Association to help advance and promote the program.

9. LAMP RECYCLING

Program Description

The Lamp Recycling program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Lamp Recycling is designed to target residential and business customers and encourages them to use LEDs (through our Home Lighting Program) and provides education on how to dispose of spent fluorescent, HID and LED bulbs properly to ensure that the mercury from fluorescents and HID lamps does not get into the environment. This program is offered consistent with Minnesota Statute 216B.241, Subd 5. The Plan includes the consolidation of lamp recycling program to encompass both residential and business lighting as the program is the same for both customer segments.

<u>Eligibility/Qualification for Participation</u>

The Lamp Recycling program targets all customer classifications per the statute. a

<u>Qualifying Upgrades/Measures</u>

The program's main offerings include the following:

- Free compact fluorescent light (CFL) bulb recycling at participating local hardware stores and partnering county hazardous waste facilities.
- Coupons for 50¢ off the recycling fee for each fluorescent tube and HID bulb. The coupons are available at participating hardware stores and on the Company's website.
- Education on ways to dispose of LEDs.

<u>Quality Assurance</u>

Our fluorescent/HID recycling partner follows all applicable regulations and processes when recycling the bulbs to ensure mercury does not get into the environment.

<u>Rebates</u>

Not applicable.

<u>Trade Partner Incentives</u>

Not applicable.

<u>Program Changes</u>

The Company is not proposing any changes to the Lamp Recycling program.

Budget, Participation and Target Considerations

The budget was developed based on historical spending and the expected number of bulbs to be recycled in the coming years.

The main budget drivers include the following:

- Customer Services: This covers the cost of the third party to administer the program. We expect that the budget will decrease annually due to an anticipated decline of bulbs needing to be recycled each year, as fluorescents exit the marketplace and are replaced with longer lifetime LEDs.
- Utility Administration: This provides funds for internal labor and program implementation.

Stakeholder Involvement
Not applicable.

10. REFRIGERATOR & FREEZER RECYCLING

Program Description
Refrigerator & Freezer Recycling was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Refrigerator & Freezer Recycling product is designed to decrease the number of inefficient refrigerators, freezers, air conditioners, and dehumidifiers in the Company's service territory in an environmentally safe and compliant manner and, by doing so, achieve electric energy savings and peak demand reduction. Customers receive an incentive plus free pickup and disposal of their operable, inefficient refrigerator and freezer. In addition, air conditioners and dehumidifiers are picked up and recycled for free with no rebate. A third-party implementer administers the product, including customer scheduling, pickup, recycling, and rebating. This product is primarily marketed through email, direct mail, bill onserts, online/social media, and community outreach. In this Plan, the Company is making no additional changes to the current offering.

<u>Eligibility/Qualification for Participation</u>
The program is limited to residential electric customers in Xcel Energy's service territory. In order to verify eligibility, customers are required to have an active billing account that is linked with the premise.

All refrigerator, freezer, room air conditioner, and dehumidifier units must meet the following requirements to qualify for this product:

- Must be operational. "Operational" is defined as in working order. Refrigerators must be capable of cooling; freezers must be capable of freezing.
- Refrigerator/Freezer must be plugged in the night before the pick-up date (customer will receive a call from the implementer, reminding them to do this). This is to ensure full operation (cooling for a refrigerator; freezing capability for a freezer) when inspected at the time of pick-up.
- Refrigerator/Freezer must be no smaller than 10 cubic feet or no larger than 30 cubic feet.
- There will be a limit of two refrigerators and/or freezers per household per year.
- Room air conditioners and dehumidifiers may be picked up if the third-party implementer is already at a customer's home to collect a refrigerator or freezer.

<u>Qualifying Upgrades/Measures</u>
The program has five measures total:

- Primary Refrigerator: Used as the primary unit in the home at the present time
- Secondary Refrigerator: Used as a secondary unit for at least two months prior to pick up
- Freezer: Used separately from the primary refrigerator and is a standalone unit.
- Room AC: Used to cool a single room or small space
- Dehumidifier: Used to reduce the level of humidity in a single room or small space

Rebates

Incentives will be given for each Primary Refrigerator, Secondary Refrigerator, or Freezer. The rebate amount can change at any time. Room AC and Dehumidifier units will be picked up for free while the implementer is at the premise, but no incentive will be given.

Measure	Rebate Amount
Primary Refrigerator	$50
Secondary Refrigerator	$50
Freezer	$50
Room AC	N/A
Dehumidifier	N/A

Trade Partner Incentives

Not applicable.

Quality Assurance

The Company is a proud partner in the EPA's Responsible Appliance Disposal (RAD) Program. This program goes above and beyond federal requirements to make sure refrigeration appliances are disposed of in a way that will protect Earth's climate and ozone layer. The Company requires the third-party implementer to be a RAD partner and comply with all local, state, and federal requirements, including maintaining all permits and license required for any facilities, equipment and personnel.

Program Changes

The Company is not proposing any changes to the Refrigerator & Freezer Recycling program.

Budget, Participation and Target Considerations

The target market consists of customers who are disposing of their functioning refrigerator and/or freezer. These customers generally have a single-family home with two or more individuals in the household.

The program's participation, energy savings levels, and budget were determined from historical program performance and costs per participant. The main budget drivers include the following:

- Utility Administration: The program uses a third-party vendor to implement the program and perform necessary fulfilment activities.
- Participant Incentives: The program pays customer rebates with these funds.
- Promotion & Advertising: This effort includes but is not limited to email, direct mail, bill onserts, online/social media, and community outreach.

Stakeholder Involvement

The Company will continue to work with our third party implementor to ensure these units are properly recycled following RAD requirements.

11. RESIDENTIAL HEATING & COOLING

Program Description

The Residential Heating and Cooling program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Residential Heating and Cooling program is designed to target residential customers and provide prescriptive financial incentives for space heating, space cooling, and water heating equipment. For the Plan, the Company is proposing to add efficient fuel-switching measures for heat pumps and heat pump water heaters.

The Company will coordinate with other utilities to offer efficient fuel-switching rebates, including tools such as a joint application and marketing efforts. For heat pumps, the Company will claim the cooling savings and pay a cooling energy efficiency rebate for the upgrade if the customer receives electric service from the Company and claim the heating savings and pay a heating efficient fuel switching rebate, using gas efficient fuel switching dollars for the upgrade if the customer receives gas service from the Company. For heat pump water heaters, the Company will only claim savings if the Company provides gas service and will pay that rebate as an efficient fuel switching rebate, using gas efficient fuel switching dollars.

The Company believes that substantial rebates for heat pumps and heat pump water heaters are needed to move the market and that consistency is critical for driving customer and contractor adoption of these technologies. In instances where the gas utility does not offer an efficient fuel switching rebate or offers a rebate not sufficient to move the market, the Company will provide a supplemental efficient fuel switching rebate using electric efficient fuel switching dollars, so that the customer would receive the same total rebate as if the customer received electric and gas service from Xcel Energy.

These measures are also available for customers replacing electric resistance equipment, in which case the Company will claim electric savings and pay the full rebate, and the customer must receive electric service from the Company.

The Company will also offer a bonus electric energy efficiency rebate of $600 for customers who install insulation and air sealing first, followed by installation of a qualifying heat pump within two years of installation of the insulation. The bonus will be paid at the same time as the heat pump. Providing this bonus and requiring the completion of the measures in this order promotes best practices for minimizing the heating load of the home, which minimizes upfront costs and bill impacts for the customer, as well as saving energy and peak demand for the utility. The two-year period is intended to allow for time for customers and contractors to address challenges such as availability of funds, equipment, and labor.

<u>Eligibility/Qualification for Participation</u>

Customers must have residential service.[30] Only new equipment is eligible for a rebate. Rebates must be submitted by September 30 of the year following the invoice date.

[30] The fuel provided by Xcel Energy will dictate the rebate available, e.g., customers receiving gas service from Xcel Energy can receive gas energy efficiency and gas fuel-switching incentives.

Qualifying Upgrades/Measures

Air Conditioner: The customer must install a new air conditioner of up to 5.4 tons. At a minimum, the condenser and coil must be replaced. The customer must use a participating contractor for the installation, and the contractor must install the air conditioner according to the Company's Quality Installation Guidelines. Equipment which is listed on the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) directory and meets higher qualifying efficiency levels qualifies for higher rebates.

Natural Gas Furnace: The customer must install a new high-efficient natural gas furnace. The equipment must be listed on AHRI. Equipment which meets higher qualifying efficiency levels qualifies for higher rebates. Rebates for existing homes are higher than rebates for new homes.

Natural Gas Boiler: The customer must install a new natural gas boiler with a minimum AFUE of 95%. The equipment must be listed on AHRI.

Natural Gas Storage Water Heater: The customer must install a new high -efficient natural gas storage water heater. The equipment must be listed on AHRI or ENERGY STAR®.

Natural Gas Tankless Water Heater: The customer must install a new natural gas tankless water heater with minimum efficiency levels. The equipment must be listed on AHRI or ENERGY STAR®.

Heat Pump Water Heater: The customer must install a new heat pump water heater. The equipment must be listed on AHRI or ENERGY STAR equipment, which is compatible with the Company's demand management programs, based upon a list of qualifying equipment maintained by the Company, is eligible for a higher rebate.

Connected Thermostat: The customer must install a connected thermostat which is ENERGY STAR® certified and is compatible with the Company's AC Rewards measure, based upon a list of qualifying equipment maintained by the Company.

Dehumidifier: The customer must install an ENERGY STAR® dehumidifier.

Air Source Heat Pump: The customer must install a new air source heat pump of up to 5.4 tons. At a minimum, the condenser and coil must be replaced. The customer must use a participating contractor for the installation, and the contractor must install the heat pump according to the Company's Quality Installation Guidelines. The heat pump must have a minimum qualifying efficiency of 15.2 SEER2 (Seasonal Energy Efficiency Ratio), 9.6 EER2 (Energy Efficiency Ratio), 7.8 HSPF2 (Heating Seasonal Performance Factor).

Cold Climate Air Source Heat Pump: The customer must install a new air source heat pump of up to 5.4 tons. At a minimum, the condenser and coil must be replaced. The customer must use a participating contractor for the installation, and the contractor must install the heat pump according to the Company's Quality Installation Guidelines. The heat pump must have a minimum qualifying efficiency of 15.2 SEER2, 10 EER2, 8.1 HSPF2, 1.75 COP at 5 degrees, and a maximum capacity at 5 degrees Fahrenheit that is at least 70 percent of the rated capacity at 47 degrees Fahrenheit.

Mini-Split Heat Pump: The customer must install a new mini-split heat pump with a minimum qualifying efficiency of 15.2 SEER2, 9.3 EER2, 8.5 HSPF2.

Cold Climate Mini-Split Heat Pump: The customer must install a new mini-split heat pump with a minimum qualifying efficiency of 16 SEER2, 9.3 EER2, 9.5 HSPF2, 1.75 COP at 5 degrees, and a maximum capacity at 5 degrees Fahrenheit that is at least 70 percent of the rated capacity at 47 degrees Fahrenheit.

Ground Source Heat Pump: The customer must install a new ground source heat pump with a minimum qualifying efficiency of 16 EER2 and 3.3 COP at 5 degrees.

Rebates

Rebates will be paid according to upgrade type and cost in the schedule below:

Measure	Rebate
Central AC, QI Only	$150
Central AC, 15.2 SEER2/12 EER2	$450
Furnace, Existing Home, 95% AFUE	$200
Furnace, Existing Home, 96% AFUE	$300
Furnace, Existing Home, 97% AFUE	$400
Furnace, New Home, 95% AFUE	$100
Furnace, New Home, 96% AFUE	$150
Furnace, New Home, 97% AFUE	$200
Boiler, 95% AFUE	$400
Storage Water Heater	$75
Tankless Water Heater	$250
Heat Pump Water Heater	$400
Heat Pump Water Heater (demand management compatible)	$500
Dehumidifier	$35
Connected Thermostat	$50
Air Source Heat Pump	$1,600
Cold Climate Air Source Heat Pump	$2,000
Mini-Split Heat Pump	$1,600
Cold Climate Mini-Split Heat Pump	$2,000
Ground Source Heat Pump	$500/ton

Trade Partner Incentives

The program offers trade incentives equivalent to 10 percent of the rebate amount for the following measures: Heat Pump Water Heater, Heat Pump Water Heater (demand management capable), Air Source Heat Pump, Cold Climate Air Source Heat Pump, Mini-Split Heat Pump, Cold Climate Mini-Split Heat Pump, Ground Source Heat Pump. These technologies are still early in their adoption curve in the market and require additional support for trade partners.

Quality Assurance

To be eligible for the AC and ASHP program incentives, customers must use a participating contractor for the installation. Participating installation companies have at least one installer who has taken and passed an online QI assessment. Xcel Energy also accepts, but does not require, North American Technician's Excellence (NATE) certification to become a participating contractor. A list of participating contractors is available to customers from Xcel Energy.

Program Changes

Change	Rationale
Rebate increases for heat pumps.	Significant upfront cost, needed to move market.
New qualifying efficiencies for heat pumps.	Add metrics related to heating savings, better align with rebates from external groups (federal, state, etc.)
Expanding heat pumps to efficient fuel-switching applications	Consistent with new ECO guidance and efforts to reduce carbon.

Budget, Participation and Target Considerations
The budget for the Residential Heating and Cooling program was developed based on historical costs per participant for the program and was estimated according to expected participation. Taking into consideration the economic state of the market, the program targets reflect steady participation and a decrease in the promotional budget to provide a cost-effective program for our stakeholders.

The main budget drivers include the following:
- Utility Administration: This category funds administration labor, materials, postage and rebate processing labor and measure and verification.
- Advertising & Promotion: The program utilizes low-cost promotions including bill onserts, email marketing, direct mail marketing, social media, blogs, and Trade Partner outreach.
- Participant Incentives: These funds customer rebates for qualifying products.

Stakeholder Involvement
Xcel Energy will continue to work closely with CenterPoint Energy and Center for Energy and Environment regarding development and implementation of its heat pump offerings, particularly for efficient fuel-switching applications.

12. SCHOOL EDUCATION KITS

Program Description
The School Education Kits product was included in Xcel Energy's previous Triennial Plan for 2021-2023 and received approval for modifications (on January 31, 2022 and September 22, 2022 in Docket No. G,E002/CIP-20-473) to the program to include such offerings as specialty kits. The Company proposes to continue this project as described below in the 2024-2026 triennium.

The School Education Kits program offers a multi-component kit that combines classroom activities and in-home projects to fifth or sixth grade students and their parents to teach them about energy and water conservation. The program targets schools within our Minnesota service territory that receive both electric and natural gas service and to those teachers and students who enroll in the program through the third-party implementers. In this Plan, the Company is proposing no additional changes to the School Education Kits but will begin to account for those kits impacting an income-qualified population as detailed below.

This prescriptive program provides direct impact savings, helps to build awareness of energy conservation at a young age, and provides energy and water savings to customers of various income levels. Traditional marketing tactics are not needed since schools are selected to ensure maximum outreach. Once schools are selected and enrolled, a third-party implementer recruits and trains the teachers, provides all materials, distributes the kits, and continues ongoing support if the teachers have questions while implementing the program. Classroom support is available via fax, phone, email, by a toll-free 800 number, and online through the third-party vendor's website.

Teachers can enroll through a variety of channels. If teacher response is insufficient, the third-party provider implements contingencies for additional outreach. Upon enrollment, teachers dictate to the third-party when in the school year they would like to use the program materials and provide accurate enrollment numbers. The third-party staff remains in contact with teachers throughout the school year to assist teachers as needed, as well as to ensure return of the surveys that provide Measurement and Verification results. It can take up to three months to receive the results from each elementary school depending on when the teachers begin the activity.

<u>Eligibility/Qualification for Participation</u>
Schools qualifying for the program are within the Company's Minnesota service territory and receive electric and natural gas service or electric service with CenterPoint Energy as the gas service provider.

The Company proposes to include the program costs for schools with an income qualifying population towards the Company's low-income spending requirements. The third-party vendor collects demographic data on each school to determine income eligibility. School kits that are distributed to income qualified schools would be tracked, and costs associated with the kits counted towards the low-income spend requirements.

<u>Qualifying Upgrades/Measures</u>

The program's main offering is the "Take Action Kit" containing the following:

- 11-Watt LED Lights
- 9-Watt LED Light Bulbs
- LED Night Light
- Natural Resources Fact Chart
- Digital Water/Air Thermometer
- FilterTone Alarm
- Kitchen Aerator (1.5 GPM)
- Bathroom Aerator (1.0 GPM)
- Energy Efficient Showerhead (1.5 GPM)
- Teflon Tape
- Flow Rate Test Bag
- Parent Comment Card

Rebates
The School Education Kit program and energy saving devices are free to participating students and community organizations.

Quality Assurance
The third-party implementer surveys classrooms for measurement and verification results.

Program Changes
The Company is not proposing any changes to the School Education Kits program but will begin to account for those kits impacting an income-qualified population.

Budget, Participation and Target Considerations
The program's participation, electric and natural gas energy savings targets, and budgets were estimated using historical program results and proposed third-party costs.

The main budget drivers include the following:

- Utility Administration: This funds the program's internal labor and external fulfillment by our third-party implementer, which includes project planning, turn-key coordination, implementation, marketing, tracking of installations/surveys, call center and online help centers, measurement and verification of the program, and enrollment/reporting.
- Participation Incentives: This category covers the costs of the kit contents to participants.

Stakeholder Involvement
The School Education Kits project works with the Company's Community Affairs department, Account Management group, and local community non-profits to identify schools to participate in the program. Additional opportunities are sought for cross promotion, outreach, or cost sharing.

13. WHOLE HOME EFFICIENCY

Program Description
The Whole Home Efficiency program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. In this Plan, the Company is proposing to increase incentives and modify the incentives offered.

The program offers prescriptive and performance-based electric and gas rebates to residential customers who take a whole-house approach to improving the energy efficiency of their existing, single-family homes and eligible multi-unit homes. The concept of the product is to provide the customer with one-stop for all of their home efficiency needs. Program participation begins with an energy audit as a prerequisite which is then used to generate a list of potential improvements from which the customer can choose to install. Additionally, the program provides customers personalized advisory services from beginning to end of their project to assist with prioritizing improvements and connecting them to contractor resources. The program also offers rebates including potential bonus rebates to offset upfront project costs, and independent verification of the improvements after completion. Due to the emphasis on weatherization measures along with the inclusion of EFS measures and advisory services, the program is well suited to providing a potential pathway for those customers who wish to fully electrify their home.

Eligibility/Qualification for Participation
Any customer with electricity and natural gas provided by the Company may participate in Whole Home Efficiency. An energy audit through Xcel Energy or by a company-approved contractor must precede the project and must include a blower door test. The program is marketed primarily through Xcel Energy's Home Energy Squad and Home Energy Audit programs and additionally through contractors with the objective of helping customers find and prioritize energy efficiency improvements in their homes.

Qualifying Upgrades/Measures
Upon completion of the energy audit, a customer receives a list of potential upgrades such as:
- air leakage reduction
- attic and wall insulation
- heating and cooling systems, including heat pumps
- water heaters, including heat pump water heaters
- clothes washers
- refrigerators

Rebates
Incentives for building envelope (air sealing and insulation) performance measures will be based on the deemed energy savings comparing ex-ante and ex-post building envelope conditions and are based on savings achieved. To receive rebates, customers are required to install either attic insulation or comprehensive wall insulation and air sealing. Customers then need to select at least one other improvement, listed on the Whole Home Efficiency application. Customers will receive the standard prescriptive rebate for all installed measures with the exception of the envelope measures. Customers must use company-approved contractors for these installations, they are included on the list of approved contractors on the Company website. Customers are eligible for rebates for a Whole Home Efficiency project within two years of the energy audit. Customers may receive additional bonus rebates for installing prescriptive measures. Customers are not eligible to receive rebates from Whole Home Efficiency and other programs for the same improvement. All improvements are verified by the program implementer during the final inspection.

Trade Partner Incentives
The program offers trade incentives equivalent to 10 percent of the rebate amount for the following measures: Heat Pump Water Heater, Heat Pump Water Heater (demand management capable), Air Source Heat Pump, Cold Climate Air Source Heat Pump, Mini-Split Heat Pump, Cold Climate Mini-Split Heat Pump, Ground Source Heat Pump. These technologies are still early in their adoption curve in the market and require additional support for trade partners.

Quality Assurance
Third-party implementer is responsible for ensuring measurement and verification.

Program Changes
Program changes are reflective of updates in individual programs.

Change	Rationale
Increased rebates for heat pumps	Significant upfront cost, needed to move market
Increase time for customers to complete improvements to two years	Allow more time for customers to plan and budget for improvements
Expanding heat pumps to efficient fuel-switching applications	Consistent with new ECO guidance, reduce carbon
Removing ENERGY STAR® Connected Thermostats enrolled in AC Rewards measure	Historic low customer participation
Removing ENERGY STAR® dehumidifiers measure	Historic low customer participation
Bonus rebate for participation in envelope measures and Heat Pumps within 2 years	Industry focus on efficient fuel switching and right sizing equipment
Air Sealing requirement with Attic or Wall insulation	Air Sealing, when combined with insulation maximizes comfort and savings in a home.
Increased envelope measure rebates	Supports efficient homes and equipment sizing for heat pumps.

In addition, the program will be adding specific incentives for increased envelope measures. These are the only rebates that will be provided differently than the prescriptive rebates normally provided as part of the program offering.

Increased envelope measure rebate amounts:

Measure	Combo Customer $/Dth	Non-Xcel Energy heat source. Electric customer with AC $/kWh
Attic Insulation	$90.00	$0.45
Wall Insulation	$90.00	$0.45
Air Sealing	$90.00	$0.45

Budget, Participation and Target Considerations
The budget, targets and participation were developed in collaboration with the program implementer and based on previous years' participation with an anticipated increase.

The main budget drivers include the following:

- Utility Administration: This funds the program's internal labor and implementer contracts.
- Advertising and Promotion – The program is marketed through advertising and support materials, including brochures and welcome kits.
- Participant Incentives – This category covers rebates and trade incentives.
- Measurement & Verification – The program funds the Implementer to inspect 100% of projects completed and to do the exit blower door test.

Stakeholder Involvement
The program implementer is responsible for program promotion support, sign-ups, customer follow-up, verification visits, paperwork administration, contractor management and program tracking. The Company is also exploring targeted marketing by collaborating with communities in Xcel Energy's Partners in Energy program.

BUSINESS SEGMENT

Overview

The Business Segment is a portfolio of offerings assembled to reach commercial and industrial customers through a combination of study analysis to identify low-cost opportunities for energy efficiency as well as incentives offered to help lower the cost of high efficiency equipment.

For the 2024-2026 triennial period, the Company continues many of our successful business programs, while combining certain programs for customer ease, updating rebates where necessary, and broadening our offerings to encompass new technologies. In addition, we are going beyond the traditional scope of our Business Segment by incorporating EFS and load management (specifically load shifting) as the Company and our customers look towards the future of energy.

Programs

Our program portfolio encourages customers to choose high efficiency options ranging from a simple lighting fixture replacement to the inclusion of energy efficiency in the design of an entire new facility. Study programs assist customers whether they need to identify simple energy efficiency opportunities or are considering a complex manufacturing process change. Holistic programs foster a deeper level of customer commitment to energy efficiency and engage customers in long term energy planning intended to change the way customers look at energy and conduct their business.

Targets

With a portfolio of 17 programs, the business segment accounts for over 50 percent of our total electric and natural gas energy savings in this Plan. Our Business Segment targets for this Plan period are outlined in the following table.

Table 47a: 2024 Business Segment

	Electric				Natural Gas		
2024	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Business Education	20,191	$242,300	-	-	2,562	$30,750	-
Business Energy Assessments	453	$4,372,896	4,601	28,011,279	95	$418,929	27,552
Business New Construction	320	$11,757,153	13,859	65,579,288	32	$557,897	50,009
Compressed Air Efficiency	172	$979,183	1,291	9,016,793	-	-	-
Custom Efficiency	37	$1,162,191	859	6,115,321	9	$202,236	20,518
Data Center Efficiency	91	$1,236,777	922	15,070,217	-	-	-
Efficiency Controls	85	$629,119	320	8,206,755	24	$64,744	7,945
Empower Facilities	24	$964,662	-	-	6	$107,185	-
Empower Intelligence	386	$539,517	-	2,697,511	2	$53,947	61
Foodservice Equipment	54	$61,857	45	319,386	66	$94,749	5,536
HVAC+R	2,799	$ 4,121,836	6,069	34,073,550	692	$1,638,749	133,232
Lighting Efficiency	7,414	$11,951,825	18,975	115,021,767	-	-	-
Load Strategy Analysis	46	$ 745,263	622	6,455,982	6	$ 30,917	5,341
Multi-Family Building Eff.	7,920	$2,279,319	477	3,314,283	1,293	$859,841	32,216
Non-Profit Energy Savings	210,924	$1,711,680	992	9,096,643	110,143	$922,649	158,528
Process & Commercial Eff.	969	$11,655,440	20,298	124,477,870	54	$1,415,421	165,470
Self-Direct	1	$179,372	221	1,000,327	-	-	-
Business Segment Total	**251,886**	$ 54,590,390	**69,551**	**428,456,974**	**114,984**	**$4,069,972**	**606,408**

Table 47b: 2025 Business Segment

	Electric				Natural Gas		
2025	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Business Education	20,191	$254,415	-	-	2,562	$33,000	-
Business Energy Assessments	538	$5,251,876	6,396	38,87,419	94	$435,924	29,859
Business New Construction	258	$9,777,425	12,135	60,945,779	37	$702,499	70,664
Compressed Air Efficiency	193	$1,094,767	1,625	10,536,355	-	-	-
Custom Efficiency	38	$1,209,943	938	6,290,044	9	$204,178	20,518
Data Center Efficiency	84	$1,191,899	890	14,120,715	-	-	-
Efficiency Controls	104	$728,907	461	9,891,105	29	$70,300	8,918
Empower Facilities	34	$880,689	-	-	6	$97,854	-
Empower Intelligence	414	$601,774	-	2,851,654	2	$65,672	61
Foodservice Equipment	49	$ 62,378	41	292,923	56	$95,657	4,806
HVAC+R	2,802	$4,237,488	6,071	34,119,425	691	$1,513,609	126,624
Lighting Efficiency	7,414	$2,065,388	18,975	115,021,767	-	-	-
Load Strategy Analysis	46	$773,752	622	6,455,982	6	$31,169	5,341
Multi-Family Building Eff.	8,986	$2,541,301	658	4,000,742	1,428	$975,874	43,965
Non-Profit Energy Savings	221,642	$ 1,914,729	1071	9697637	116,233	$1,073,364	183,991
Process & Commercial Eff.	852	$ 10,826,644	18,111	111,825,97	55	$1,399,023	159,026
Self-Direct	1	$ 181,826	221	1,000,327	-	-	-
Business Segment Total	**263,646**	**$ 53,595,201**	**68,214**	**425,867,852**	**121,208**	**$6,698,125**	**653,773**

Table 47c: 2026 Business Segment

	Electric				Natural Gas		
2026	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Business Education	20,191	$267,750	-	-	2,562	$35,050	-
Business Energy Assessments	564	$5,305,310	6,306	36,195,555	104	$443,922	32,034
Business New Construction	262	$10,339,461	14,556	80,667,002	42	$695,185	94,860
Compressed Air Efficiency	207	$1,151,675	1,857	11,164,825	-	-	-
Custom Efficiency	39	$1,259,632	1,017	6,464,768	9	$206,188	20,518
Data Center Efficiency	64	$896,090	650	10,255,381	-	-	-
Efficiency Controls	122	$818,250	579	11,065,001	33	$76,105	9,825
Empower Facilities	58	$545,840	-	-	12	$60,649	-
Empower Intelligence	445	$670,933	-	3,082,869	2	$73,140	61
Foodservice Equipment	45	$64,236	37	260,588	53	$98,206	4,626
HVAC+R	2,806	$4,315,824	6,075	34,207,680	691	$1,468,757	123,345
Lighting Efficiency	7,414	$12,205,974	18,975	115,021,767	-	-	-
Load Strategy Analysis	46	$780,244	622	6,455,982	6	$37,669	5,341
Multi-Family Building Eff.	10,098	$2,774,969	854	5,281,569	1,575	$1,054,868	50,251
Non-Profit Energy Savings	232,898	$2,022,376	1,154	10,328,831	122,666	$1,133,631	210,171
Process & Commercial Eff.	797	$10,515,135	17,183	106,638,985	55	$1,412,754	159,026
Self-Direct	1	$185,298	221	1,000,327	-	-	-
Business Segment Total	**276,057**	**$ 54,118,999**	**70,089**	**438,091,129**	**127,810**	**6,796,124**	**710,059**

Market Analysis

Commercial customers have the highest potential for energy savings within indoor and outdoor lighting, cooling and ventilation, data servers, and refrigeration end-uses. In the industrial market segment, pumps, lighting, compressed air, fans, cooling, and drives show the greatest end-use potential.

Trade allies, end-use equipment vendors, energy services companies, and the Company's Account Managers and marketing team work individually and collaboratively to drive participation in the Business Segment. While coordination of DSM participation by the largest business customers typically requires regular personal communications and site visits, the Company also uses newsletters, customer events, direct mail, email communications, and awareness advertising to reach business customers. A challenge in marketing energy efficiency is that it is not a topic on the top of customers' minds – they are busy managing the core aspects of their businesses, particularly those who do not have dedicated onsite energy managers. Customers tend to focus on purchase price (or "first costs") rather than lifetime costs and are often unlikely to replace equipment prior to failure. Customers may also not be aware of energy efficient equipment and process options available to them when the need arises to make purchase decisions. Yet, opportunities are growing in marketing energy efficiency to customers as awareness on conservation, climate change, and the environment is increasingly creating an affinity for energy-saving actions. To support marketing efforts, the Company employs an integrated approach to marketing communications, where the tactics are designed to work in concert with each other and reinforce key messages over time.

Marketing/Advertising/Promotion

Although sales to the largest business customers typically require personal interaction, the Company also utilizes a variety of tactics and channels, including newsletters, customer events, direct mail, email communications, awareness advertising and social media to build awareness and drive program activity. In this Plan, the Company strives to drive deeper energy savings across the portfolio by expanding our messages in the marketplace. To support its marketing efforts, the Company will employ an integrated approach to communications, where the tactics are designed to work in concert with each other to reinforce key messages over time. We also market our programs as customer solutions to various business segments; focusing on the segments which have significant potential and the segments in which participation is under performing compared to others. Multimedia campaigns are used to provide each segment customized tools and information and to direct them to the most applicable programs in our portfolio.

Policies

The Company has adopted several general policies that guide the implementation of Business Segment programs. Individual programs may follow different policies as noted in the program descriptions. The general policies provide overall management direction; however, they may be modified when warranted and within guidance documented in statute or from the Department of Commerce. The segment-level policies include:

- *Cost-Effectiveness Tests:* All customer projects going through the custom analysis process must pass the Minnesota test with an absolute ratio of 1.0 or greater.
- *Proof of Installation*: All programs require documentation of installation, such as proof of purchase (e.g., invoices) or site verification.
- *Payback Requirements:* Projects must have a payback longer than nine months and cannot exceed the expected lifetime of the equipment.

- *Studies*: Study funding cannot exceed 75 percent of the incremental equipment cost unless otherwise noted in the individual program policies.
- *Influenced Savings*: These savings refer to projects for which the Company played a significant role in the customer's decision to implement an energy efficiency measure, and for which the customer participated in the normal Custom Efficiency project submission process, yet whose cost-effectiveness analysis or payback period failed. For such projects, no rebate is offered for the measure but the Company claims Influenced Savings in order to appropriately account for the Company's efforts and to recognize the often-significant labor investment and/or study costs involved in the project. Influenced savings guidelines are listed below:

    1. Project approval – Must follow program guidelines.
    2. Cost-Effectiveness Tests – Projects must pass the Minnesota and Participant Tests.
    3. Payback – Projects with a payback period of less than nine months may be considered only if they meet all the other Influenced Savings guidelines herein.
    4. Large Projects – Projects with savings of two GWh and greater require separate prereview by Department of Commerce. All other projects will be reviewed as part of the Status Report.
    5. Savings Cap – Influenced Savings claims cannot exceed four percent of the Company's annual achievements.
    6. Documentation – Documentation must be provided to show Xcel Energy's involvement was an important factor in implementing the energy saving project.

- *Study-Driven Credit:* If a customer implements measures identified in a study analysis or assessment, or identified in a study funded by Xcel Energy, and the measure has a payback period of less than nine months or longer than the expected lifetime of the equipment, the customer will not receive a rebate, but the Company will claim those savings as study-driven credit. We believe that our help identifying and analyzing the energy efficiency measures provides influence on the customer's decision to implement those measures. These savings do not count toward Influenced Savings. All programs that fund studies are eligible to claim study-driven credit.
- *Program Incentives*: Custom projects limit rebates to 60 percent of the actual project cost. Prescriptive rebate levels are set based on deemed incremental costs and rebates are capped at 60 percent of actual total project cost; this practice helps ensure we do not pay more than 60 percent of the total cost for a specific project for which the pricing varies from the deemed cost. Bonuses and special offers may increase the rebate cap as a percent of incremental cost, but we strive to ensure that it never exceeds 100 percent.
- *Bundling*: Due to the holistic nature of many of our business offerings, the Company utilizes "bundling." "Bundling" allows customers to identify multiple measures for installation which can then be evaluated together to see if they qualified for a rebate versus each individual

component. This allows measures with too short of a payback for a rebate to be leveraged to drive projects with too long a payback for the customer to install so that both are implemented.

Involvement with Interested Individuals and Entities

The Company continues to regularly meet with many organizations to refine existing programs, shape new programs, and discuss partnership opportunities. These organizations include but are not limited to, other utilities and industry experts such as the Building Owners and Managers Association, Center for Energy and Environment, CenterPoint Energy, Consortium for Energy Efficiency, Enterprise Minnesota, E Source, Midwest Energy Efficiency Alliance, Minnesota Technical Assistance Program and Motor Decisions Matter to name a few. Additionally, we continue to work with several third parties to implement parts of our business portfolio.

1. BUSINESS EDUCATION

The Business Education program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Business Education program is an indirect-impact offering that focuses on creating awareness of energy efficiency and providing business customers with information about what they can do to reduce energy use in their buildings. The program encourages customers to make Xcel Energy their first contact when considering equipment or process upgrades and engages customers to make changes that lower their energy use. It seeks to lower the barriers to the adoption of energy efficiency measures by educating customers and their employees on the impacts of their energy use and offering information on how to take action to achieve long-term energy savings. The program is primarily marketed to small and mid-sized business customers through sponsorships, customer outreach and advertising campaigns. For the Plan, the Company will focus on renewing existing partnerships and building new relationships. In addition, the program employs digital media strategies to drive active engagement in energy efficiency. By continuing to diversify the communication channels, the program increases customer knowledge of energy efficiency options and provides a greater variety of resource options and services.

Program Details

The program's main offerings include the following:

- Customer outreach via sponsorships and events;
- Print and Digital Communications targeted at business/facility decision-makers;
- Sponsorship of seminars and conferences for DSM Business Program Managers to network and present information;
- Direct mail marketing campaigns.

The Business Education program targets a variety of community events, sponsorships, workshops, and business expos to promote energy efficiency rebates and energy conservation strategies to many business customers. These opportunities allow for in-person, one-on-one customer outreach, which is critical to driving onsite customer leads and program signups.

Program Changes
The Company is not proposing any changes to the Business Education program.

Budget, Participation and Target Considerations
The program's participation targets and budgets were determined by reviewing historical trends and expected future demand for educational material requests, community outreach events and sponsorships.

The main budget drivers include the following:

- Utility Administration: This category represents the labor needed for program planning and implementation.
- Advertising & Promotion: This budget includes funds for printed materials, community outreach events, sponsorships, and digital advertising.

Participation targets were established through the review of historical data from targeted, successful outreach to customer segments and use of multiple channels for delivery of energy efficiency messaging. Participation for the program is defined as any time a customer engages with the program via impression or touch point, whether it be an in-person event interaction or a digital impression.

Stakeholder Involvement
The Business Education program participates in a variety of community-hosted customer outreach events. The program provides displays, staffing, and materials to promote energy conservation and efficiency to attendees.

2. BUSINESS ENERGY ASSESSMENTS

The Business Energy Assessments program was included in Xcel Energy's previous Triennial Plan for 2021-2023. Further, the Commercial Streamlined Assessments program was also included in our previous Triennial Plan. In this Plan, we have combined these programs under Business Energy Assessments to streamline our efforts and reduce customer confusion regarding these two offerings.

The Business Energy Assessments program offers study funding and electric and natural gas implementation rebates to commercial and industrial customers who improve their building performance through an energy assessment. The program is primarily marketed through our account managers, Energy Efficiency Specialists, and approved study providers.

Eligibility/Qualification for Participation
The program offers four types of options for customers under our Assessment Suite to help meet a customers' unique needs. In addition, to help remove barriers to implementation we offer implementation services to help move the project forward through completion.

Assessments Suite

Customers enrolling in the Business Energy Assessments program will receive a whole-building energy analysis. This assessment includes a utility bill analysis, a thorough walkthrough of the entire facility and a list of energy-saving strategies with savings estimates, as well as associated cost and rebate values. The assessment options are listed below:

- Industrial Assessment: Whole-facility assessment for small-to-midsize industrial customers.
- Commercial Streamlined Assessment: An affordable, quick to complete assessment focusing on immediate savings from minor repairs, tune-ups, and free energy-saving equipment installations.
- Building Assessment: An assessment that focuses on optimizing existing equipment as well as prescriptive and custom energy-saving opportunities and applicable rebates.
- Targeted Building Assessment: An assessment that encompasses the same components as the Building Assessment but at a greater depth. A detailed, comprehensive assessment that will be tailored to highly engaged customers that have an expectation of building an ongoing relationship with their study provider and utility.

Implementation Services

The program offers a variety of services that customers may choose from depending on their specific needs to help them implement their projects. Implementation consultation is used to improve the conversion rate on energy-saving opportunities identified in our study offerings. Services may include, but are not limited to:

- Attending internal stakeholder customer meetings to obtain approval;
- Assistance with prioritizing projects;
- Financial analysis of implementing measures;
- Bidding process review;
- Coordination of implementation;
- Verification of installation; and
- Paperwork compilation and rebate submission.

Funding

Participants are eligible for prescriptive and custom rebates for installed and implemented energy-saving opportunities. The program may offer bonuses for the implementation of recommended measures.

In addition, we subsidize assessments and implementation services to encourage customers to move beyond the barriers to participation. Consistent with other custom type projects, we anticipate there will be projects identified through the program that are custom in nature and payback to the customer is less than nine months. The Company claims study-driven credit for these projects.

Qualifying Upgrades/Measures

The program's main offerings include the following:

- Prescriptive rebates for the end-uses rebated in our other prescriptive programs;
- Custom rebates for any energy-saving opportunities eligible for rebates under our other custom programs;
- Operationally focused rebates for implementing recommissioning or building system tune-up measures identified through a study;
- Subsidized assessment options that identify energy-saving opportunities. Customers pay a portion of the assessment cost based on their size;
- Free implementation services to help customers implement energy-saving opportunities; and
- Rebates to off-set the cost of Building Operator Certification training.

Rebates

Incentives are calculated using the existing prescriptive and custom rebate levels.

Trade Partner Incentives

The Business Energy Assessments program follows the trade partner incentive structure for the individual end-use programs.

Quality Assurance

Prescriptive and Custom projects are verified in accordance with the policies of the end-use programs. Implementation of low/no cost measures will be verified by the third-party study providers. The Company continually samples the assessment reports for quality and for relative accuracy of savings estimates. Company personnel typically attend customer review meetings, and assure that the customers' have support for any follow-up questions.

Program Changes

Change	Rationale
Combining Business Assessments and Commercial Streamlined Assessments	To increase efficiencies and customer transparency.
Custom measure added for future EFS and load shifting opportunities.	Optimize customer's usage to produce bill savings and reduce electric system costs.

Budget, Participation and Target Considerations

We determined the program's participation, energy savings targets, and budgets by examining historic participation levels, project and participation cycles, and costs.

The main budget drivers include the following:

- Utility Administration: These costs are driven by marketing, sales, engineering, and external labor resources to support the Company's heavy engagement with the customer, as well as cover the costs of those projects requiring metered verification.
- Customer Service: The Company utilizes third-party resources to deliver the program's identification and scoping phases.
- Participant Incentives: The program has a robust rebate budget due to the size of projects initiated through the Process and Commercial Efficiency program. In addition to standard rebates, Business Energy Assessments offers lucrative bonus rebates for exceeding energy savings and/or implementing projects on a system-wide approach.

Stakeholder Involvement
Customers, trade allies, and other stakeholders are engaged at the project level to gather input regarding best practices, methods, and support for evaluating new technologies.

3. BUSINESS NEW CONSTRUCTION

Program Description
The Business New Construction (BNC) program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The BNC program is composed of three individual offerings including Energy Design Assistance (EDA), Energy Efficient Buildings (EEB) and Code Support. It is primarily designed to provide Commercial & Industrial customers with no-cost consulting services and financial incentives for electric and natural gas energy efficiency projects. These efficiency projects may pertain to new construction, additions to existing buildings, and/or major renovation projects. For the Plan, the Company is proposing to expand the Code Support offering to target building code officials, add bonus rebates for Income Qualified projects, and increase EEB rebates to be more consistent with EDA rebate levels. Specific details are provided below.

Eligibility/Qualification for Participation

Energy Design Assistance
The Energy Design Assistance (EDA) offering provides business customers with energy expertise to encourage energy efficient building design and construction practices. EDA offers real-time energy modeling so the project team can visualize the impacts of their efficiency choices. The program encourages an integrated approach to the design process by providing free computer energy modeling of the project design, funding to offset the cost of design time associated with the increased energy analysis, financial incentives to improve the cost-effectiveness of a package of energy efficiency measures, and field verification to ensure that the strategies are installed per the design intent.

The Company administers the EDA program in coordination with natural gas utilities CenterPoint Energy and MERC, with help from outside energy design consultants who facilitate meetings with the design teams and building owners, and complete energy modeling activities. Preapproval is required for participation.

Projects typically enter the program during schematic design or design development phase of the architectural design process. There are two tracks available for customers: Standard and Enhanced. The Standard track is for projects that are 20,000 square feet or greater in size that are in the schematic design or early design development phase. Rebates are based on peak coincident demand and energy savings (PC kW, kWh, and Dth); the project must achieve a minimum of 5 percent savings over the baseline to be eligible for the rebate.

The Enhanced track is for customers registered with a sustainable building certification program such as the United States Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) or Minnesota B3. The Enhanced track provides additional analysis in the early stages of design for HVAC, daylighting, and massing analysis. T he Enhanced Track is for projects that are at least 50,000 square feet that are in the pre-design or early schematic phase. The project must achieve a minimum of 30 percent demand savings over the baseline to be eligible for the rebate.

Energy Efficient Buildings (EEB)
The EEB offering is intended to provide a simplified approach to optimizing energy efficiency options in new construction, additions, and major renovations. It offers design review, equipment recommendations, and onsite verification.

The EEB offering provides a comprehensive list of typical energy efficiency measures that can be incorporated into the new building design, as well as the rebate amounts for each measure. The program is administered using both internal and external resources to review the calculations, recommend equipment, and verify installation. Preapproval is required.

Any size building may participate, but EEB is primarily targeted at buildings that are between 5,000 and 20,000 square feet and/or projects not suited for the full-blown energy modeling of the EDA offering. Projects must enter the program prior to completion of construction documents.

Code Compliance Support
New to this Plan is an expanded offering to support communities across Minnesota to improve code compliance. The Company, in coordination with CenterPoint Energy, Minnesota Energy Resources, Minnesota Power and Otter Tail Power will give those communities the tools to improve compliance with the new codes and help them reach their energy performance and economic development targets. This proactive support will be designed to meet each community's needs and address current gaps in new code adoption across the state including: a

lack of resources, lack of knowledge, and internal and external opposition to increasing code requirements. Specific strategies include one on one support for local officials, marketing materials available through various channels, and training designed to support awareness and implementation.

Importantly, this effort is a complement to the offerings that support projects going above the applicable energy code. Assuring that every building meets a level or performance that manages costs and helps reduce emissions while separately incentivizing the building owners that are testing new approaches that may eventually become standard practice is a necessary approach to reaching the clean energy transition targets that are shared by customers, policymakers, and the Company. There will be opportunities to add participating utilities in the future should additional electric or natural gas utilities want to participate in this statewide code initiative.

A key coordination effort will be between this code compliance support program and activities sponsored directly or indirectly by the Efficient Technology Accelerator (ETA) advised by the Department of Commerce and utilities jointly participating in the ETA Coordinating Committee. Activities such as adoption of minimum performance requirements tied to specific equipment supported by ETA or implementation of federal funding that leverages the ETA's statewide platform will be factored into implementation once identified. The Companies have worked with the ETA in advance of filing to transparently discuss areas of unique focus for each discrete program to maximize the support available and minimize duplication.

Participating utilities hired a consultant to develop a program design and budget estimates to support cost-effectiveness testing for the Minnesota Codes Program and a copy of this report can be obtained by submitting a formal information request. Starting in 2021, the consultant began researching the potential codes support program to evaluate potential energy savings that could be claimed by the utilities from a coordinated building codes program in Minnesota. The consultants researched existing codes support programs nationally and completed Minnesota specific research such as interviews and assessment of potential energy savings. The results of that research were used to design this proposed initiative.

The Code Compliance Support initiative will consist of several different support services that will provide comprehensive support:

- Program Planning and Coordination: Includes coordinating communication to the market, program activities, and resources with entities working to support code compliance and adoption outside the utility and other utility programs, if applicable, to support code compliance and adoption targets.
- Code Compliance Improvement/Support: Includes activities that aim to improve compliance with existing codes and address barriers to compliance. Examples of the primary activities within this category are training, development of technical materials, purchasing and distribution of code publications, and participation in industry meetings.

- Building Code Update Support: Includes efforts related to supporting the state when considering higher performance building energy codes and providing technical support, such as providing technical data on energy savings or cost. (For clarity, this is not advocacy for new codes to be adopted as state or federal policy, but rather providing information for decision-makers to consider in reviewing proposed changes to code.)
- Proactive Outreach: Includes outreach to parties involved in administering and applying the building energy code on a regular basis to better understand how Minnesota utilities can support industry stakeholders, primarily through:
    - A circuit rider who acts as a consultant to proactively train and resolve issues around building code.
    - Marketing and outreach materials intended to increase awareness and provide easy to understand basic information on the products and services utilities are providing to support code compliance and adoption.
- Third-Party Support: For example, includes assisting jurisdictions with plan reviews for the highest energy savings portion of the code, most commonly performance path projects.

<u>Qualifying Upgrades/Measures</u>

Energy Design Assistance

Project energy savings is calculated based on the collective bundle of energy efficiency measures implemented as compared to a building constructed to meet the energy code.

Energy Efficient Buildings (EEB)

The EEB program leverages the commercial and industrial (C&I) portfolio of prescriptive measures, including motors, cooling, and heating equipment. It also includes EEB specific prescriptive measures for building envelope (Windows, Walls and Roof) and a lighting measure that calculates savings utilizing the Lighting Power Density allowed for the space type. Custom measures are also available for energy efficiency strategies not offered as a prescriptive measure.

Income-Qualifying Bonus Incentives

New to this plan, the Business New Construction programs will offer bonus incentives of up to twice the original rebate amount for income-qualified, multi-family buildings under our income-qualified multi-family program. Eligibility will follow the same process as those described in our Income-Qualified Segment section.

To qualify property owners and managers must demonstrate that the buildings will meet the following requirements:

- 5+ units with functional kitchens
- Common entrances and common living areas
- Electric Service from Xcel Energy
- Natural gas service from Xcel Energy or CenterPoint Energy

- Provide proof that 66 percent of their tenants will be income qualified based on parameters defined in the Low-Income Multi-Family Building Efficiency program.

The determination of whether a property is eligible to participate is reviewed on a case-by-case basis.

Rebates

Energy Design Assistance (EDA)

Rebates are paid according to the rebate schedule below.

Table 48: EDA Rebate Schedule

Unit	Rebate – Standard Program	Rebate – Income-Qualified
PC kW	$500.00	$750.00
kWh	$0.04	$0.06
Dth	$5.00	$8.00

Energy Efficient Buildings (EEB)

New to this plan, custom and EEB specific measures (Lighting Power Density and Envelope – Window, Wall, and Roof) and will be based on the EDA standard rebate levels (see chart above). This change will make the rebate levels across programs more comparable. Other incentives are calculated using the existing prescriptive rebate levels. Income-qualifying projects will be eligible for double the base rebate levels.

Trade Partner Incentives

A Design Team Incentive is available to offset the cost of the design team's time to participate in project meetings and activities.

Table 49: Design Team Incentive

Building Square Feet	Trade Incentive
20,000-49,999	$4,000
50,000-99,999	$8,000
100,000-399,999	$10,000
400,000+	$12,000

Quality Assurance

Field verification is utilized for both Energy Design Assistance and Energy Efficient Buildings to ensure the strategies are installed per the design intent.

Code Compliance Support

Although the research consultant behind the design of the Code Compliance Support program provides some good indication of what this project might achieve, there is still uncertainty about actual energy savings realized in future years because of changing building codes. For this reason, the Company, in coordination with participating utilities, may conduct an ongoing evaluation of the project during the 2024-2026 triennial period. The Company is interested in being flexible as we move forward with implementation and gain more experience with this type of program.

One such opportunity for flexibility includes validation of evaluation methods by the Department of Commerce's selected administrator of the Technical Reference Manual or the evaluator for the ETA. The partner utilities suggest that this should happen during the 2024 program year to reduce potential follow up during the reconciliation of 2024 activities after the 2024 Status Report has been filed on April 1 (electric and combination utilities) or May 1 (natural gas utilities) of 2025.

Program Changes

Change	Rationale
Add EFS measures	Optimize customer's usage to produce bill savings and reduce electric system costs.
Bonus rebates will be available for income-qualified projects	This market segment actively participates in Business New Construction; providing additional funds will help the customers expand the efficiency measures they implement leading to long-term energy savings for tenants.
Raise rebates for EEB prescriptive and custom measures to match EDA levels	Rebates will be more comparable, enabling customers multiple program paths for their projects
Expand Code Support	The revised program will include a broad set of offerings available to more customers.
Adjust Baseline	Projects enrolled in EDA and EEB on January 1, 2024 and after will use the Minnesota State Energy Code referencing the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-2019 Energy Standard as the project baseline.

Budget, Participation and Target Considerations
The program's participation, energy savings targets, and budgets were determined by reviewing historical achievements and the state of the construction industry. In recent years, the construction industry has been very active, although there are signs that growth may be tapering off. Given the time required to complete these projects, the buildings currently in development will drive most of the achievement for this Plan.

The main budget drivers include the following:

- Participant Incentives – Customer rebates and vendor incentives make up most of the budget. In addition to customer incentives, the EDA product provides incentives to design teams to offset the extra expense associated with participation.
- Customer Service – These activities are associated with the cost of analyzing building plans, developing energy models, identifying energy efficiency opportunities, as well as time spent conducting customer meetings, trainings and participating in code compliance activities.
- Measurement & Verification – All EDA and EEB projects are verified using on-site visits. The Company will conduct a program evaluation of the Code Support program to verify assumptions used and determine energy savings.

Code Compliance Support
The supporting information developed by the consultant anticipated that new commercial and residential energy codes would take effect on January 1, 2026. However, since that research was substantially complete, the Department of Labor and Industry (DLI) gave notice that a new commercial energy code (ASHRAE 90.1-2019) would take effect in January of 2024 and the residential energy code is currently under review by DLI after a recommendation to the Commissioner of Labor and Industry. However, due to the lag in time between when a building is permitted and when it begins operations, there will not be savings claimed in the first year of the expanded program and thus 2024 will not be affected by these possible changes. The partner utilities propose that updated savings calculations for the 2025 and 2026 program years will be filed in the compliance section of the 2024 status report for claimed savings in these future years. The 2024 proposal allows for the evaluation of the first year of activities to inform future year program effects, including changes in gross technical savings for claiming savings in 2025-2026, compliance, and attribution, which would need to be reflected in a program that supports accelerated code adoption.

Stakeholder Involvement
The New Construction program engages customers, trade allies, and other stakeholders at the individual project level and supports organizations including the United States Green Building Council (USGBC-MN) and the Center for Sustainable Building Research (CSBR).

4. COMPRESSED AIR EFFICIENCY

Program Description
The Compressed Air Efficiency program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Compressed Air Efficiency program offers financial incentives to electric business customers that implement energy saving projects within their compressed air systems. The program offers study funding to perform system diagnostics, as well as prescriptive and custom rebates for the purchase of energy saving equipment. Compressed Air is targeting industrial customers to

provide alternatives to traditional propane forklifts which are typically used in these settings. The program is primarily marketed to mid- to large-sized industrial customers.

For the Plan, the Company proposes to add prescriptive rebates for larger variable speed drive compressors and forklifts. Additionally, we will provide financial incentive option for customers who choose to fix system leaks without completing an Xcel Energy study.

Eligibility/Qualification for Participation

The Compressed Air product is available to electric business customers. Compressed Air studies require preapproval prior to execution and must be completed by an approved study provider. Custom projects are evaluated under the Custom Efficiency analysis and must follow the rules of the Custom Efficiency product. These processes help to minimize so-called "free ridership" and ensure the technical and financial soundness of projects that are awarded rebates.

System requirements include:

- Electrically driven compressed air systems;
- Minimum 10 hp total installed air compressor capacity (excluding backup equipment); and
- Systems must operate at least 40 hours per week (2,000 hours per year).

Qualifying Upgrades/Measures

The Compressed Air Efficiency program includes compressed air supply-side, demand-side studies, and an efficient fuel switching measure as well as both prescriptive and custom incentives.

Prescriptive	Custom
Variable speed drive compressors	Calibration/tune-up of system set points
No loss air drains	Adjustment of valves and dampers
Cycling refrigerated dryers	Reducing system demand
Dew point demand controls	Air to electric conversions
Mist eliminators	Capital equipment replacements and upgrades
	System redesigns

Rebates

Measure	Rebate
Supply Side Study	100% Study Cost of current Max structure + Additional $50.00/Leak Fix
Cycling Dryers	$3.00/SCFM
Dryer Purge Demand Controls	$1,500.00 + $1.00/CFM
Mist Eliminators	$2.00/SCFM
No Air Loss Drain	$200.00/Drain

Measure	Rebate
New VFD Compressor	$150.00/HP
Demand Side Study	75% of Study Cost
Flow Controller	$10.00/Operating HP
Storage Tank	$1.00/Gallon
Dryer Purge Demand Controls	$1,500.00 + $4.00/CFM
Leak Only Study	$50.00/Leak Fix
Industrial battery chargers	$250.00/Charger
Forklift Electrification	$4,000/ Forklift

Trade Partner Incentives

The Company provides Trade Partner incentives to trade partners who leverage the program rebate to help customers off-set the first costs with purchasing and installing energy efficient equipment. Trade incentives are available to all trade partners that provide the criteria to participate. The trade incentive paid is 15 percent of the customer's rebate up to $5,000 per project.

Quality Assurance

Study providers are vetted and must go through a trial period prior to becoming approved to conduct compressed air studies.

Program Changes

Change	Rationale
Increase in eligible sizes of VSD compressors	This is a project that commonly goes through the Custom Efficiency product and making it prescriptive will improve the experience and turnaround times for participating customers.
Leak fix check	Looking to solely check leaks, which could correspond with a study.
Expand mist eliminator to large size range	Avoids Custom Efficiency path, and already have assumptions built for expanding.
New pressure/flow controllers	Adopting measure as defined in Minnesota's Technical Reference Model.
New storage tanks on fixed speed load/unload systems	Adopting measure as defined in Minnesota's Technical Reference Model (TRM).
New heated desiccant dryers with controls	Common through Custom Efficiency and furthers efficiency beyond current Heatless Desiccant Dryer offering.
New Blower Purge Desiccant Dryers with Controls	Common through Custom Efficiency and furthers efficiency beyond current Heatless Desiccant Dryer offering.
Add measure for Forklifts	Addition of EFS measure of lithium-ion battery forklifts bundled with industrial battery chargers

Budget, Participation and Target Considerations
The program's participation, energy savings targets, and budgets were determined by analyzing historical data, reviewing projects in the pipeline and evaluating the forecasted economic conditions. We also included other variables such as promotions needed to reach targets, rebate levels, and staffing. Projected customer participation and savings are based on expected average project size and mix of technologies anticipated.

The main budget drivers include the following:

- Participant Incentives: This budget represents the rebates we will pay for energy efficient equipment and studies. This is based on historical participation across the offering and includes predicted growth from existing and new products.
- Utility Administration: These budgets are based on past program performance with an increase built in for increased participation and technical engineer support.
- Advertising & Promotion: This budget will assist in raising awareness of the program and provide training to customers and trade to establish the Company as an expert in the market.

Stakeholder Involvement
The Compressed Air program partners with the U.S. Department of Energy to provide training on the Compressed Air Challenge program and Fan Systems. We have partnered with the Consortium for Energy Efficiency to establish best practices for industrial systems including blower systems and pumping.

5. CUSTOM EFFICIENCY

Program Description
The Custom Efficiency program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Custom Efficiency program offers financial incentives to electric and natural gas business customers that implement energy saving projects outside of what is available through our prescriptive programs. The program is marketed to all business customers regardless of size using direct contact with customers via our sales representatives, the internet, and trade channels. Energy-saving, non-prescriptive projects encompass installing new equipment, replacing existing equipment, retrofitting equipment or improving processes that lower a customer's electric or natural gas use. The project list includes, but is not limited to boilers, compressed air, cooling, lighting, motors, and other technologies, all of which must pass cost-effectiveness on an individual project basis. This program also offers study funding to help customers determine project viability and energy savings potential.

For the Plan, the Company is proposing to add measures to capture EFS opportunities as well as load shifting opportunities outside of prescriptive measures.

Eligibility/Qualification for Participation

Each custom project must meet specific eligibility requirements. This process can be broken into distinct steps: Application Submission, Project Analysis, Project Acceptance or Ineligibility, and Project Completion.

- *Application Submission*: The Company's Account Managers and/or Energy Efficiency Specialists work with a customer and their vendor to identify a project with energy efficiency opportunities and start the application process. In addition to the application, which must be signed by the customer, an electronic "workbook" is filled out with a detailed description of the project.

- *Project Analysis*: Xcel Energy engineers review the project information and enter pertinent data into a model to determine the projected energy savings, benefit/cost ratio and payback. The model calculates energy savings for various end-uses (lighting, motors, cooling, compressed air, etc.) to ensure consistency in analysis from one project to another. All calculations are based on approved ASHRAE methods or other similar industry standards. Based on the modeled results, the project either passes or fails.

- *Project Acceptance or Ineligibility:* Once the engineers have completed the analysis, an approval or not rebate eligible letter is sent to the customer. The letter provides critical information regarding the project, including rebate amount, project description and costs, energy savings, and any conditions that must be met to receive the rebate (e.g., measurement and verification). Should a project be ineligible for a rebate, a letter is sent to the customer with an explanation as to why the project was not approved.

- *Project Completion*: When a project is completed, the customer will inform their Account Manager or Energy Efficiency Specialists. The customer will sign the verification section of the application and submit it along with copies of invoices and other required information as stipulated in the approval letter. If the final documentation matches the approved project information, the project the paperwork is submitted to the Company for issuance of the rebate.

Occasionally, projects must undergo re-analysis because the final project parameters do not match the original project application. This may be due to minor changes in project scope, cost, or technology. In these cases, the actual project information will be given to the technical staff for review and re-analysis. The original analysis will be updated with the new information to determine if the project still meets passing criteria. A passing project will be awarded a rebate based on the calculated savings from the updated analysis. A project that fails on re-analysis will not be issued a rebate.

Qualifying Upgrades/Measures

The custom product is available for business customers who purchase and install equipment or change processes within their facilities that do not fit under the criteria of the prescriptive rebates. The custom process includes a customized analysis based on each customer's project, associated costs, equipment, or process change and the savings delta of the baseline equipment and energy savings option. The rebate is based on the energy savings delta. Qualification for financial incentive within this product is dependent on meeting specific criteria including payback and passing cost benefit analysis.

External project funding, such as possible IRA funding, may be considered in the custom model when calculating cost-effectiveness and payback periods if the external funding meets the following criteria: (1) is known to the Company; (2) dedicated to a specific technology measure or set of related measures; (3) available for at least the length of the Plan; and (4) broadly applicable (not restricted to a specific proprietary project or specific customer).

Rebates

Rebate amounts are defined by the engineering examination of the demand and energy savings attributed to the project. The analysis incorporates standard engineering principles, relative to industry standards and the interactive energy effects of the equipment and/or system components. Successful applicants receive a rebate if their completed project passes cost-effectiveness testing. In addition, successful applicants receive partial study funding based on an engineering assessment of the estimated demand and energy savings of the project.

Trade Partner Incentives

The Company provides Trade Partner incentives to trade partners who leverage the program rebate to help customers off-set the first costs with purchasing and installing energy efficient equipment. Trade incentives are available to all trade partners that provide the criteria to participate. The trade incentive paid are 15 percent of the customers rebate up to $5,000 per project.

Quality Assurance

M&V is completed for projects that exceed specified thresholds of electric and/or gas savings. M&V may consist of pre- and post-monitoring data collection to confirm savings estimates.

Program Changes

Change	Rationale
Custom measure added for future EFS and load shifting opportunities.	Optimize customer's usage to produce bill savings and reduce electric system costs.

Targets, Participants & Budget

The program's participation, energy savings targets, and budgets were determined by analyzing historical data, reviewing projects in the pipeline, and evaluating the forecasted economic conditions.

We also included other variables such as promotions needed to reach targets, rebate levels, and staffing. Projected customer participation and savings are based on expected average project size and mix of technologies anticipated.

The main budget drivers include the following:

- Utility Administration: Custom Efficiency is a labor-intensive product due to the pre-approval process and analysis components.
- Participant Incentives: The budget for rebates is established based on an estimation of participation levels, multiplied by the rebate per kW amount in the technical assumption models.

Stakeholder Involvement
Customers, trade allies, and other stakeholders are engaged at the project level to gather input regarding best practices, methods, and support for evaluating new technologies.

6. DATA CENTER EFFICIENCY

Program Description
The Data Center Efficiency program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Data Center Efficiency program is a holistic offering that provides prescriptive and custom rebates to business customers that install energy saving measures in their existing or new data center. The program also offers rebates for data center energy studies. The program is primarily marketed to our enterprise and colocation data center customers through our account managers and Business Solutions Center, but any size data center can participate. We also work closely with our trade partners, specifically engineering firms, technology services firms, mechanical contractors, and manufacturers' representatives to market the program. For the Plan, the Company is proposing to expand prescriptive offerings to larger unit sizes for Computer Room Air Conditioners. We detail these more specifically below.

<u>Eligibility/Qualification for Participation</u>
The Data Center Efficiency product is available to electric business customers.

- *Existing Facilities:* Customers may perform a study by selecting a pre-qualified study provider. If they select a provider who is not on the Company's list, the new provider will be required to submit qualifications prior to receiving study funding approval. The Company typically evaluates measures identified within a study as one project, based on the customer's indication to implement all measures included in the project. Pre-approved projects must be cost-effective. If at least two years has passed since a project was approved, the technical staff will re-analyze it to determine if the savings/payback has changed. This re-analysis is conducted prior to issuing a rebate check. Studies, once pre-approved, need to be submitted to the Company within three months of issuance of the pre-approval letter.

- *New Facilities*: To participate in this measure, customers will work directly with contracted agents of the Company who will facilitate the integrated design and modeling components of the measure. The choice of contracted providers is influenced primarily by the fact that the new Data Center market is highly dynamic and complex. To manage the risk introduced by this complexity, the Company chose to move forward with a limited provider delivery model. As the market evolves, the Company will evaluate the potential to open the consulting services of this measure up to other providers in a manner similar to studies undertaken by existing data centers.

- *Computing Spaces:* For prescriptive Virtual Desktop Infrastructure (VDI) measures and prescriptive high efficiency servers, all equipment rebated through the measure must be new and meet all measure rules and requirements. A minimum of 10 units must be purchased to qualify for the rebate. The application must be submitted within twelve months of the invoice date.

<u>Qualifying Upgrades/Measures</u>
The program's main offerings include the following:
- Prescriptive rebates for efficiency improvements falling under any of the end-use prescriptive programs within the Business Segment.
- Custom rebates are awarded for efficiency measures such as: air-flow management; high efficiency servers and IT systems; cooling systems; humidification systems; transformers; and uninterruptable power supplies (UPS).
- Study funding is available to identify and/or quantify energy savings projects.
- Design Consulting Services are available for customers building a new data center, free of charge, to help data center owners optimize the efficiency of their facilities during the siting, design, and early operation stages of the new data center. Custom rebates are available for the efficiency improvements incorporated into the design, as in the Energy Design Assistance offering.

Prescriptive Rebates

Measure	Rebate
Computer Room Air Conditioners (CRAC)	Total Rebate = Size + AC Unit + Economizer Size = $60/ton x tons AC Unit = $10 X (Unit SCOP - Minimum qualifying SCOP)/0.01 Economizer = $2 X (Economizer SCOP - Minimum qualifying Sensible Coefficient of Performance (SCOP))/0.01
Mini-split AC units	($20 + ($1/0.1 SEER over minimum qualification)) x tons
Plate and frame heat exchangers for water-side economizing	$120 - $300
Virtual desktop infrastructure systems (including thin client and zero client computing)	$10/unit with a minimum of 10 units installed

Trade Partner Incentives

The Company provides trade partner incentives to trade partners who leverage the program rebate to help customers off-set the first costs of purchasing and installing energy efficient equipment. Trade incentives are available to all trade partners that include a Trade Incentive ID on their rebate/preapproval application.[31] The trade incentive paid is 15 percent of the customer's rebate up to $5,000 per project.

Quality Assurance

Approved study providers have submitted qualifications to Xcel Energy, including information on their data center expertise, examples of prior studies, and samples of energy calculations. Providers are approved to provide studies addressing various data center components noted as IT or facility services.

Program Changes

Change	Rationale
Custom measure added for future load shifting opportunities.	Optimize customer's usage to produce bill savings and reduce electric system costs.

Budget, Participation and Target Considerations

The program's participation, energy savings targets, and budgets were determined by analyzing historical data, reviewing projects in the pipeline, and evaluating the forecasted economic conditions. We also included other variables such as promotions needed to reach targets, rebate levels, and

[31] Trade Incentive IDs can be obtained from Xcel Energy and found on xcelenergy.com/TradePartners

staffing. Projected customer participation and savings are based on expected average project size and mix of technologies anticipated.

The main budget drivers include the following:

- Participant incentives: This budget represents the rebates we will pay for energy efficient equipment and studies. This is based on historical participation across the offering and includes predicted growth from existing and new products.
- Utility Administration: These budgets are based on past program performance with an increase built in for increased participation and technical engineer support.
- Advertising & Promotion: This budget will assist in raising awareness of the program and provide training to customers and trade to establish the Company as an expert in the market. Promotional dollars include an increase to support an increased savings target.

Stakeholder Involvement
The Data Center Efficiency program works with multiple community energy organizations, ranging from trade partners and installers to local industry organizations. Xcel Energy hosts program and technical training and information sessions for trade partners and sponsors and presents at local industry chapter organization meetings and events.

7. EFFICIENCY CONTROLS

Program Description
The Efficiency Controls program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Efficiency Controls program offers custom electric and gas rebates to customers who install automated control systems resulting in energy savings. These systems are centralized networks programmed to monitor and control mechanical and sometimes lighting systems within a building, allowing customers to reduce energy costs and shift energy load by adjusting usage of equipment. The program is marketed to all business customers. For the Plan, the Company is proposing to add prescriptive measures, apply a cost-reduction to account for non-energy costs in controls proposals, and add a demand response component.

Eligibility/Qualification for Participation
Used equipment does not qualify. To be eligible for a rebate, customers must submit their application and project proposal for preapproval before purchase or ordering equipment. Used control equipment does not qualify, although updates to existing control systems are eligible. The Company evaluates each application, estimates energy savings of the proposed system, and notifies the customer of rebate qualification and estimated rebate amount.

Qualifying Upgrades/Measures

Various types of controls projects can qualify for a rebate; the general categories of projects are presented in the following table with examples of measures that would fall into each category.

Resets • Supply air/discharge air temperature • Entering condenser water temperature • Chilled water supply temperature • Variable air volume fan duct pressure and flow • Chilled water pressure • Hot deck and cold deck temperature	**Scheduling** • Holiday scheduling • Zonal scheduling • Override control and tenant billing • Night setup/setback • Optimum start/stop • Morning warm-up/cool-down
Ventilation Control • Occupancy sensors • Supply air volume/outside air damper compensation routines • Carbon dioxide sensing • Exhaust fans • Typical air-side • Air-side economizers • Night ventilation purge	**Lighting** • Daylight dimming • Lighting sweep • Occupancy sensors • Zonal lighting control
Miscellaneous • Simultaneous heating/cooling control • Zone-based HVAC control • Variable Speed Drive (VSD) control • Chiller staging • Boiler control • Building space pressure • Heat recovery	**Demand Management** • Demand limiting or load shedding • Sequential startup of equipment • Duty cycling

In addition to custom rebate opportunities, the Company offers a HVAC ventilation add-on rebate for rooftop unit economizers and demand-controlled ventilation of $20 per ton of cooling capacity that meet eligibility.

Rebates

As part of the Efficiency Controls program, the Company looks at individual situations to determine an incentive level that corresponds to the energy-savings potential of control systems. The more energy a project saves, the more businesses can earn rebate dollars—up to $450 kW on-peak + $200 kW in excess + $.02 kWh saved and up to $5 per dekatherm (dth) saved.

Trade Partner Incentives

The Company provides Trade Partner incentives to trade partners who leverage the program rebate to help customers off-set the first costs of purchasing and installing energy efficient equipment. Trade incentives are available to all trade partners that include a Trade Incentive ID on their rebate/preapproval application. The Efficiency Controls program provides a trade incentive of 15 percent of a customer's rebate for a maximum amount of $5,000 per project for completed projects.

Quality Assurance

The Company applies rigorous training for engineering analysis to this custom product. The Company also works with reputable energy analysis firms and the Consortium of Energy Efficiency to advance the Efficiency Controls program.

Program Changes

Change	Rationale
Adding prescriptive measures • Pneumatic to DDC Thermostats • Rooftop Economizer Control with Demand Control Ventilation • Guest Room Energy Management Thermostats (3 Types)	Expedite project approvals for our stakeholders
Adjust incremental cost cap to 50 percent	Energy management system projects have many costs which do not directly apply to energy savings such as user interface upgrades. These types of non-energy savings costs are incorporated into the total project costs and are difficult and sometimes impossible to separate out, so the incremental cost cap reduction aims to take these non-energy savings costs into account.
Custom measure added for future load shifting opportunities.	Optimize customer's usage to produce bill savings and reduce electric system costs.
Adding additional training opportunities to both trade partners and customers on peak energy control sequences.	Help educate customers regarding load shifting strategies and their impact to their business.

Budget, Participation and Target Considerations

The program's participation and energy savings targets and budget were determined by historical program performance, current technology, and market conditions as described above.

The main budget drivers include the following:

- Participant Incentives: As the market becomes more saturated with digital control systems, the customers left to convert require greater assistance and higher rebate incentives to influence project implementation.
- Utility Administration: Internal labor to market and administer program offerings are estimated based on historic spend.
- Customer Services: Supporting engineering and staff augmentation to ensure accurate consistent analyses and support any M&V efforts as needed.

Stakeholder Involvement
In 2022 the Company held interviews with trade partners, customers, and vendors to gain feedback and ideas on product improvements. We intend to take these learnings along with analysis conducted in other jurisdictions to make future program improvements.

8. EMPOWER FACILITIES

Program Description
Empower Facilities was added to Xcel Energy's previous Triennial Plan for 2021-2023 through a program modification approved by the Commissioner on August 11, 2022. The Company proposes to continue this product as described below in the 2024-2026 triennium. Empower Facilities is an indirect impact program for business customers. The program is designed to help reduce barriers for customer participation in our business segment by offering a comprehensive approach to managing their energy needs.

Eligibility/Qualification for Participation
Empower Facilities delivers a turnkey service that assesses energy consumption, current equipment, and a customer's future business plans that may affect their facility's energy use. If needed, a building assessment will be conducted, and the program will provide a list of recommendations from which the customer can choose the scope of their project. The program will also prepare detailed customer proposals for costs and services based on different scope options. These services are provided at no cost to the customer.

The customer may then choose to continue to work with the program, contracting for implementation services and/or ongoing support, under an agreed scope and financial arrangement, or they may choose to implement projects independently. Implementation services contracted for could include support in identifying qualified trade partners and equipment providers to provide project costs or working with the customer's preferred partners and providers including preparation and submission of any applicable rebate paperwork associated with direct impact CIP programs. The contracted services will be billed to the customer by the Company as part of the customer's utility bill.

This program is marketed through the Company's Account Managers toward commercial, industrial and government customers who struggle to identify and/or more importantly, face barriers to implementing energy efficiency projects. All non-CIP-exempt customers with a business rate are eligible.

Qualifying Upgrades/Measures

While focused on delivering direct energy efficiency measures, customer project scopes may include non-efficiency measures that facilitate customer action on the overall project.

Rebates

No special or program specific rebates are provided beyond the rebates associated with the direct energy efficiency measures with the customer project.

Trade Partner Incentives

No special or program specific trade partner incentives are provided beyond the incentives associated with the direct energy efficiency measures within the customer project.

Quality Assurance

Not applicable.

Program Changes

The Company is not proposing any changes to the Empower Facilities program.

Budget, Participation and Target Considerations

Customers with projects at multiple facilities would be treated as multiple participants for reporting purposes; a customer facility receiving both gas and electric service from the Company would be reported as both a gas and an electric participant; and a customer who completes projects at separate times is the year would be treated as multiple participants. The overall participation target was allocated between electric and gas participants using a 4:1 ratio, roughly the ratio of electric to gas customers in the commercial and industrial segments in the Company's Minnesota service area.

A customer who participates in Empower Facilities and another program (e.g., receiving a rebate for equipment installed) will be reported as a participant in both programs.

The main budget drivers include the following:

- Utility Administration: Costs include both payments to the program implementer and Xcel Energy employee labor, along with employee expenses.
- Advertising & Promotion: This includes activities such as external targeted advertising campaigns to generate qualified leads such advertisements on social media. In addition, we will conduct external targeted campaigns to generate qualified leads such as webinars.

Stakeholder Involvement
Business customers have played a major role in the ongoing dynamics of this product. Additionally, key internal stakeholders such as the Account Management team will provide consistent feedback on product performance and customer satisfaction that continuously influences product design and operations. The Company continues to meet frequently and interact with these business customers and internal stakeholders to encourage their input.

9. EMPOWER INTELLIGENCE

Program Description
Empower Intelligence was not part of Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to add Empower Intelligence to our Business Segment in the 2024-2026 triennium. Empower Intelligence is a paid subscription service that gives customers access to energy use information and insights; it is intended to replace the existing tariffed InfoWise offering. If Empower Intelligence is approved as a component of the 2024-2026 Triennial, the Company will file a request with the Minnesota Public Utilities Commission to transition customers from InfoWise to Empower Intelligence and terminate the tariff.

The Empower Intelligence program offers business customers a data-driven software solution that delivers energy usage insights through a simple and intuitive web-based portal. Customers can subscribe to monthly, daily, or real-time levels of electric energy usage granularity subject to the capability of the customer's meter. Water and natural gas usage tracking may also be available from the vendor for an additional fee with a real-time subscription.

In addition, the Company will provide a virtual commissioning component identifying low, no-cost measures to customers for implementation. If other opportunities are identified, the customer will have the opportunity to participant in one of our many Businesses Segment programs. Empower Intelligence provides more granular information than the free Energy Benchmarking service, along with offering insights and suggestions through a Virtual Commissioning component. The product is primarily marketed through our Account Managers and Energy Efficiency Specialists.

<u>Eligibility/Qualification for Participation</u>
All business customers are eligible to subscribe to Empower Intelligence. Depending on the level of service chosen additional metering may need to be installed at the customer's expense. Customers pay a monthly subscription fee to access the portal to view usage for the premises they have enrolled. Customers utilize the portal to view utility usage, identify anomalies, compare usage patterns over time, set usage and peak demand alerts, and more.

<u>Qualifying Upgrades/Measures</u>
Empower Intelligence is a direct savings program as savings are identified through Virtual Commissioning (VCx) provided by a third-party vendor. Business customers that have subscribed to

Empower Intelligence will automatically receive the VCx services as part of their subscription. VCx analysis by the vendor is ongoing if the customer has an active subscription, and we estimate that around 10percent of percentage of customers will have opportunities identified. If the customer chooses to proceed with the identified improvements, there is a measurement & verification period that follows the implemented changes. Opportunities that are undertaken will be communicated back to The Company for tracking.

<u>Rebates</u>
Not applicable.

<u>Trade Partner Incentives</u>
Not applicable.

<u>Quality Assurance</u>
Empower Intelligence subscribers receive Virtual Commissioning (VCx) services via a third-party partner.

Through the Virtual Commissioning offering:

- Opportunities identified are typically low-cost and yield simple paybacks of less than a year;
- The customer only pays for their subscription to Empower Intelligence and any implementation costs of identified operational improvements they choose to pursue;
- There are no in-person meetings nor rebates;
- The vendor utilizes regression models on an hourly or daily basis to measure savings looking at a variety of metrics to verify customer savings. The vendor routinely runs M&V modeling and monitors savings to ensure accurate savings are captured and anomalies can be identified.

<u>Program Changes</u>
Empower Intelligence is a new program within the Business Segment.

Budget, Participation and Target Considerations
Participation, targets, and budgets were determined by analyzing existing, known costs of the Empower Intelligence product and forecasted growth of the product. Costs of the Virtual Commissioning feature were also taken into consideration.

The main budget drivers include the following:

- Utility Administration: These costs are driven by marketing, sales, and internal labor resources to support the program.
- Subscriptions: Subscription costs vary by tier with the lowest, monthly tier priced at $75 per month per meter. Daily and real-time subscriptions cost $150 per month per meter. The customer pays the Company for the utility data and analytics services, and a credit will

appear in the program budget. The Company pays the vendor for the data and analytics services.

- Customer Service: The Company utilizes a third-party vendor to provide the customer portal and VCx services.

Stakeholder Involvement
Business customers have played a major role in the ongoing dynamics of this product. Additionally, key internal stakeholders such as the Account Management team will provide consistent feedback on product performance and customer satisfaction that continuously influences product design and operations. The Company continues to meet frequently and interact with these business customers and internal stakeholders to encourage their input.

10. FOODSERVICE EQUIPMENT

Program Description
The Foodservice Equipment program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Foodservice Equipment program offers prescriptive electric and gas rebates to commercial businesses that purchase and install qualifying energy efficient foodservice equipment. The program is primarily marketed to small and large commercial customers through the Company's Account Managers, BSC representatives, Energy Efficiency Specialists and trade partners. There are no changes proposed for this triennial.

Eligibility/Qualification for Participation
The Foodservice Equipment program is available to both electric and gas business customers. Rebates are available when new qualifying equipment is purchased and installed within 12 months of the invoice date. Used equipment is not eligible for an incentive. The equipment must comply with local, state, and federal regulations. Rebates cannot exceed 60 percent of the project cost, including equipment and labor per our Business Segment rules.

Qualifying Upgrades/Measures

Electric Equipment

- Demand-Controlled Ventilation
- Dishwashers (ENERGY STAR)
- Hot Food Holding Cabinets (ENERGY STAR)

Natural Gas Equipment

- Broilers (infrared & upright)
- Demand-Controlled Ventilation
- Dishwashers (ENERGY STAR)
- Fryers (infrared or ENERGY STAR)
- Ovens
- Pasta Cooker

Rebates

The program offers prescriptive rebates for new food service construction or replacing failing equipment.

- Natural gas equipment rebates range from $125 to $1,000.
- Electric equipment rebates range from $100 to $400.

Trade Partner Incentives

Trade Partners can apply to receive 15 percent of the customer's rebate; with a $5,000 maximum per completed project.

Quality Assurance

Inspections and field verification are completed on randomly selected prescriptive projects.

Program Changes

The Company is not proposing any changes to the Foodservice Equipment program.

Budget, Participation and Target Considerations

The program's participation, energy savings targets, and budgets were based upon historical achievement, the Technical Resources Manual, ENERGY STAR® assumptions, and the state of the foodservice industry.

The main budget drivers include the following:

- Utility Administration: Budgets based on historical performance with a slight increase for engineering support, expanding program offerings, and participation.
- Advertising & Promotion: budget provides funds to promote the program through customer and trade education along with awareness through direct communication to increase program performance and participation.
- Participation Incentives: budget reflects rebates that pay for energy efficient equipment. Historical performance from past program activities have predicted the growth of the program.

Stakeholder Involvement

The program works with several trade partners and local organizations within the industry to collaborate ideas, maintain relationships, raise program awareness, and improve program participation through conferences and training.

11. HVAC+R SOLUTIONS

Program Description

The HVAC+R Solutions program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The HVAC+R Solutions program is designed to target commercial and industrial customers of all sizes. The program provides electric and natural gas rebates for new and retrofit equipment within the technologies of the program: heating, motors and drivers, cooling, and refrigeration. In addition to rebates, the program also offers refrigeration assessments for grocery stores. For the Plan, the Company is proposing to make program changes for the betterment of the program and the customers who participate in it.

Eligibility/Qualification for Participation

The HVAC+R Solutions program allows for a holistic approach to promote the upgrading or replacement of equipment as a system versus individual pieces of equipment, as customers typically replace their heating and cooling systems at the same time. The motors and drives and refrigeration technologies also offer customers opportunities to participate throughout the year as these technologies are not impacted by the seasonal nature of the other products of the program.

Rebates

The program offers four types of rebates and services: prescriptive rebates, custom rebates, mid-down rebates, and grocery store refrigeration assessments.

- *Prescriptive Rebates:* Available for a variety of heating, motors and drives, cooling, and refrigeration equipment. The program follows the TRM savings methodology throughout the rebate offerings. These rebates have specific rules and criteria so customers and trade partners who participate in the program know what information is required to apply for a rebate.
- *Custom Rebates:* available for customers who purchase and install equipment or change processes within their facilities that do not fit under the criteria of the prescriptive rebates. Customers participate in the custom process follow all rules and regulations as described under the Custom Program.
- *Mid-down Rebates:* These rebates provide a hybrid rebate structure between mid-stream and downstream sales channels. Under the mid-down offering, the program works with representatives of the equipment manufacturers or trade partners to assist customers with equipment purchases. The manufacturer reps or trade partners then submit the completed project paperwork on behalf of the customer. The manufacturers rep or trade partners that are in the mid-down network are paid a trade incentive that is 15 percent of the customer's rebate up to $5,000 per project.
- *Refrigeration Assessments*: The Company offers customers the ability to assess their refrigeration needs. Beginning in 2024, these assessments will only be available for the grocery store segment, where refrigeration systems can be the primary consumer of energy for the customer. The program offers refrigeration assessments free of charge to customers in this segment to eliminate a barrier in participating in the product by having to justify or find funding for an assessment. By removing this barrier, customers in the grocery store

segment can focus on using their budgets to make improvements to their refrigeration systems and processes.

The refrigeration product will leverage an engineering company who is a recognized leader in the grocery store segment to perform the assessments and manage this product as a third-party implementer. This engineering company will work with customers who receive a refrigeration assessment to provide project management support to assist with the implementation of prescriptive projects, including coordination between the customer, the Company, and the installation contractors/trade allies to complete the improvements and submit rebate applications on behalf of the customer.

By combining the four separate technologies into one program, HVAC+R Solutions reduces many of the barriers that customers may have to participate. Even with the combining of four technologies into one program the ability to reach smaller, typically non-managed or non-participating customers will still be challenging. This is especially true for refrigeration and will require additional promotional strategies and industry experts that specialize in refrigeration and grocery store refrigeration.

The HVAC+R Solutions program will be primarily marketed through our Account Managers and Energy Efficiency Specialists to our large and mid-range customers. The Company will also work closely with our trade partners, specifically manufacturers' representatives, to market the program.

Qualifying Upgrades/Measures

The program's main rebate offerings include prescriptive and custom rebates. The prescriptive rebates are for equipment that exceeds the minimum efficiency as specified in the TRM for each technology.

Rebates

Rebates will be paid according to upgrade type, as shown below. New rebates are identified in Program Changes below.

Table 50: Prescriptive Rebates Available for HVAC+R

Heating	Motor and Drive	Cooling	Refrigeration
Furnaces, water heaters, unit heaters and new or early retirement for commercial boilers and new industrial process load boilers that exceed the minimum efficiency required by the TRM	Upgrade motors that include induction and permanent magnet alternating current (PMAC) motors that meets or exceed the National Electric Manufacturers Association (NEMA) Premium efficiency energy standards for Motors	Cooling equipment that exceeds the minimum efficiency required by the TRM;	Refrigeration equipment that is typically found in grocery stores, restaurants, convenience or liquor stores

Heating	Motor and Drive	Cooling	Refrigeration
Optional auxiliary boiler equipment that further improves a new or existing boiler's efficiency	HVAC and non-HVAC VFDs used to control the motor speed of fans and pumps	VFD retrofits on chillers;	Refrigeration reimbursement rebates similar to direct install equipment.
Distribution-system improvements, including steam trap repair, boiler tune-ups and replacement and pipe insulation	Clean water pumps for industrial and commercial clean water pumping applications	Direct Expansion (DX) units: condensing units, rooftop, split systems Air-Cooled Condensing Units	
Smart thermostats High volume low speed (HVLS) fans	Fan energy index	Commercial AC Switch Single or Multistage	
Aerators and pre-rinse sprayers for kitchens and restrooms	Fractional horsepower (hp) electronically commutated motors (ECM)s for fans and pumps;	Heat pumps, mini-split heating and cooling or cooling only options and water source	
Linkageless Controls	Switched reluctance motors	Smart thermostats.	
Ozone Laundry	Full hp ECMs		
Smart thermostats			

Custom rebates are available for each technology for equipment that does not fall under the prescriptive portion of the program. Additionally, the Company will offer in-depth study funding of up to 75 percent of the study cost, not to exceed $25,000, to identify and quantify energy savings of the HVAC+R Solutions projects.

Trade Partner Incentives

The Company provides Trade Partner incentives to trade partners who leverage the program rebate to help customers offset the first costs of purchasing and installing energy efficient equipment. Trade incentives are available to all trade partners that include a Trade Incentive ID on their rebate/preapproval application. The trade incentives paid are typically paid at 15 percent of the customer's rebate up to $5,000 per project with exceptions for boiler tune-ups which are $35 per tune-up.

In addition, trade partner incentives for mid-down rebates do need to be approved to participation and must sign an agreement with Xcel Energy. Specific guidelines and procedures are also required.[32]

[32] https://mn.my.xcelenergy.com/s/partner-resources/trade/online-distributor-rebates-for-trade-partners

The trade partners that receive a trade incentive help customers select highly efficient equipment, assist them with the project paperwork and in many cases submit the completed project paperwork for them.

<u>Program Changes</u>
The Company proposes to add three new measures that have both electric and gas baselines. These new measures are summarized in the following table.

Change	Rationale
Add dual fuel roof top unit measure	Encourage customer usage of new technologies.
Add heat pump water heater, electric baseline measure	Encourage customer usage of new technologies and support efforts to electrify buildings.
Add heat pump water heater, gas baseline	Encourage customer usage of new technologies.
Hire a third-party implementer for refrigeration product / technology	This change will allow the implementer to leverage the newly added refrigeration recommissioning product, bundling custom-type projects and working more closely with grocery store customers.
Add Refrigeration Recommissioning	Added to assist customer in implementing low-cost, no-cost measures that are identified in the grocery store refrigeration assessment.
Refrigeration assessments for non-grocery store segment	The assessments for the non-grocery store will be retired as of due to low participation and lack of implementation of the measures identified in the assessment reports.
Remove Water well pump VFDs	The rebates for this measure will be retired as of at the end of 2024. The rebates will be available for the first year of the new plan to allow customers and trade partners to complete any projects in development.
Add Process load steam traps to the program	Adding process load steam traps as a prescriptive rebate under the heating technology that does not have a cap on the process load. This natural gas savings measure expands the portfolio's incentive offerings for steam traps to those with up to 100 percent process load.

Budget, Participation and Target Considerations
The program's participation, energy savings target, and budgets were determined by reviewing the historical targets target and achievement and participation levels for each of the previous four programs. The analysis included the review of equipment and characteristics of historical projects to develop a projected average savings per participant for various custom program offerings.

The main budget drivers include the following:

- Participant Incentives: The budget reflects rebates to help offset initial costs associated with the capital investment in energy efficient equipment.
- Utility Administration: These budgets are based on past program performance with a slight increase built in for expanded program offerings, engineering and participation.
- Advertising & Promotion: The promotional budget was derived using historical data from past activities. Promotions are targeted to customers and trade partners. These promotions typically focus on program updates for new or revised product offerings; targeted promotions such as seasonal measures for heating or cooling or benefits of one of the four technologies; information regarding bonus rebates and trade incentives; or program or policy changes.
- Customer Service: The Company employs consulting and analytical services for custom projects that are analyzed through the HVAC+R program, as well as for engineering studies and refrigeration assessments.

Stakeholder Involvement

The HVAC+R program works with multiple community energy organizations and trade vendors, distributors, and installers. This is done by hosting training sessions for both customers and trade partners. The Company also participates regularly with the following organizations:

- The Minnesota Blue Flame Association, to drive awareness of natural gas conservation topics and increase educational resources for energy savings options;
- Minnesota ASHRAE Chapter, host trade partner training events to further local industries understanding of cooling and energy efficiency programs;
- Motors Decisions Matter (MDM), a national awareness campaign that promotes effective motor management and informed on the latest energy efficiency technologies for motors and motor related equipment; and
- Minnesota Heating & Cooling Association and Industrial Refrigeration Consortium.

The Company meets frequently with these trade organizations to assess engagement, program strengths and weaknesses, as well as to get feedback on the market for all technologies. Each technology within the program can be complex and trade support is crucial to achieving our targets. The Company actively engages with trade organizations and local trade partners in program design and project implementation when applicable.

12. LIGHTING EFFICIENCY

Program Description

The Lighting Efficiency program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Lighting Efficiency program offers light emitting diode (LED) rebates to business customers that install qualifying energy efficient lighting equipment or lamps in existing or new buildings. The Company works closely with our trade partners, manufacturers' representatives, distributors, and contractors to market the program. The program is marketed to large business customers predominantly through our account managers and to small to medium sized customers through the Business Solutions Center. In this Plan, the Company is proposing to add new technologies to our portfolio to help lower the upfront barrier of more efficient technologies.

Eligibility/Qualification for Participation

The program's main offerings include the following:

- *Prescriptive Retrofit*: These rebates include equipment incentives for LED fixtures, lamps and controls to help offset the cost of installing new lighting equipment. Rebates are available for customers of any size and qualifying equipment must be more efficient than what is currently installed.
- *Prescriptive New Construction*: These rebates are for qualifying lighting equipment for facilities that are newly constructed or undergoing major renovations. The equipment must be more efficient than standard equipment that meets baseline codes.
- *Custom Rebates*: Are available for energy saving lighting projects that do not fall within the requirements of the prescriptive rebates. Custom applications must follow all required Custom Efficiency rules and requirements.
- *LED Instant Rebates:* These rebates offer discounts on LED lamps that are purchased from a participating distributor for existing or new construction facilities.
- *Redesign Studies:* These studies are available for customers needing assistance in determining optimum lighting levels for their facilities. Certified Lighting Professionals or a member of the International Association of Lighting Designers work with customers to identify and quantify lighting solutions that include energy saving opportunities. Implementation rebates are available to customers who proceed with recommendations from the study and install energy efficient lighting equipment.

Qualifying Upgrades/Measures

The Lighting program offers several incentives to help customers install new, more efficient lighting options in their business. These include such fixtures such as wall pack, parking garage, and LED replacements for HID lamps. Additionally, there are incentives for occupancy sensors and networking controls.

Rebates

Rebates are paid per technology based on whether the technology is prescriptive or custom. Instant rebates are provided to customers through their participating distributor.

Program Changes

Change	Rationale
Adjust baseline for general service lamps, screw-in lamps and downlight retrofit kits.	The baseline for general service lamps, screw-in lamps and downlight retrofit kits, will change to 45 lumens per watt to align with federal EISA Backstop legislation.
Eliminate non-DLC rebates.	Only a small portion of rebates submitted are for non-DLC rebates. Using one rebate level will be less confusing for customers. The rebate levels for all measures will be for DLC or non-DLC products.
Increase the wattage ranges for area lights, high bays and parking garages measures.	The equipment has become energy efficient and the lumens per watts have increased. By increasing the lower wattage threshold, the Company can account for more efficient fixtures.
Add new measures for Prescriptive Retrofit: exterior mogul base lamps, exterior downlights, interior track lighting	Customer's demand continues to grow for these fixtures as part of the Custom offering. Offering prescriptive options reduce customer adoption barriers.
Add new measures for Prescriptive New Construction: exterior downlights, interior track lighting	Customer's demand continues to grow for these fixtures as part of the Custom offering. Offering prescriptive options reduce customer adoption barriers.
Add networked lighting controls to Prescriptive New Construction	Networked lighting controls are growing in popularity, and it is the next step after installing LED fixtures for customers to continue to save energy.

Budget, Participation and Target Considerations
The product's participation and energy savings targets were determined by looking at historical participation levels, as well as the large number of LED products that are expected to be commercially available during this Plan. Previous project characteristics, including equipment type/mix, were also used to develop projected average dollars-per-kWh rebate for each measure.

The main budget drivers include the following:

- Participant Incentives: Rebates encompass most of the program budget. This budget reflects the rebate levels and projected customer participation in each measure, which was based on historical participation across the offerings.
- Utility Administration: The administration budget is based on past product performance with a slight increase built in for expanded product offerings, engineering, and account management involvement.
- Advertising & Promotion: A promotional budget was developed based on expected expenditures to drive the market to energy efficient equipment. Promotions are targeted to

customers and trade partners, and typically focus on activities such as new or revised product offerings, case studies featuring successful projects, educational opportunities such as events, and bonus rebates.

Stakeholder Engagement

Business customers have played a major role in the on-going dynamics of this product. Additionally, key internal stakeholders such as the Account Management team provide consistent feedback on product performance and customer satisfaction that continuously influences product design and operations. The Company continues to meet frequently and interact with these business customers and internal stakeholders to encourage their input.

13. LOAD STRATEGY ANALYSIS

Program Description

Energy Information Systems was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to modify the product and the name to better serve customers with load shifting and fuel switching strategies for the 2024-2026 triennium. The new product called "Load Strategy Analysis" is designed to target Commercial & Industrial customers and to provide financial incentives for complex, custom energy strategy analysis studies and projects. These efficiency projects may pertain to natural gas or electric consumption in a commercial or manufacturing process, or for HVAC and industrial water heating.

<u>Eligibility/Qualification for Participation</u>

The Load Strategy Analysis (LSA) program offers custom electric and natural gas rebates along with consulting services to business customers that implement operational improvements. The program primarily targets large commercial and industrial customers.

<u>Qualifying Upgrades/Measures</u>

The program's main offerings include consulting services to:

- Help customers identify data sources, primary and sub-metering needs;
- Provide software with graphical representation of energy usage;
- Develop a baseline energy model and M&V plan for the facility; and
- Support analysis to identify how the customer can use energy data to persistently curtail usage.

LSA will use a three-phase approach to implement the process and capture savings. The customer's formal acknowledgement of planned participation in the program begins with the customer signing an agreement before Phase 1 begins. The Company views signing the agreement as formally establishing a date of influence for all projects completed under the program's umbrella.

Although load shifting opportunities will be the primary focus, behavioral and low cost/no cost energy savings opportunities, and additional capital improvements such as fuel switching, and thermal storage studies will be supported.

- *Phase 1 (Set-up)*: The Company works with the customer to identify the energy use baseline, metering, data and communications needs, and opportunities to improve data collection through equipment within the customer's budget. At this time the Company will work with the customer to establish energy saving and load shifting targets as well as the definition for how efficiency for each building and system is characterized.
- *Phase 2 (Treatment):* As part of the consulting services, the data is captured to inform the identification of energy efficiency opportunities. These opportunities are expected to include measures that include behavioral changes, require capital investments, and/or require operational adjustments as described below. Once the baseline, data methods and sub-meters are established, a one to three-day energy assessment will identify and suggest prioritization for energy optimization opportunities. Frequent communication with the customer and thorough documentation throughout this phase will be required to ensure that new measures are discovered and implemented.

Table 51: Measure Types

Measure Type	Explanation
Behavioral	With visibility and tighter management of energy performance metrics, occupants and end users are expected to be more engaged in load shaving and reducing energy consumption.
Capital	Expansion of controls systems, fuel switching or thermal storage
Operational	Low cost/no cost measures associated with tune-up of equipment or scheduling of equipment operating times

- *Phase 3 (Verification):* Annual analysis and reporting will delineate savings achievements from each primary measure identified in Phase 2. Capital measures will be analyzed and incentivized through the Company's prescriptive and custom programs. Behavioral, load shifting, and low cost/no cost operational measures will be analyzed using the multi-variable regression modeling capabilities embedded in the study.

<u>Rebates</u>

A 30 percent incentive towards the purchase and installation of sub-metering equipment, energy information software, or other interval data gathering device or subscription is provided to customers for systems deemed eligible by the Company. Other prescriptive and/or custom rebates may be available based on measured identified during the analysis. Incentives for M&V of behavior change, and low-cost/no cost operational improvements are also available to qualifying systems.

Trade Partner Incentives
Xcel Energy will provide Trade Partner incentives in line with all Custom and Prescriptive projects.

Quality Assurance
Vendors will be supervised by the product manager with weekly meetings and reports to ensure customers are retaining valuable energy strategies. To ensure persistence of savings, the Company will follow appropriate monitoring guidelines and participants will be held to requirements in return for eligibility toward incentives related to load shifting and energy efficiency activities pursued.

Program Changes

Change	Rationale
Custom measure added for future EFS and load shifting opportunities.	Optimize customer's usage to produce bill savings and reduce electric system costs.
Extend engagement up to five years versus three years, to engage and monitor load shifting opportunities.	For exceptionally motivated customers, offering more in-depth opportunities to maximize energy optimization at multiple levels.
Adjusting requirements to allow customers without an existing energy information system to participate in the program.	This will increase participation and add flexibility to evolving digital platforms.

Budget, Participation and Target Considerations
The program's participation and energy savings targets and budget were determined based on current technology, and market conditions as described above.

The main budget drivers include the following:

- Participation Rebates: Rebates encompass most of the program budget. This budget reflects the rebate levels and projected customer participation in each measure, which was based on historical participation across the offerings.
- Utility Administration: The administration budget is based on past product performance with a slight increase built in for expanded product offerings, engineering, and account management involvement.
- Advertising & Promotion: A promotional budget was developed based program changes. We anticipate higher costs in year one due to product rebranding and the need to communicate to stakeholders.

Stakeholder Involvement
In 2022 the Company held interviews with trade partners, customers, and vendors to gain feedback and ideas on product improvements. We intend to take these learnings along with analysis conducted in other jurisdictions to make future program improvements.

14. MULTI-FAMILY BUILDING EFFICIENCY

Program Description

The Multi-Family Building Efficiency (MFBE) program is a joint offering with CenterPoint Energy that was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Multi-Family Building Efficiency program is designed to target 5+ unit multi-family properties and delivered jointly with CenterPoint Energy. Offered through a single shared program implementer, it is designed to engage building owners by helping them understand their energy use, achieve immediate energy savings through low-cost improvements, and move beyond the initial measures for whole-building energy savings. The delivery model is a combined approach of a whole-building energy audit with direct-install phase to engage the building owners and achieve early savings, and a performance-based component to encourage further improvements in the building, then assistance to begin benchmarking their building and provide financial incentives for more complex, custom energy efficiency projects.

For the Plan, the Company is proposing to add a Low-Income Multi-Family Building Efficiency Program specifically targeted at Income Qualified buildings to match the filing submitted by CenterPoint Energy in 2022 (Docket No. G008/CIP-20-478). Additional adjustments will be made to the market rate program to remove participation barriers and increase opportunities to encourage building owners to invest in identified energy efficiency improvements beyond the free direct install measures.

Eligibility/Qualification for Participation

To qualify property owners and managers must demonstrate that the buildings meet the following requirements:

- 5+ units with functional kitchens
- Common entrances and common living areas
- Electric Service from Xcel Energy or
- Natural Gas service from Xcel Energy or CenterPoint Energy (or other natural gas utilities)

The determination of whether a property is eligible to participate is reviewed on a case-by-case basis.

Qualifying Upgrades/Measures

To encourage engagement, the program starts with a free whole-building energy audit and the direct installation of energy-saving measures, with all services being provided by one third-party program implementer. After completion of the energy audit and direct installations, a written report identifying the building's baseline energy use, the audit findings and recommended energy savings opportunities that could receive an incentive is provided to the building owner/manager.
Direct-install measures include:

- In-unit LEDs;

- Common area screw-in LEDs;
- Smart Power strips;
- Water heater setback;
- Kitchen and bath faucet aerators;
- Energy efficient showerheads; and,
- Exterior door weather stripping for gas and electrically heated buildings

We will continue to offer limited quantities of Renter's Kits for individual renters whose property owners/managers choose not to participate in the program. Since the Renter's Kits energy savings measures are limited to the individual unit, the kits alone do not provide robust program benefits to the multi-family property and are therefore intended as a stop-gap measure to aid individual renters. The intent is that the renter encourages their property owner/manager to participate in the program and receive the full array of benefits offered through the program to the whole building. Materials and resources are available to aid renters in communicating about the program to their property owner/manager.

Project consultation
The building owner/manager works with the program implementer to determine the energy improvements preferred for implementation from the audit report. The program implementer will provide review and oversight of equipment efficiency specifications, oversee Quality Assurance and Quality Control (QA/QC) to ensure improvements are performed as specified, and assist with the rebate and incentive submission.

As part of our strategy to increase participation in demand response programs, this program will be offering smart thermostats and Business Saver's Switch® for common areas of the buildings. Further details are provided in the technical assumptions.

<u>Rebates</u>
Participants moving beyond the assessment and direct-install phase of the program and choosing to undertake energy efficiency upgrades are eligible for rebates consistent with the standard prescriptive or custom rebate for the measure, plus a program bonus incentive equal to 30 percent of rebate value for work completed.

<u>Trade Partner Incentives</u>
The Company will provide Trade Partner incentives of 15 percent of total rebates earned to HVAC contractors working on this program.

<u>Quality Assurance</u>
The customer-selected contractor(s) for energy efficiency upgrades will perform the specified work. The consultant will oversee QA/QC to ensure improvements are performed as specified, including collection and review of project documentation or on-site inspections as appropriate. The consultant

will work with the utility to determine appropriate QA/QC activities. Each quarter, the consultant randomly selects 20 percent of completed improvements and performs on-site verification to ensure the projects were completed as specified.

Program Changes

Change	Rationale
Separate out a Low-Income MFBE (LI MFBE) program targeted specifically to income qualified buildings.	Help bring additional attention to the enrollment and participation of buildings providing affordable housing. Enable specific marketing tactics to target disproportionately impacted communities. Match program offering filed in 2022 by CenterPoint Energy.
Adjust current policy to allow customers with two-year-old audits to participate in bonus rebates.	Continue to encourage customers that have participated in an audit to continue to participate in energy efficiency. Audit and direct install services will remain available and encouraged, but not required to obtain bonus rebates.
Offer MFBE participation to customers with natural gas only or electric only service by Xcel Energy.	(1) Open up participation to more multi-family buildings in rural areas. (2) Match the CenterPoint change that offers participation to their customers regardless of electric provider. (3) Expand the ability of additional electric only customers to participate in the program which will particularly benefit rural territories and electrically heated buildings.
Add a rebate cap of 100% of measure costs.	To maintain cost effectiveness for the market rate program
Add trade ally incentives to match HVAC +R incentives	To encourage trade allies to promote the program and complete rebate paperwork for customers.
Add new direct installation measures to include commercial programmable thermostats, window and sleeve air conditioners, and mini- split heat pumps.	Increase energy savings opportunities for customers and decrease barriers for busy building managers dealing with worker shortages.

Budget, Participation and Target Considerations

Participation projections have been modified to reflect that a portion of the multi-family market now qualifies for Low-Income Multi-Family Building Efficiency. This decline is mitigated by our plans to more aggressively engage the trade to promote the program, expansion of qualifying buildings, and aggressive marketing and outreach.

The main budget drivers include the following:

- Utility Administration: This budget covers internal labor and expenses for program planning, promotion, implementation, and vendor administration.

- Participant Incentives: This budget covers the direct install measure costs, rebates and bonus incentives paid when energy efficient upgrades are achieved.

Stakeholder Involvement
The Company participates in Minnesota Multi-Housing Association Events and other rental/property management organizations as identified. Further, we participate with various stakeholders in Xcel Energy's Equity Stakeholder Advisory Group to identify opportunities to better serve the rental market.

15. NON-PROFIT ENERGY SAVINGS

Program Description
The Non-Profit Energy Savings Program was included in Xcel Energy's previous Triennial Plan for 2021-2023 via a modification request made in December 2020. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Non-Profit Energy Savings Program is designed to target non-profits organized and operated primarily to serve low-income customers in the Company's electric or natural gas service territories. The program offers free education, facility assessments, direct installation, efficient equipment and financial incentives for customers to complete energy efficient upgrades. These efficiency projects may pertain to natural gas or electric consumption in buildings owned and operated by non-profits to serve their low- and moderate-income clients. We anticipate that some of these services will be offered in residential type buildings. For the Plan, the Company is proposing to add additional robust measures to include mini-split heat pumps, window air conditioners and energy efficient refrigerators.

Eligibility/Qualification for Participation
To qualify for the program, the organization must be a non-profit entity. The program will work with community partners, program implementers and trade partners to identify, qualify and prioritize 501(c)(3) organizations such as shelters, treatment centers, education, food shelves, housing, emergency relief services and other non-profits for facility improvement projects that result in energy savings.

The primary purpose of the organization must be to serve low-income or moderate income disproportionately impacted customers. However, identified non-profits that are unable to demonstrate that the majority of their services benefit income-qualified customers will also have the ability to participate through direct installation measures as described below.[33] As a relatively new program, the Company wants to continue to provide opportunities to these customers.

Qualifying Upgrades/Measures
Rebates for common energy-saving and demand-reduction measures such as lighting, HVAC+R,

[33] Customers classified as income-qualified will follow the criteria established in our Income-Qualified Segment.

appliances and facility weatherization will be combined with bonus incentives to provide non-profit customers project funding above the Company's standard rebate offerings.

Direct install measures include:

- Screw-in LEDs;
- Kitchen and bath faucet aerators;
- Energy efficient showerheads;
- Exterior door weather stripping;
- Select ENERGY STAR® certified smart thermostats, AC Rewards for Business;
- Pipe Insulation

Direct installation measures will be paid in full to the implementer by the Company including installation costs and the non-profit will receive those measures free of charge.

<u>Rebates</u>
Rebates will vary depending on the type of measure installed. Prescriptive and custom measures will receive standard prescriptive rebates plus a 200 percent bonus for those non-profits demonstrating that they primarily serve the low-income market (up to the cost of the equipment).

<u>Trade Partner Incentives</u>
The Company proposes to provide Trade Partner incentives to HVAC trade partners performing HVAC equipment installations for this program. These incentives will match trade partner incentives for the HVAC +R Prescriptive program.

<u>Quality Assurance</u>
The program implementer will support QA/QC and evaluation by:

a) Compiling and completing all necessary Stage 3 QA/QC paperwork (e.g. incentive back-up documentation) for the customer and keeping accurate records that are available to the Company to support evaluation efforts.
b) Helping resolve any discrepancies that are identified through evaluation efforts.
c) Working with a third-party evaluator to verify the program is meeting or exceeding expectations if/when applicable.

The third-party evaluator shall also randomly select 20 percent of the completed improvements and perform an on-site verification to ensure the project was completed as specified.

<u>Program Changes</u>

Change	Rationale
Add measures proposed in our Low-Income Multi-Family Building Efficiency program	Simplify the opportunity for nonprofits to participate by minimizing the time they need

including mini-split heat pumps, window air conditioners, refrigerator replacement and recycling, where appropriate.	to execute audit recommendations and reduce the cost of implementation for them.
Add new direct installation of programable thermostats and thermostat adjustment measures.	Increase savings for participants
Direct installation of mini-split heat pumps as replacement for air conditioners and/or electric resistance heating.	Bill reduction, increased comfort and increased energy efficiency for participating non-profits.
Direct installation of smart power strips	Increased electric savings for both nonprofit commercial participants and for residential non-profit customers residing in non-profit run facilities such as homeless shelters, group homes or treatment centers.
Distribution of LEDs, showerheads and smart power strips individually through participating non-profits directly to low-income customers.	Provides an additional channel through trusted partners to provide energy saving measures to the low-income market.

Budget, Participation and Target Considerations

Targets, participants, and budget were estimated using information from similar holistic programs in our service territories. The dollars associated with providing services to improve the energy performance of these sites (audits, direct installation measures, equipment distribution and rebates) will be tracked and reported for inclusion towards our low-income spending requirement as identified in our Compliance Section. To be categorized as serving the low-income market the 501C3 will be registered to show they service income qualified customers by targeting their services in areas of concentrated poverty, or that they engage in provide basic housing, food or medical treatment services to income qualified clients.

The main budget drivers include the following:

- Utility Administration: This budget covers internal labor and expenses for program planning, promotion, implementation and vendor administration.
- Advertising & Promotion: As a new initiative with low awareness, the program will use customer education and conservation promotion funds, especially in year 1, to build interest, drive facility assessments and project follow through.
- Participant Incentives: This budget covers measure equipment and installation costs, rebates and bonus incentives paid when energy efficient upgrades are achieved.

Stakeholder Involvement

The Company continuously works to build relationships with existing agencies, non-profit organizations, and communities throughout the state. These partnerships allow us to improve program awareness and increase program participation. We are also members of a national ACEEE working group focused on energy efficiency for low-income customers.

16. PROCESS & COMMERCIAL EFFICIENCY

Program Description

The Process Efficiency program was included in the Company's previous Triennial Plan for 2021-2023; as was the Commercial Efficiency program. In this Plan, we have combined these efforts to reduce customer confusion and provide a comprehensive, holistic approach for both commercial and industrial customers.

The Process & Commercial Efficiency program is a strategic energy management approach to creating persistent savings and continuous improvement. In addition to capital equipment improvements for energy efficiency and demand response opportunities, the program stresses system-level operational changes as well as cultural changes from customers' senior management, mid-management, and other personnel. The program is targeted at medium to large sized industrial and commercial customers that have at least 0.3 GWh or 2,000 Dth of conservation potential. The program offers customized resources to develop a holistic, sustainable energy management plan. This program provides funding for studies to identify and scope energy efficiency opportunities. Rebates are available to customers who implement qualifying energy efficiency recommendations. This program is marketed to industrial and commercial customers by the Company's account managers.

<u>Eligibility/Qualification for Participation</u>

The program offerings are delivered in multiple phases. Each phase is defined in a Phase Letter that is customized to reflect the needs of the specific customer. Typical phases are described in the following sections.

Phase 1: Identification

Xcel Energy performs a high-level analysis to identify opportunities for energy savings in the customer's business practices, facilities, and operations. This is completed at no cost to the customer. Phase 1 is delivered using a third-party provider selected through a Request for Proposal (RFP) process.

Phase 2: Scoping

This phase provides support and resources to further define, measure, and provide recommendations and assistance for energy savings opportunities while working with the customer to optimize the business practices identified in Phase 1. Total funding for Phase 2 is based on estimated savings and a typical customer is asked to contribute up to 25 percent with a maximum amount of $7,500 or an equivalent investment or commitment. The purpose of the customer contribution is to ensure management-level engagement and the customer's commitment to a holistic approach. Phase 2 is delivered using internal resources and/or third-party technical experts selected through an RFP process, or through technology-specific experts of the customer's choosing.

Phase 3: Implementation Plan
The Company works with the customer to put together an energy management plan which includes conservation targets and energy conservation and demand reduction projects. This phase includes a customized rebate and bonus schedule that rewards energy efficiency savings and/or a system-wide approach.

Upon project completion, customers receive rebates for improvements that qualify for any of our prescriptive or custom programs. The savings are included in the Process and Commercial Efficiency program achievements but mirror the rules and rebate levels of our other programs. If the improvements do not qualify for rebates due to program rules, we claim the project savings in a manner consistent with our study-driven credit policy.

Phase 4: Energy Performance Indicator Services
Phase 4 is an option for customers who are interested in ongoing commissioning and/or continuous improvement. Specifically, this phase provides consulting services that support the customer through the process of installation, integration, and commissioning of energy information systems to demonstrate repeated and consistent improvements in energy usage. These services are offered to develop a baseline energy model and measurement and verification of energy savings due to behavior change and low-cost/no cost operational improvements. The offering can be done in conjunction with the Phase 2 offering or later in the engagement process.

Due to the holistic nature of this program, several policies have been previously filed and approved by the Department and continue to remain in effect:

- *Bundling:* When customers identify multiple measures for installation, a bundle can be evaluated to see if it qualifies for a rebate versus each individual component. This allows measures with too short of a payback for a rebate to be leveraged to drive projects with too long a payback for the customer to install so that both are implemented.
- *Preapproval:* Custom-type measures in Process and Commercial Efficiency require a custom analysis, but the actual date the project is submitted does not disqualify a project if it was initiated after the customer entered into the program. This is due to the extensive resources used by the program to identify and scope ways to drive energy efficiency into how a customer does business. The targets and awareness created during Phases 1 and 2 can result in projects that drive energy savings in business areas that act without immediately notifying the personnel in contact with the Company.
- *Rebate Bonuses:* We will use the rebate structure of the other end-use programs and then incorporate additional rebate bonuses for system optimization and/or exceeding annual achievement targets.
- *Facility-level Metering*: Facility-level metering provides us the ability to accurately account for all savings generated by installation of a measure and incorporate the savings that may be driven plant-wide that we have been unable to accurately capture historically.

Qualifying Upgrades/Measures
The Process & Commercial Efficiency program leverages all of the C&I portfolio of prescriptive measures, including motors, cooling, heating, and lighting equipment. Custom measures are also available for energy efficiency strategies not offered as a prescriptive measure.

Rebates
Incentives are calculated using the existing prescriptive and custom rebate levels.

Trade Partner Incentives
The Process & Commercial Efficiency program follows the trade partner incentive structure for the individual end-use programs.

Quality Assurance
During Phase 2 of the program, the consultant's draft report is reviewed for accuracy by the Energy Solutions Engineer prior to sharing it with the customer.

Program Changes

Change	Rationale
Merge Process Efficiency & Commercial Efficiency programs	Impacts Customer satisfaction, creates internal efficiencies and consistencies.
Provide financial and technical support for customers to investigate EFS opportunities.	More customers are choosing to go all electric and this will support their efforts.
Custom measure added for future load shifting opportunities	Optimize customer's usage to produce bill savings and reduce electric system costs.

Budget, Participation and Target Considerations
We determined the program's participation, energy savings targets, and budgets by examining historic participation levels, project and participation cycles, and costs.

The main budget drivers include the following:

- Utility Administration: These costs are driven by marketing, sales, engineering, and external labor resources to support the Company's heavy engagement with the customer, as well as cover the costs of those projects requiring metered verification.
- Customer Service: The Company utilizes third-party resources to deliver the program's identification and scoping phases.
- Participant Incentives: The program has a robust rebate budget due to the size of projects initiated through the Process and Commercial Efficiency program. In addition to standard rebates, Process and Commercial Efficiency offers lucrative bonus rebates for exceeding energy savings and/or implementing projects on a system-wide approach.

Stakeholder Involvement
The Process & Commercial Efficiency program works with Community Energy Organizations to promote the program and deliver its offerings. In particular, the Trillion BTU financing delivered by the St. Paul Port Authority and Xcel Energy could help customers fund large capital projects when financing is a barrier to implementation. We consider leveraging resources as they become available through these and other external organizations and consider integrating their offerings into both our program and our customers' energy management plans.

17. SELF-DIRECT

Program Description
Self-Direct was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Self-Direct is intended for financial incentives to larger business customers and commercial and industrial customers for their energy efficiency projects. These efficiency projects may pertain to natural gas and/or electric consumption and other energy affiliated savings. The Company is making no additional changes to the program at this time.

<u>Eligibility/Qualification for Participation</u>
This program is marketed through the Company's Account Managers and toward self-sufficient customers with an interest and capability to oversee their own energy efficiency improvement projects, as opposed to those who desire full-service via holistic products like Process Efficiency. The program gives larger self-sufficient retailers and public service providers, larger property management companies, manufacturers, and multi-national corporations the opportunity to plan efficiency around their business model and helps with their sustainably objectives and plans.

- *Preapproval:* Using our existing energy savings calculator, customers will identify their energy savings initiatives and submit their proposed energy saving plan, monitoring plan, and pre-project energy usage data to the Company for review and preapproval.

- *Completion:* Customers will submit their project calculations, completion documents, final report, and monitoring results, for review. The Company will issue final approval and a rebate check based on the achieved savings.

Qualified customers will be allowed to participate in other ECO programs offered by the Company but will not be eligible for a rebate for the same efficiency measure through another program. Also, because of this continued program's desired nature of this holistic approach, customers will not be able to enlist solely prescriptive or solely custom products alone whereby a prescriptive product offering exists; however, when customers identify multiple measures for installation, aggregation of the technologies and analysis consideration is available. The existence of another program's promotion (bonus rebate) may not be applied to this program given the higher rebate.

Qualifying Upgrades/Measures

The process includes an analysis based on the customer's project scope and the projected savings against an appropriate baseline and achieved results. The final energy efficient solution must be cost effective.

Rebates

Rebate amounts are defined by the demand and energy savings attributed to the project. Successful applicants receive a rebate if their completed project passes cost-effectiveness testing.

Trade Partner Incentives

Not applicable.

Quality Assurance

Customers (or their vendor) will engineer, implement, and commission projects and will conduct, as appropriate, pre- and post-measurement validation as defined by the International Performance Measurement and Verification Protocol (IPMVP). The Company will provide the energy calculator to the customer for quantifying the energy savings potential for pre- and post-project work. This helps to define and develop baseline energy consumption model and measurement and verification of energy savings.

Program Changes

The Company is not proposing any changes to the Self-Direct program.

Budget, Participation and Target Considerations

Reviewing historical engagement and spending was used to define the program moving forward. We continue to understand that the anticipated sales cycle from project initiation to completion is about 18 to 24 months, and it represents a risk of stranded investments to the Company if a customer withdraws before completing their project. We will mitigate this risk by monitoring the customer's commitment throughout the process.

Stakeholder Involvement

We anticipate some customers will hire local consulting engineering companies to help design and manage their projects, and we also anticipate customers in area energy initiatives will also be involved. We will consider leveraging resources as they become available through these and other external organizations and consider integrating their offerings into our program and our customers' energy management plans.

INCOME-QUALIFIED SEGMENT

Overview
The Income-Qualified Segment is a portfolio of offerings dedicated to providing customers who meet the statutory definition of "low-income household"[34] with educational resources on how to understand and reduce their energy bills, energy-efficient equipment and building shell improvements, "pre-weatherization" improvements that enable the installation of conservation and weatherization measures, and trade resources to support workforce implementation of energy-efficient measures for this market segment.

For the 2024-2026 triennial period, the Company proposes to continue the income-qualified/low-income offerings it has delivered in the 2021-2023 period, with modifications in terms of program design, eligibility and the transition of the Workforce Development and Education program as low-income. The Company has also increased both the energy savings targets and budget for this segment over the triennium.

In 2023, we completed a study of our active programs within the income-qualified segment that is helping to inform better program delivery. Additionally, we continue to work with stakeholders to identify solutions to the barriers identified within the study itself. Based on these discussions to-date in this triennium the Company proposes program modifications for improving program access to renters, developing tools and resources to better inform customers what programs meet their needs and qualifications, and leveraging outreach through community service providers already working with these customers. Further, we propose to add additional measures and updated equipment incentives to areas we know have caused barriers or are necessary to increase energy efficiency with these customers. As we work to enhance our program offerings to this market, we are considering not only the programs and offerings described in this section, but also opportunities to serve income-qualified customers through market rate (or "hybrid") offerings.[35]

We propose to expand our program offering to include not just the residents' homes but also work with low-income individuals to engage them in the energy-efficiency industry through our Workforce Development and Education Program. This program provides direct support to income-qualified customers by engaging this market with the opportunity to join the energy-efficiency industry and more broadly helping to remove the barrier of workforce shortage in delivering conservation programs to income-qualified customers. We discuss this program and how we propose to utilize it for this triennial within this section.

[34] MN Stat. 216B.2402, Subd. 16.
[35] Specific income-qualified provisions of these "hybrid" programs are described in the summaries of each program; this section will consider only those programs that are exclusively income-qualified. Discussion of the expected contribution from both dedicated and "hybrid" programs to achievement of the statutory minimum spending for low-income households can be found in the Compliance section.

We will be working to develop additional resources to support income-qualified customers by engaging the organizations that already support them. We will continue to develop our network with non-profits serving the income-qualified market through the Non-profit Energy Saving Program, which will be launching in the second half of 2023. This program will assist them in reducing energy bills, so they have additional resources to provide the income-qualified segment. We will also work with these organizations to distribute additional educational materials on the program resources available to serve the income-qualified market and distribute easily installed conservation measures to their clients to engage them in saving energy. It is not currently proposed to be part of the Income Qualified Segment but our direct work through Non-Profit Energy Savings program with these organizations will be evaluated and we may request to include it in the segment in future filings.

Programs

The Company proposes to offer five programs in the Income-Qualified Market Segment in 2024-2026. All programs will include delivery of electricity and natural gas conservation measures or education that addresses both fuel sources.

- Affordable Efficient New Home Construction – This program works with builders contributing to the affordable housing segment and provides financial incentives for building high performance building envelopes and installing high efficiency mechanical systems.
- Home Energy Savings (HESP) - This program provides an assessment to identify opportunities to lower energy consumption and comprehensive energy efficiency upgrades including appliances and HVAC measures depending on the condition of the current equipment to customers in 1–4-unit residential buildings.
- Low-Income Home Energy Squad (LI-Squad) - This program provides an assessment and no cost, direct installation of efficiency measures to 1–4-unit residential customers. Additionally, the program identifies potential candidates for HESP.
- Low-Income Multi-Family Building Efficiency (LI-MFBE) - This program provides an assessment of common-spaces and centralized mechanicals in 5+ unit housing. It also includes direct installation measures both in-unit and in common spaces, and provides rebates, project management and trade incentives to support additional efficiency improvements. Installations within the unit may include appliances and HVAC depending on the condition of the current equipment.
- Workforce Development and Education – This program provides training and internships to enable placement in the energy-efficiency industry to low-income clients. This provides support directly to the income qualified segment by providing opportunities for careers delivering conservation and enables additional labor force development to delivery programs and serve the low-income market, many from under-served populations who are not currently represented in the workforce. In addition, scholarships are provided to income-qualified students for post-secondary training in fields that support conservation.

The Multi-Family Energy Savings Program (MESP) found in our 2021-2023 Triennial will be discontinued with low-income rental now served through the Multi-Family Building Efficiency-Low Income. This will avoid market confusion and allow us to leverage the structure, marketing, and delivery of the Multi-Family Building Efficiency program by adding enhanced services and rebates for the income-qualified market segment.

Where appropriate, the Company plans to use the spending that benefits income-qualified customers in demonstrating its compliance with the minimum spending requirement, consistent with the Department guidance on hybrid programs. We anticipate tracking spending and associated activity including Business New Construction for projects that serve the low-income market, Partners in Energy for outreach and education targeting the low-income market, Non-Profit Energy Savings for DIY measures distributed directly to income qualified customers and where assessments and direct installation measures for service providers can be shown to impact the Income-Qualified Segment, School Education Kits for schools located in a census tract area with a social vulnerability index greater than .80, and for pilots and research designed to improve our low-income portfolio.

Targets

The tables below provide a breakdown of the Segment participation, budget, and savings goals in proportion to our total portfolio.

Table 52a: 2024 Income-Qualified Segment

	Electric				Natural Gas		
2024	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Affordable Efficient New Home Con.	25	$414,778	10	110,585	11	$198,213	460
Home Energy Savings Program	4,864	$2,900,491	395	1,659,600	754	$2,909,990	8,963
Low Income Home Energy Squad	2,521	$1,137,714	283	1,655,817	945	$363,983	6,702
Low Income Multi-Family Building Eff	3,691	$2,298,051	676	2,115,334	1,126	$162,778	13,556
Workforce Development & Ed.	87	$2,438,368	-	-	13	$435,008	-
Income-Qualified Segment Total	**11,188**	**$9,189,401**	**1,363**	**5,542,337**	**2,849**	**$4,069,972**	**29,681**

Table 52b: 2024 Income-Qualified Segment

	Electric				Natural Gas		
2025	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Affordable Efficient New Home Con.	25	$414,690	10	110,585	11	$198,540	460
Home Energy Savings Program	5,497	$3,293,220	450	1,971,529	874	$3,539,922	10,378
Low Income Home Energy Squad	3,152	$1,196,872	354	2,069,771	1,181	$378,635	8,378
Low Income Multi-Family Building Eff	4,290	$2,819,758	824	2,647,837	1,255	$220,880	14,616
Workforce Development & Ed.	104	$3,272,181	-	-	16	$582,316	-
Income-Qualified Segment Total	**13,067**	**$10,996,722**	**1,637**	**6,779,722**	**3,337**	**$4,920,293**	**33,832**

Table 52c: 2026 Income-Qualified Segment

	Electric				Natural Gas		
2026	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Affordable Efficient New Home Con.	25	$413,743	10	110,585	11	$199,664	460
Home Energy Savings Program	6,150	$3,798,435	515	2,241,852	1,093	$4,729,485	13,129
Low Income Home Energy Squad	3,939	$1,256,787	442	2,587,214	1,477	$396,741	10,472
Low Income Multi-Family Building Eff	4,883	$3,265,152	990	3,407,067	1,384	$156,582	15,386
Workforce Development & Ed.	114	$3,615,554	-	-	17	$643,082	-
Income-Qualified Segment Total	**15,111**	**$12,349,670**	**1,957**	**8,346,718**	**3,981**	**$6,125,554**	**39,448**

Market Analysis

In 2023, the Company completed a Low-Income Program study. This will help inform the improvements and expansion of our programs by identifying potential gaps and needs in the structure and delivery of our low-income programs. Many of the areas identified addressed potential improvements in outreach and education versus the core program attributes. The Company is also exploring our ability to better serve the manufactured home market, how to prudently expand our ability to pre-qualify customers based on geographic indicators, and how to best educate the low-income market on options related to beneficial electrification while targeting customers who use electricity for space and water heating for efficiency improvements with heat pump technology.

Marketing/Advertising/Promotion

We leverage a comprehensive approach to build awareness of our low-income programs with customers, property owners and community agencies. In our Low-Income Program study, awareness was identified as one of the primary barriers to participation. In response, we will be working to provide additional outreach in the market leveraging not only our traditional mix of tools (advertising, direct mail, tabling at community events, workshops and social media) but identifying and testing new ways to reach additional audiences.

Policies

Policies related to the verification of income may vary by individual program to what extent we are able, we have identified overall eligibility below. Programs may have other eligibility requirements in addition to income. The Segment does not have additional unique policies. Each program will enforce its participation and equipment eligibility rules and requirements; however, they may be modified when warranted and within guidance from the Minnesota Department of Commerce.

Eligibility

For clarification, we provide the table below to show differing qualifications for our income qualified programs.

Table 53: Income-Qualified Eligibility Criteria
(with the exception of Affordable Efficient New Home Construction)

	HESP	LI- Home Energy Squad	LI- MFBE	Workforce Development
≤80% AMI	x	x	x	x
Limited Assistance Programs	x	x	x	x
Geographic Proxy	x		x	
WAP			x	

In addition, each program does have specific requirements above these eligibility criteria. Currently we used the Geographic Proxy Method on income-qualified Multi-Family Buildings and propose to extend this to HESP for this triennium.

Low-Income Households
To participate in the Income-Qualified Segment programs, customers must have met the definition of "low-income household" in MN Stat. §216B.2402, subd. 16. As modified by legislation passed into law in May 2023 in H.F. 2310, this includes households whose household income is 80 percent or less of area median income (AMI) for their area, or who meet the income eligibility standards for certain financial assistance programs. In this Plan, we also propose to broaden participation criteria, based on allowing automatic eligibility for customers participating in selected means-tested public assistance programs (e.g., the Supplemental Nutrition Assistance Program, the Women, Infants, and Children Program). The Company believes that these assistance programs are a good place to begin meeting the new legislation. As additional eligibility opportunities are added to the low-income household definition, the Company will continue to review and modify its programs based on the Department's requirements.

The exception to the participant income requirement is in the case of the Affordable Efficient New Home Construction program. In this program, "participants" are not customers but homebuilders; homes eligible for incentives through the program must be built with the expectation that the occupant will meet the income-eligibility requirements.

Minnesota Weatherization Assistance Program (WAP)
For rental properties the income qualification criteria will follow the WAP policy. In order to be weatherized, a single-family dwelling (one unit) must be occupied by an eligible household prior to the start of any weatherization activities. In multifamily building complexes, each individual building must meet the eligibility guidelines of 66 percent (50 percent for 2- and 4-unit buildings)

Geographic Proxy
The Geographic Proxy Method has been successfully used for income-qualified Multi-Family Buildings in 2022 and 2023. The method was used only if all other eligibility methods in the Department's March 15, 2022, CIP Policy Guidelines: Low-Income Programming in Multi-Family

Buildings with 5+ Units [36] have been exhausted. The multi-family guidance suggested three potential resources utilities could use to make the case for using a geographical proxy method to determine a building's eligibility and invited utilities to work with the Department on a case-by-case basis regarding using those or additional resources in order to help the Department learn more about this topic, track the concerns that are described in the Guidance Document, and prepare for future guidance document updates. The three resources are:

- Social Vulnerability Index ("SVI")[37]
- Census tracts like Opportunity Zones[38]
- Qualified Census Tracts ("QCT")[39]

Once it has been concluded that the only potential low-income eligibility pathway for a building is to use the Geographic Proxy option to qualify for eligibility, the preferred method is for the building to meet the following three criteria: (1)a high score of social vulnerability on the SVI,[40] (2) located inside an Opportunity Zone, and (3) located in a QCT. However, if the building is not in an Opportunity Zone, but meets both the Social Vulnerability Index Requirement and is in a qualified Census Tract, it may move forward due to the limited number of Opportunity Zones designated in each state.

To prevent targeting student housing when using the Geographic Proxy Method, the following will be excluded from the census tracks:

- Private and Public Colleges and Universities;
- 2-year, 4-year, and Graduate schools;
- Provide on-campus housing options for students. e.g., dormitories
- Have a Student Housing Office on campus, or
- Are adjacent to census tracts with any of the four characteristics listed above.

Because these types of educational institutions offer on-campus housing options, it is reasonable to assume that the average student is full-time, and some share of the students would be expected to come from a substantial distance away. Therefore, attractive market-rate multi-family student housing would likely be close to these Colleges and Universities to provide close, off-campus living options for married students, graduate students, students with families, students who do not want to live on campus, and students who find the multi-family building option more affordable and/or attractive than living on campus.

Census tracks will be permitted if they include public and for-profit colleges, 2-year, community, technical and graduate schools and do not provide on-site housing for students. Because these types

[36] CIP Policy Guidelines: Low-Income Programming in Multifamily Buildings with 5+ Units, https://mn.gov/commerce-stat/pdfs/low-income-in-mf-bldgs-15Mar2022.pdf, (Mar. 15, 2022).
[37] https://www.atsdr.cdc.gov/placeandhealth/svi/index.html
[38] https://mn.gov/deed/business/financing-business/tax-credits/opp-zones/census-opp-zone-tracts.jsp
[39] https://www.huduser.gov/portal/sadda/sadda_qct.html
[40] SVI score of 0.8 or higher

of educational institutions do not offer on-campus housing options, it is reasonable to assume that students are not full-time and would be expected to commute to school from local private residences.

Involvement with Interested Individuals and Entities
The Income-Qualified Segment programs will continue to be delivered through third-party vendors and we anticipate expanding engagement in delivery of outreach and education to include community service providers who serve this Segment. The Company is currently working with several both formal and informal stakeholder groups and individual entities to refine our existing programs, shape new offerings and discuss partnership opportunities. We have great appreciation for their willingness to share their experience and expertise delivering services to this Segment.

1. AFFORDABLE EFFICIENT NEW HOME CONSTRUCTION

Program Description
Affordable Efficient New Home Construction was added to Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Affordable Efficient New Home Construction is designed to target home builders contributing to the affordable housing segment and provide financial incentives for building high performance building envelopes and installing advanced mechanicals. For the Plan, the Company is proposing to add prescriptive rebates for heat pump water heaters.

Eligibility/Qualification for Participation
All home builders are eligible to participate in the Affordable Efficiency New Home Construction program.

Builders may be 501(c)(3) non-profits. Organizations that have broad community support, provide affordable home ownership or rental opportunities to income-qualified customers, provide non-discriminatory services to recipients, can measure the impact and effectiveness of projects, and the ability to issue financial statements to demonstrate their financial stability, are allowed to participate in the program. For these affordable housing builders, all homes being built with in Xcel Energy service areas with the Company providing the primary heating fuel will qualify for the program.

Market rate builders can participate by building homes in known areas of economic need in Company service territory; for example, in Minneapolis Green Zones or St. Paul ACP50 areas. Market rate builders can also participate in the program by partnering with an affordable housing public authority. For the latter, there are no geographic requirements.

The Company may route homes to our market rate program (Efficient New Home Construction) if the Company determines the as-built home is not intended for an income-qualified homeowner or if the Company does not provide the primary heating fuel.

Program participants utilize the services of RESNET Home Energy Rating System raters (Raters), who collect and submit the necessary information to participate in the program. Raters collect the same data as in the market rate program as well as verifying the required specifications below.

Qualifying Upgrades/Measures

All participating homes must have the following measures:

- Air infiltration at final inspection no greater than 1.5 ACH50
- High Efficiency Furnace or Air Source Heat Pump Installed
- High Efficiency Natural Gas or Heat Pump Water Heater
- High Efficiency Recovery Unit HRV Recovery of 67%
- Duct leakage at final inspection no greater than 2 CFM/100 CFA

Further details regarding specifics measures can be found in the portfolio measure details.

Participating homes may choose to follow a prescriptive path or performance path. The prescriptive path must have the five measures above, plus measures outlined in Table 54. Homes that use 5 5/8" Structurally Insulated Panels (SIPs) in lieu of R-19+5 walls are eligible for the 12-measure rebate, and homes that also use Insulated Concrete Form (ICF) foundation walls are eligible for the 13-measure rebate. The performance path must have the five measures above and have a building envelope with a UA that exceeds that of the 2012 IECC by at least 10 percent.

Table 54: Required Measures

Prescriptive Path	Performance Path
R-50 attic insulation	The building envelope must exceed the IECC 2012 UA by a minimum of 10%
R-19+5 continuous wall insulation or 5 5/8" SIPs	
R-12 Slab edge and R-15 foundation wall insulation or ICFs	
Window U-value 0.26	
R-5 door insulation	
Strategic door & window placement for solar heat gain	

Rebates

The Affordable Efficient New Home Construction has six different tiers of rebates available, outlined in Table 55. The rebate depends on whether the customer heats with Company-provided natural gas or electricity, and whether the home chooses a prescriptive or performance path to comply with program requirements. All rebates are paid to the builder upon project completion and submission of necessary paperwork from the evaluating Rater.

Based on upward pressure on building materials and feedback from known affordable housing builders, the Company elected to increase the rebates available in the Program.

Rebates will be paid according to upgrade type and cost in the schedule below based on how far they exceed the International Energy Conservation Code (IECC):

Table 55: Rebate Amounts ($) by Path & Customer Type

Prescriptive Path	Performance Path	Customer Type	Rebate
11 Measures	Exceeds IECC 2012 UA by 10-14.999%	Split system combo or gas heat customer	$17,000
12 Measures	Exceeds IECC 2012 UA by between 15 and 19.999%	Split system combo or gas heat customer	$19,000
13 Measures	Exceeds IECC 2012 UA by more than 20%	Split system combo or gas heat customer	$21,000
11 Measures	Exceeds IECC 2012 UA by 10-14.999%	All-electric customer	$17,000
12 Measures	Exceeds IECC 2012 UA by between 15 and 19.999%	All-electric customer	$19,000
13 Measures	Exceeds IECC 2012 UA by more than 20%	All-electric customer	$21,000
Electric heat pump water heater without CTA-2045 communications port		Combo customer	$400
Electric heat pump water heater with CTA-2045 communications port		Combo customer	$500

Trade Partner Incentives

There are no dedicated trade partner incentives for Affordable Efficient New Home Construction.

Quality Assurance

The Quality Assurance paradigm matches that of the market-rate Efficient New Home Construction program.

Program administrators will perform field reviews of five percent of program homes, verifying the information provided by the HERS raters. This includes a full duplication of the HERS rating to ensure consistency and compliance with Program expectations. Program administrators will also perform desk reviews of an additional ten percent of program homes, or more if individual participating Rating firms warrant additional scrutiny.

Program Changes

Change	Rationale
Add prescriptive rebates for heat pump water heaters to split fuel combo customers	Increase the market share of heat pump water heaters

Budget, Participation & Target Considerations

Budgets, savings targets, and participation are based on historical participation and production capacity of known affordable housing builders.

The main budget drivers include the following:

- Utility Administration: This category funds project planning and implementation along with program management. This includes the payment for the data aggregator serving the program.
- Participant Incentives: These funds cover rebates. The overall budget is based on the production capacity of known affordable housing builders.

Stakeholder Involvement

The Company works with all affordable housing builders who have participated in the Efficient New Home Construction program in the past to determine whether the Program meets the current market needs and realities.

2. HOME ENERGY SAVINGS PROGRAM

Program Description

The Home Energy Savings program (HESP) was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Home Energy Savings program is designed to target income-qualifying customers living in smaller building units (1-4 units) and provide energy audits, a home visit and energy bill analysis to educate participants about energy conservation opportunities. Based on the findings in the home visit, we determine the customer's eligibility for other offerings in the program, including home weatherization and appliance replacements. When appropriate, information regarding efficient fuel switching options will be provided to customers to highlight additional option for larger energy efficiency upgrades in their homes.

For the Plan, the Company is proposing to streamline the qualification process for customers, decrease measure copay for income-qualified building owners and add more cold climate heat pump options. We will continue to work with our implementers to explore new opportunities for education and outreach to drive program participation.

Eligibility/Qualification for Participation

To qualify for participation in HESP, Xcel Energy customers must meet the income qualification criteria described above, plus:

- Properties with two to four housing units, at least 50 percent of the households must have incomes below 50 percent of the State Median Income guidelines or 300 percent of the federal poverty level, whichever is greater; and
- Rental property owners must agree to maintain affordable rent to receive benefits from this program.

Eligibility may be granted for rental properties located in census tracts with a high social vulnerability index (greater than 0.8) and in qualified census tracts.

Rental Property Landlord Contribution

HESP will use the Weatherization Assistance Program (WAP) policy as the guidelines for 1-4 unit rental properties except in cases where the property owner also qualifies for HESP services. For rental properties where the owner is income qualified, HESP services are provided at no cost. In addition, we propose that weatherization measures will be provided at no cost in 1-4 unit rental property. Previously a landlord contribution was required at the discretion of the implementer. This change is discussed in more detail below. For all other rental properties, the property owner contributions will be handled as follows:

- Service Providers may not require property owner contributions for one-unit rental properties. However, contributions for two to four-unit dwellings are optional and may be accepted.
- Property owners must complete work to come into compliance with MN Statute 504B.161 or other local rental code, if identified through the audit. This work must be completed prior to or in conjunction with weatherization projects. This is not counted towards property owner contribution requirements.

To further clarify, the Company provides the following table to describe these contributions.

Summary of Co-Pay Contributions for HESP

Electric Service	Previous Owner Contribution	Previous Landlord Contribution* (1-4 unit)	Proposed (2024-2026) Owner Contribution	Proposed (2024-2026) Landlord Contribution (1-4 unit)
Home Energy Squad visits	N/A	N/A	N/A	N/A
Screw-in LED bulbs	N/A	N/A	N/A	N/A
Smart Power Strips	N/A	N/A	N/A	N/A
Energy efficiency aerators and shower heads in homes with electric water heaters	N/A	N/A	N/A	N/A
Refrigerator replacement	0	Up to 50%	0	Up to 20%
Freezer replacement	0	Up to 50%	0	Up to 20%
Window and Wall AC replacement and recycling	0	Up to 50%	0	Up to 20%
Air Source Heat Pump in electrically heated homes	0	Up to 50%	0	Up to 20%
Air Source Heat pump water heaters for homes with electric water heater	0	Up to 50%	0	Up to 20%
Attic Insulation for electrically heated homes	0	Up to 50%	0	0
Dehumidifiers	0	Up to 50%	0	Up to 20%
Electric Service				
Mobile Home Park floor insulation	0	Up to 50%	0	0
Smart thermostat	0	Up to 50%	0	0
Renter's Kit (Showerheads, Aerators)	NA	0	NA	0
Gas service				
Energy efficient aerators and showerheads in home with natural gas water heaters	N/A	N/A	N/A	N/A
Attic insulation and air sealing	0	Up to 50%	0	0
Wall insulation	0	Up to 50%	0	0
Furnace or boiler tune-up	0	Up to 50%	0	Up to 20%
Water heater replacement	0	Up to 50%	0	Up to 20%
Crawl space insulation	0	Up to 50%	0	0
Rim Joist Insulation	0	Up to 50%	0	0
Furnace replacement	0	Up to 50%	0	Up to 20%
Energy efficient water heater replacement	0	Up to 50%	0	Up to 20%
Mobile Home Park floor insulation	0	Up to 50%	0	0
Smart thermostat	0	Up to 50%	0	0
Renter's Kit Showerheads, Aerators	NA	0	NA	0

**Note that 50% landlord contribution is currently up to the discretion of the provider.*

Qualifying Upgrades/Measures

The program's main offerings include the following:

Free Electric Home Service	**Free Natural Gas Home Services**
Home energy educational visits	Energy-efficient aerators and showerheads in homes with natural gas water heaters
Screw-in LED bulbs	Attic insulation and air-sealing
Smart power strip	Wall insulation
Energy-efficient aerators and showerheads in homes with electric water heaters	Furnace or boiler tune-up
Refrigerator replacements and recycling	Furnace or boiler replacement
Freezer replacements and recycling	Water heater replacement
Window and wall AC replacements and recycling	
Air Source Heat Pump in electrically heated homes	
Air Source Heat Pump water heaters for homes with electric water heaters	
Attic insulation for electrically heated homes.	
Free dehumidifiers and dehumidifier recycling	

The main offerings are described below.

Electric Home Services

The home energy educational visits are available to all income-qualified customers in Xcel Energy's electric service territory and are provided during a Low-Income Home Energy Squad visit. Similar services can be provided through HESP if the customer has not previously had a Home Energy Squad visit. These visits include:

- Analysis of the electric bill;
- Home energy assessment and education;
- Inspection and evaluation of major appliances;
- Energy savings recommendations; and
- Distribution of energy conservation educational materials.

Appliance replacements are available to those customers whose appliances meet the following criteria:

- Customer must own the appliance or provide a signed waver to allow replacement and recycling of the old inefficient appliance;
- Appliance must be used on a regular basis;
- Appliance must be in working condition;
- Refrigerators must be the primary unit in the home unless the customer agrees to recycle a second working appliance as well; and

- Window or wall AC units with an EER rating less than 10.8.

Additional upgrades available for income qualified customers in Xcel Energy's Electric territory:

- Attic, wall, crawl space and rim joist insulation.
- Air Source Heat Pumps with a minimum of 16 SEER to replace existing inefficient central AC or no AC.
- Air Source Heat Pump Water Heaters to replace existing inefficient electric tank water heater.
- Residential Saver's Switch as an option for participants who have central AC. In addition, smart thermostats will be added as a new measure for customers who have Wi Fi.

Natural Gas Home Services

These services are available to all income-qualified customers in Xcel Energy's natural gas service territory:

- DOE standard energy audit including blower door testing;
- Detailed specifications for all weatherization measures;
- Insulation of attic and bypass sealing to an R-value of 48 or greater;
- Insulation of walls to an R-value of 11 or greater;
- Carbon monoxide detector installed with any weatherization job; and
- Furnace or boiler tune-up.
- Energy-efficient aerators and showerheads

We provide funding for the replacement of old inefficient furnaces, boilers and water heaters with the following:

- High-Efficiency Furnaces
- High-Efficiency Boilers; and
- High-Efficiency Natural gas water heaters

Further details regarding specific measures can be found in the portfolio measure details in the Appendix of this Plan.

As part of our strategy to increase participation in demand response programs, this program will also offer Saver's Switch® and Smart Thermostats for interested customers. Further details on demand response measures are provided in the technical assumptions.

<u>Rebates</u>

HESP does not offer rebates, but rather pays the full cost of measures for participants. Owner-occupied income qualified property owners will not be required to provide a co-pay for equipment. Property owners who are not income qualified may be required to provide a co-pay for a share of the equipment cost for appliances and HVAC equipment. This was previously up to 50 percent but we are currently exploring lowering this to no co-pay for weatherization measures and 20 percent for HVAC equipment. We anticipate these reduced co-pays will drive incremental activity in rental properties. If successful, these co-pays will be standardized for all non-income qualified rental properties served through the program.

Co-pay exceptions may be made for non-income-qualified owners for buildings located in census tracts with a high vulnerability index (greater than 0.8) and qualified census tracts.

Trade Partner Incentives

No trade partner incentives are offered for this program.

Quality Assurance

The program implementer provides quality control through inspections and on-site supervision, and client satisfaction through follow-up inspections and surveys. The insulation crew leaders are Building Performance Institute (BPI) certified, and 50 percent of the insulation work is inspected by energy auditors. Both the insulation and HVAC contractors get program specs at the beginning of each year on equipment installed and quality installation information. The Company also follows WAP Quality Assurance requirements.

Program Changes

Change	Rationale
Add programmable thermostats as a HESP measure	Providing and programming thermostats if the customer does not have WiFi or is unable or unwilling to operate a smart thermostat will help residents reduce their heating and cooling costs. They are currently only provided to customers getting new furnaces.
Smart thermostats	Providing and programming smart thermostats will help residents reduce their heating and cooling costs. They are currently only provided to customers getting new furnaces.
Cold climate air source heat pump	New measure to increase options for households seeking to replace their air conditioning units while reducing electric costs and helping reduce their heating costs during the shoulder season.
Eliminate rental property co-pay for weatherization measures and reduce co-pay for HVAC equipment and appliances.	Increase weatherization participation to help increase achievement and potentially reduce the operating costs of future heating or cooling equipment.

Budget, Participation & Target Considerations Budgets, savings targets, and participation are based on current participation and achievement, feedback from implementers and expected growth driven by increased outreach to community-based organizations and collaboration with both implementers' other stakeholders.

The main budget drivers include the following:

- Utility Administration: Covers internal labor and expenses for program planning, implementation and vendor administration, and the services provided by Third-party program implementers.
- Participant Incentives: Covers the cost of the equipment/measures installed.
- Advertising & Promotion: The program's direct advertising, bill onserts, search engine marketing, communications outreach events and more are supported with these funds.

Stakeholder Involvement

The Company continuously works to build relationships with existing agencies, non-profit organizations, and communities throughout the state. These partnerships allow us to improve program awareness and increase program participation. We are also members of a national ACEEE working group focused on energy efficiency for low-income customers. Additional outreach funding has been added to this program so implementers can proactively collaborate with social service organizations serving income qualified customers to disseminate information about the programs and help them apply as needed.

Stakeholder input and experiences were critical to the recent Low-Income Program study completed by the Company. They provide insight into the improvement and expansion of HESP. We will continue to incorporate stakeholder input into the marketing plans and delivery of this program to remove participation barriers, improve outreach and education and simplify participation.

3. LOW-INCOME HOME ENERGY SQUAD

Program Description

The Low-Income Home Energy Squad program was included in Xcel Energy's previous Triennial Plan. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Low-Income Home Energy Squad program offers installation services to income-qualified electric and gas customers who seek to improve their homes' energy efficiency and comfort as well as lower their utility usage. The program directly installs several moderate-impact, low-cost measures for combination gas and electric customers and for electric-only customers who are natural gas customers of CenterPoint Energy. In addition, and where cost-effective, the program installs fuel-appropriate measures in Xcel Energy electric-only and gas-only territories where the operations vendor has identified potential customers. When appropriate, information regarding efficient fuel switching options will be provided to customers to highlight additional option for larger energy efficiency upgrades in their homes.

The program seeks to assist customers' efforts to overcome barriers related to making energy improvements, including affordability, customer confusion about product choices, and locating qualified installers. The program offers a free audit to income qualified customers to choose from a suite of energy-saving measures of which some materials and labor costs may be covered. The program is marketed primarily within the metro area and larger out-state cities. Historically the audit for this segment has not usually incorporated an evaluation of air-sealing and insulation but we will be exploring opportunities to incorporate this into the services delivered where appropriate.
For the Plan, the Company is exploring new methods to promote this program. One example we are proposing is to increase outreach via canvasing in neighborhoods with high social vulnerability indexes and low program participation as well as participating in public events by having tables with multilingual educational and program information. Home Energy Squad has served to identify customers for the Home Energy Saving Program so as we grow the number of participants, we anticipate it driving additional customers to that program. the Company is also working to cross-promote with other programs in the form of written materials focused on income qualified offerings.

Eligibility/Qualification for Participation

To qualify for the Low-Income Home Energy Squad program, a participant must be an income qualified, natural gas and electric customer in the Company's service area or an electric-only customer who is a natural gas customer of CenterPoint Energy. Where cost-effective, the program installs fuel-appropriate measures in Xcel Energy electric-only and gas-only territories where the operations vendor has identified potential customers. Customers self-identify as being income qualified for this program.

Qualifying Upgrades/Measures

- LED light bulbs of various types & Enrollment in the AC Rewards & Saver's Switch programs
- Temperature assessment & setback of water heater
- Demand response retrofit devices for existing electric resistance water heaters (Combined with high-efficiency showerheads)
- wattages
- Weather-stripping of 2 external doors
- Smart thermostat installation & programming
- Setback of pre-existing programmable thermostats

Additional measures for customer purchase include electronic timers, premium smart thermostat installation and programming, second programmable thermostat installation, and weather-stripping for additional doors.

Rebates

The program offers a free audit to income-qualified customers, during which a member of the Home Energy Squad will assess their home for energy saving opportunities. Homeowners are then presented with the choice of multiple energy-savings measures, some of which will have materials and labors cost covered either in part or in their entirety.

Trade Partner Incentives

Not Applicable

Quality Assurance

Implementer provides quality control through inspections and on-site supervision, and Client satisfaction through follow-up inspections and surveys.

Program Changes

Change	Rationale
Addition of Direct Install Water Heater Pipe Insulation	Increase gas savings for customers at a relatively low cost while maintaining the convenience of the direct installation

Budget, Participation & Target Considerations The program budget is determined by cost estimates based on vendor proposals, the targeted number of participants and historical program expenses. The main budget drivers are:

- Utility Administration: This category funds program administration costs through third-party vendors and third-party labor for installing energy-efficient measures in customers' homes.
- Advertising & Promotion: This category covers print, broadcast, and interactive advertising, phone and street canvassing, and event promotion. New and increased outreach efforts to reach a greater number of participants are reflected here.

Stakeholder Involvement

The Company continuously works to build relationships with existing agencies, non-profit organizations, and communities throughout the state. These partnerships allow us to improve program awareness and increase program participation. We are also members of a national ACEEE working group focused on energy efficiency for low-income customers. Additional outreach funding has been added to this program so implementers can proactively collaborate with social service organizations serving income qualified customers to disseminate information about the programs and help them apply as needed.

Stakeholder input and experiences were critical to the recent Low-Income Program study completed by the Company. They provide insight into the improvement and expansion of Low-Income Home Energy Squad. We will continue to incorporate stakeholder input into the marketing plans and delivery of this program to remove participation barriers, improve outreach and education and simplify participation.

4. LOW-INCOME MULTI-FAMILY BUILDING EFFICIENCY (MFBE)

Program Description

The Low-Income Multi-Family Building Efficiency (MFBE) program will be a joint offering with CenterPoint Energy. CenterPoint Energy filed for this program on June 29, 2022 and received approval November 7, 2022. For the Plan, the Company is proposing to add a Low-Income Multi-Family Building Efficiency Program specifically targeted at Income Qualified buildings to match the filing submitted by Center Point Energy in 2022 (Docket No. G008/CIP-20-478) as described below.

The Low-Income Multi-Family Building Efficiency will be designed to target 5+ unit multi-family properties. Offered through one program implementer, in the same manner as the Multi-family Building Efficiency Program, it is designed to engage building owners by helping them understand their energy use, achieve immediate energy savings through low-cost improvements, and move beyond the initial measures for whole-building energy savings. The delivery model is a combined approach of a whole-building energy audit with direct-install phase to engage the building owners and achieve early savings, and a performance-based component to encourage further improvements in the building, then assistance to begin benchmarking their building and provide financial incentives for more complex, custom energy efficiency projects. These efficiency projects are intended to reduce natural gas or electric consumption in qualifying multi-family buildings. Incentives to reduce energy consumption are higher for the low-income offering to assist in overcoming the barrier of upfront costs. When appropriate, information regarding efficient fuel switching options will be provided to customers to highlight additional option for larger energy efficiency upgrades in their buildings.

For the Plan, the Company is proposing to add a Low-Income Multi-Family Building Efficiency Program specifically targeted at Income Qualified buildings to match the filing submitted by Center Point Energy in 2022 (Docket No. G008/CIP-20-478).

Eligibility/Qualification for Participation

Eligibility follows the March 2022 CIP Policy Guidelines: Low-Income Programming in Multi-Family Buildings with 5+ Units.[41]

[41] https://mn.gov/commerce-stat/pdfs/low-income-in-mf-bldgs-15Mar2022.pdf https://mn.gov/commerce-stat/pdfs/low-income-in-mf-bldgs-15Mar2022.pdf

As noted in the guidance, to qualify property owners and managers must demonstrate that the buildings meet the following requirements:

- 5+ units with functional kitchens
- Common entrances and common living areas
- Electric Service from Xcel Energy or
- Gas service from Xcel Energy or CenterPoint Energy
- The determination of whether a property is eligible to participate is reviewed on a case-by-case basis.
- Demonstrate that 66 percent of their tenants will be income qualified based on parameters defined in the Low-Income Multi-Family Building Efficiency program.

Buildings can also qualify by providing information about their eligibility via Geographic qualification. This methodology includes checking the building address to identify its Social Vulnerability Index (SVI), whether it is located in a qualified census tract (QCT) and if it is in an Opportunity Zone. To qualify the building must also not be deemed to be an excluded census tract due to it being deemed to serve as student housing.

Qualifying Upgrades/Measures

To encourage engagement, the program starts with a free whole-building energy audit and the direct installation of energy saving measures, with all services being provided by one third-party program implementer. After completion of the energy audit and direct installations, a written report identifying the building's baseline energy use, the audit findings and recommended energy savings opportunities that could receive a rebate and incentive is provided to the building owner/manager.

Direct install measures for Multi-Family Building Efficiency program include:

- In unit LEDs. LEDs must be installed by the implementer and not left for residents to install
- Common area screw-in LEDs
- Smart Power Strips
- Water Heater Set-back
- Kitchen and bath faucet aerators
- Energy efficient showerheads
- Exterior door weather stripping for gas and electrically heated buildings
- Refrigerator replacements and recycling: Provide new Energy Star Refrigerators
- Freezer replacements and recycling; Provide new Energy Star Freezers
- Window air conditioner (AC) replacements and recycling – 5,999 or less or 8,000 – 10,999 BTUh
- Wall/sleeve AC replacements and recycling; 8,000 – 19,999 BTUh

- Mini Split Heat Pump installation & recycling; 21+SEER, 9+ HSPF
- Dehumidifier recycling & replacement

Appliance replacement and recycling is provided to those buildings/units where the appliances meet the following criteria:

- Appliance must be used on a regular basis;
- Appliance must be in working condition;
- Refrigerator must be the primary one used in the unit, unless customer agrees to recycle a second working appliance as well; and
- Window/wall AC units must have an EER rating of 8.5 or less to be replaced.

Appliances that are replaced through this program continue to be the property of the original owner. For example, refrigerators owned by the building owner continue to be property of the building owner and AC units owned by the tenant continue to be property of the tenant.

In addition to direct install measures the program also provides:

- Renter educational materials
- In-unit electric energy assessments
- Renter kits.

The Company will continue to offer limited quantities of Renter's Kits for individual renters whose property owners/managers choose not to participate in the program, and consequently the renter did not receive the direct install measures in their individual unit. Since the Renter's Kits energy savings measures are limited to the individual unit, the kits alone do not provide the robust program benefits to the multi-family property and are therefore intended as a stop-gap measure to aid individual renters. The intent is that the renter can encourage their property owner/manager to participate in the program and receive the full array of benefits offered through the program to the whole building. Materials and resources are available to aid renters in communicating about the program to their property owner/manager.

The building owner/manager works with the program implementer to determine the energy improvements preferred for implementation from the audit report. The program implementer will provide review and oversight of equipment efficiency specifications oversee Quality Assurance/Quality Control (QA/QC) to ensure improvements are performed as specified and assists with the rebate and incentive submission.

As part of our strategy to increase participation in demand response programs, this program will be offering Business Saver's Switch®. Further details are provided in the technical assumptions.

Rebates
Participants moving beyond the assessment and direct-install phase of the program and choosing to undertake energy efficiency upgrades are eligible for rebates with a program bonus incentive equal to 200 percent of rebate value for work completed (up to the cost of the equipment).[42]

Trade Partner Incentives
The Company proposes to increase Trade Partner incentives from 10 percent to 15 percent of total rebates earned. This will be provided to HVAC contractors working on this program to assist in overcoming the barrier of providing services to low-income properties.

Quality Assurance
The selected contractors will be hired by the implementer to install the selected upgrades. The program implementer will ensure improvements are performed as specified, including collection and review of project documentation or on-site inspections. Each quarter, the implementer will select twenty percent of completed improvements to ensure the projects were completed as specified.

Program Changes

Change	Rationale
Separate out a Low-Income MFBE program targeted specifically to income qualified buildings. Integrate the former Multi-family Energy Saving Program into this offering.	Help bring additional attention to the enrollment and participation of buildings providing affordable housing. Enable specific marketing tactics to target disproportionately impacted communities. Match program offering filed in 2022 by CenterPoint Energy.
Offer MFBE and LIMFBE to customers within Xcel Energy electric territory regardless of Natural Gas provider	Expand the ability of additional electric only customers to participate in the program which will particularly benefit rural territories and electrically heated buildings.
Offer all multi-family buildings bonus incentives regardless of MFBE program application status	Increase multi-family building energy efficiency participation even after their program participation period (currently at two years) expires. Audit and direct installation services will remain available and encouraged, but not required to obtain bonus rebates. Encourage further savings.
Cap rebates at 100 percent of measure costs not including labor	Ensure consistency with CenterPoint Energy filing and align with program rules.

[42] Docket E,G999/CIP-22-41

Change	Rationale
Add Trade Ally incentives to the multi-family programs. Higher incentive levels for the low-income offering.	To encourage trade allies to promote the program and complete rebate paperwork for customers. Encourage trade to engage work with low-income properties.
Add new direct installation measures to include commercial programmable thermostats, window and sleeve air conditioners, and mini split heat pumps. These measure equipment and installation costs will be covered in full for LIMFBE.	Increase energy savings opportunities for customers and decrease barriers for busy building managers dealing with worker shortages.
Add additional insulation measures.	Increase energy savings opportunities for customers.

Budget, Participation & Target Considerations

The Company anticipates LI MFBE to initially engage approximately 20 percent or more of total MFBE building participants. Historically, 15 to-25 percent of participating buildings in MFBE have been income-qualified, but those percentages have been trending downward. With more aggressive targeting and higher incentives the expectation is that that percentage should grow with this new approach.

Budgets, savings targets, and participation are based on historical participation from income-qualified buildings for both Multi-family Energy Savings Program and buildings that qualified as low income that participated in the MFBE program. Participation, budget and savings are expected to increase with a clearer message and targeted communication in partnership with CenterPoint Energy for this program.

The main budget drivers include the following:

- Utility Administration: This budget covers internal labor and expenses for program planning, promotion, implementation, and vendor administration.
- Participant Incentives: This budget covers the direct installation measure costs, rebates and bonus incentives paid when energy efficient upgrades are achieved.

Stakeholder Involvement

Stakeholder participation incorporates both the rental industry and low-income stakeholders:

- Participation in Minnesota Multi-Housing Association Events.
- Engagement with non-profits including the Minnesota Council for non-profits Minnesota Housing Link, and others.
- Participate in the Energy Stakeholder Advisory Group (ESAG) meetings hosted by the Company in association with the Integrated Resource Plan and deliver information and presentations as needed.

5. WORKFORCE DEVELOPMENT AND EDUCATION

Program Description

The Workforce Development and Education program was included in Xcel Energy's previous Triennial Plan for 2021-2023 via a modification filed on December 23, 2020 and approved April 29, 2021 (Docket No. E,G002/CIP-20-473). The Company proposes to continue this project as described below in the 2024-2026 triennium. The Workforce Development and Education Program is designed to target unemployed and underemployed people living in historically underserved communities, including Black, Indigenous, people of color (BIPOC), and women residing in Green Zones of Minneapolis and Areas of Concentrated Poverty (ACP) 50 zones of St. Paul. The program provides paid energy efficiency and insulation training, paid internships and transportation help as needed for attending the training. Those who complete the training can earn the Building Performance Institute's Building Science Principles certificate. Successful graduates then get help finding energy efficiency related employment. This program also funds scholarships in two- and four-year colleges for income-qualified students who are pursuing a degree in an energy efficiency related career.

During the initial cohorts of in-person training, data was collected and submitted in the 2022 DSM Status Report[43] that shows a vast majority of participants were low-income in addition to being members of traditionally underserved and disproportionately impacted markets. Graduates who pursued employment opportunities through the program were hired by vendors who provide weatherization and energy efficiency service to our income-qualified market. The program has partnered with community service providers to deliver and recruit applicants who traditionally serve income-qualified clients, further assuring that this market receives the benefits of our Workforce Development program.

Workforce Development and Education Program (2022)

Participants in Training Program to Date	49
Number of Participants in Training Program Identified as Income-Qualified	48
Percent of Participants in Training Program Identified as Income-Qualified	98%
Number of Scholarship Recipients to Date	89
Number of Scholarship Recipients Identified as Income-Qualified	59 (based on 150% FPL)
Percent of Scholarship Recipients Identified as Income-Qualified	66%

Given the performance of the program in the market the Company is proposing this offering be considered as a low-income program, as it serves income-qualified and disproportionally impacted individuals and graduates are often serving low-income communities delivering energy-efficiency

[43] https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/20-473%20-%202022%20Xcel%20Energy%20MN%20Status%20Report%20-%20for%20website.pdf

services. Throughout the 16-week internship, trainees spend over 500 hours working on income-qualified homes learning to install efficiency related measures with local service providers.

Eligibility/Qualification for Participation

To qualify for the training participants must be 18 years old, legally authorized to work in the U.S., have 5th grade level reading and math and basic computer skills. For the internships participants must also be able to obtain a driver's license by the beginning of the internship and to lift 40-50 lbs.

Currently candidates are screened for:

- Income at or below 80% Average Median Income (AMI)
- Live in the Green zones of Minneapolis or Areas of Concentrated Poverty (ACP) 50 zones of St. Paul, or
- Identify as a woman or BIPOC individual.

Those who apply and do not fit into any of these categories are referred to other opportunities. Energy Auditor candidates must also have: an insurable driving record, pass a one-time drug test, pass the Xcel Energy background check and have strong communication skills. Home insulator candidates should be able to pass the Department of Transportation (DOT) physical exam, be able to crawl, climb and move in tight spaces and an insurable driving record is preferred.

Qualifying Offering Categories:

The training program recruits students to receive:

- Classroom training on building science
- Hands on training about energy auditing, air sealing and insulation
- Wrap around services to include transportation support, childcare and employment search services.

Rebates

Not applicable.

Trade Partner Incentives

Not applicable.

Quality Assurance

Not applicable.

Program Changes

Change	Rationale
Request that this program be counted towards low-income spending	This program serves income-qualified and disproportionally impacted students who upon graduating can help better serve their communities.
Expand training offerings to include additional hands-on experience in a lab environment and guidance on how to start an insulation buisness.to individuals interested in becoming insulation contractors	There is a shortage of insulation contractors willing to work on low-income housing projects, including mobile homes.
Deliver program variations to outstate areas. Program will be modified meet the unique needs of the contractors and income-qualified residents in these areas.	Income-qualified residents in the outstate have additional challenges accessing training opportunities and new career opportunities. Trade and vendors express frustration in these geographies identifying qualified personnel to serve income-qualified and market rate customers with energy-efficiency programs.

Budget, Participation & Target Considerations

The main budget drivers of the Workforce Development training include the following:

- Utility Administration: This budget covers internal and implementor labor and expenses for program planning, program management, promotion, implementation, partner development and vendor administration.
- Advertising & Promotion: As a new initiative with low awareness, the implementer will use partner relationships and recruiting tactics to build interest, drive applications and project follow through with students before, during and after the program.
- Customer Service: This includes costs for trainers, stipends, and materials paid to the implementer.

It is our intent to continue to grow this offering and expand the geographic reach of the program. We will continue to look for opportunities to partner with community service organizations to expand our outreach and recruitment. As graduates are placed in the market, we will solicit feedback from trade partners on potential gaps and weaknesses and modify our training curriculum accordingly.

The program will continue to provide scholarships at levels like our current offering. We will continue to enhance the selection process to ensure funds are distributed to those most in need pursuing opportunities that support energy-efficiency. The main budget drivers for the CIP Workforce Development Scholarships are the scholarship funds and internal administrative costs.

Stakeholder Involvement

The implementer partners with various local non-profit organizations to help in recruiting, providing culturally specific support and additional wrap around services such as transportation, childcare, and housing needs. Both the implementer and the Company collaborate with other implementers and local community organizations to promote the workforce development program within the community.

DEMAND RESPONSE SEGMENT

Overview

Demand Response is commonly referred to as load management, which means an activity, service or technology to change the timing or efficiency of a customer's use of energy in a way that allows a utility or customer to respond to wholesale market fluctuations or to reduce peak demand for energy or capacity. Historically, this has primarily meant tools designed to shed electric load at times of peak consumption. In recent years, the definition of Demand Response has expanded to include demand management and load shifting – both of which allow a customer to manage their energy based on energy pricing and/or load availability. The Demand Response portfolio represents a mixture of programs and activities that allow a customer to manage their energy differently while adjusting the timing of energy usage or committing to reduce load when called on by the utility. Demand Response benefits all customers by helping create a more reliable electric system at a lower cost.

The ECO Act created the ability for the utility to expand demand response efforts – allowing for the inclusion of both traditional demand response efforts reducing a customer's net annual energy consumption and those that change the timing of use to reduce demand at targeted times without necessarily reducing annual energy consumption. In this Plan, we begin to explore new program opportunities and pilots that begin to move towards new opportunities for customers to manage their load and facilitate greater flexibility in order to improve the utility's ability to manage a dynamic grid. Generally, our portfolio is represented by a historically successful group of programs offering several customer options based upon customer need and desired energy goals. In addition, we have proposed new programs that begin to introduce the new opportunities presented by the ECO Act including Critical Peak Pricing. We have also incorporated load shifting opportunities; however, these appear as part of our Business Segment as they are combined with other holistic programs.

Programs

The Demand Response Segment proposes a comprehensive set of program offerings including both residential and commercial customers. Customer programs are aimed at providing differing levels of control opportunity for customers based on their preferences, including both automatic and opt-in opportunities to engage in demand response. Our segment proposes one residential program (encompassing a wide variety of products and measures) and four commercial programs. Unique to this segment, these programs include reduction of energy costs, incentives for the reduction of energy during utility-initiated events and behavioral programs to encourage a change in energy usage.

Targets

The Demand Response Segment provides both energy efficiency and load management as defined by Minnesota Statute §216B.241. Commercial AC Control is the only demand response program with natural gas savings; this is a result of the combined thermostat control offered as part of the program.

Table 56a: 2024 Demand Response Incremental Load for Programs & Pilots

	Electric				Natural Gas		
2024	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Commercial AC Control	4,017	$3,287,549	5,883	359,116	83	$32,765	639
Critical Peak Pricing	30	$216,200	22,910	90,259	-	-	-
Electric Rate Savings	60	$764,536	9,467	18,661	-	-	-
Peak Partner Rewards	65	$1,355,116	19,843	117,235	-	-	-
Residential Demand Response	824,430	$12,522,236	42,860	42,450	-	-	-
Demand Response Segment Total	**828,602**	**$18,145,637**	**100,963**	**627,721**	**83**	**$32,765**	**639**

Table 56b: 2025 Demand Response Incremental Load for Programs & Pilots

	Electric				Natural Gas		
2025	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Commercial AC Control	4,950	$3,750,507	7,024	552,387	150	$38,140	1,155
Critical Peak Pricing	50	$306,500	38,184	150,432	-	-	-
Electric Rate Savings	50	$735,687	7,889	15,551	-	-	-
Peak Partner Rewards	80	$1,465,934	22,324	131,890	-	-	-
Residential Demand Response	831,045	$13,013,280	42,244	49,905	-	-	-
Demand Response Segment Total	**836.175**	**$9,271,908**	**117,664**	**870,164**	**150**	**$38,140**	**1,155**

Table 56c: 2026 Demand Response Incremental Load for Programs & Pilots

	Electric				Natural Gas		
2025	**Participants**	**Budget**	**Gen kW**	**Gen kWh**	**Participants**	**Budget**	**Dth**
Commercial AC Control	5,950	$3,988,997	8,165	709,752	150	$41,307	1,155
Critical Peak Pricing	70	$307,000	53,457	210,605	-	-	-
Electric Rate Savings	40	$707,260	6,311	12,441	-	-	-
Peak Partner Rewards	100	$ 1,566,989	24,804	146,544	-	-	-
Residential Demand Response	836,160	$13,429,785	41,009	56,518	-	-	-
Demand Response Segment Total	**842,320**	**$20,000,031**	**133,746**	**1,135,859**	**150**	**$41,307**	**1,155**

Market Analysis

The Demand Response Segment reflects several market opportunities under demand response. Our programs leverage the following:

- *Load Shedding:*
  - Direct Load Control – The Company directly controls a customer's load, remotely, during periods of high demand creating a dispatchable resource. An example of this our Saver's Switch product.
  - Interruptible Tariffs – Customers agree to reduce consumption at a pre-qualified discount. These products are also dispatchable. Electric Rate Savings is an example of an Interruptible Tariff.
- *Load Shaping:*
  - Products that would fall into this category include offerings that are non-dispatchable, or those that are directly controlled by customers, such as pricing structures. This includes Critical Peak Pricing (CPP).

Of note, our ECO portfolio also includes load shifting opportunities for customers, these however, can be found as part our Business Segment.

Marketing/Advertising/Promotion

For commercial and industrial offerings, outreach and marketing efforts are primarily conducted through internal teams such as the Account Management team. There are several updated tools such as a program comparison chart and ongoing development of program comparison tools to assist account managers and business solution experts with marketing tools to assist customers in enrolling in the demand management program best suited for them. The Company has also created a reduction strategy by segment recommendation guide to help drive participation in demand management and provide ideas on how customers can reduce load during peak times with a customized planning template to accompany the recommendation guide. Email and direct mail campaigns are also utilized to recruit and maintain customers. There is often a longer sales cycle to secure enrollment in a demand management program and a partially customized approach to participation to assist customers with planning the Company offers planning templates. Often email campaign reminders and follow-up are used to continue communication and reminder follow up. Marketing and education training are needed for both new and existing business customers. We host annual training courses for existing customers as well as educational events to attract new customers. For demand management events, invitations, RSVP websites, promotional materials and follow-up materials are needed to ensure success. Product teams use available billing data to pre-screen and attract customers to the demand management program that will be right for their business and utilize materials above to assist and secure recruitment.

For residential offerings, marketing and outreach is primarily conducted through direct contact such as emails, direct mail, bill onserts, community events, and the online marketplace. The online marketplace works to align sales with email communication to customers around popular retail times of the year such as the beginning of cooling season Earth Day and Black Friday. The Company works across teams to promote thermostats as well as other products to enable more frequent communications to encourage participation in both energy efficiency and demand management in the marketplace. Residential programs utilize available data to target customers currently not enrolled in demand management with bill onserts on average bill onserts are sent to several thousand customers when utilized. In addition, the Company has been working with manufacturers, such as thermostat and battery manufacturers, to further encourage customers to enroll in demand response products.

Overall Policies

There are no Demand Response Program-specific policies. Individual demand response products may have unique policies as noted in each of the product summaries that follow.

Involvement with Interested Individuals and Entities

The Company continues to regularly meet with many organizations to refine existing programs, shape new programs, and discuss partnership opportunities. This includes work with individual customers through our Account Managers, industry leaders and equipment manufacturers.

1. COMMERCIAL AC CONTROL

Program Description
Commercial AC Control was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Commercial AC Control is designed to target small commercial customers and provide financial incentives for demand management projects.

Eligibility/Qualification for Participation
Commercial AC Control is a program that aims to manage system load by modifying customer air conditioning load during times of hot weather. There are two demand response products under the Commercial AC Control program: Saver's Switch for Business and AC Rewards for Business. Both products provide simple demand management solutions that are more accessible to small commercial customers.

- *Saver's Switch for Business* is available to business electric customers with central air conditioning. Participating customers receive a monthly discount on their June through September bills. In exchange for the discounts, participants allow Xcel Energy to cycle their air conditioner on and off during control events, which typically occur on hot, humid summer days. Air conditioners are controlled via a radio operated switch installed by a licensed electrician on or near the customer's air conditioner. The tariff allows for up to 300 control hours each year.

- *AC Rewards for Business* consists of thermostat-controlled measures. This product will capture the dispatchable demand savings associated with smart thermostats while the related energy efficiency savings will also be captured through new measures within the product. The smart thermostat demand response measures will be offered through a new direct install channel in addition to leveraging existing direct-installation channels. Customers will receive a free thermostat installation and be enrolled in the Company's demand response program. Customers will also receive a recurring prescriptive incentive in the form of a bill credit for remaining enrolled in the program.

For the AC Rewards for Business product, existing manual or programmable thermostats will be replaced with ENERGY STAR certified smart thermostats.

Rebates

Product	Incentive
Saver's Switch for Business	Monthly bill credits of $5 per ton of qualifying enrolled air conditioning from June through September
AC Rewards for Business	Annual bill credits of $25 per qualifying thermostat

Unlike other DSM programs there is no monetary incentive associated with Saver's Switch under our ECO Triennial as discounts are determined as part of our general rate case for the Control Rider. Rate details can be found in our Electric Rate Book in Section No. 5, beginning at 9th Revised Sheet No. 99.

Events

Events will typically occur on hot days during peak cooling times in the summer months of June through September between late morning and early evening hours. Historically, on average five to fifteen events occur each control season.

Quality Assurance

The program utilizes third-party consultants to conduct data collection for M&V to determine savings per switch for the Saver's Switch and AC Rewards for Business programs. At least one test event per year is conducted to verify load availability.

Program Changes

The Company is not proposing any changes to the Commercial AC Control program.

Budget, Participation & Target Considerations

The program budget and savings were developed based on equipment and installation costs for the number of switches to be installed and replaced. During this Plan, in addition to recruiting new participants, the Company intends to replace Saver's Switches older than 15 years. We also will conduct inspections of additional older switches to verify functionality and, if needed, replace with new hardware. The overall participant target is met with a combination of new installations and maintenance replacements.

The main budget drivers include the following:

- Utility Administration: This budget category covers the costs of internal labor for program planning and implementation, as well as the costs of external contract labor and software maintenance.
- Customer Service: The program uses a third-party to install the switches.
- Advertising & Promotion: This includes awareness campaigns for Saver's Switch for Business and Commercial AC Control.
- Participant Incentives: Enrollment and ongoing incentives for the AC Rewards product
- Measurement & Verification: The program hires a third-party to conduct data collection for M&V to determine the savings per switch.

Stakeholder Involvement

The Company recognizes that the HVAC community is in a position to influence customer attitudes towards the product. The HVAC community may also have lingering misconceptions about Saver's Switch being harmful to customers' air conditioners.

2. CRITICAL PEAK PRICING

Program Description

The Critical Peak Pricing (CPP) pilot was approved by the Department on January 19, 2023, for inclusion in the 2021-2023 Triennial. The Company proposes to continue this project as described below in the 2024-2026 triennium.

The Company's new time of use (TOU) rate tariffs in Minnesota Docket E002/M-20-86: General TOU and TOU CPP were approved by the Minnesota Public Utilities Commission (MPUC) on February 1, 2023. The CPP Pilot program as a two-year pilot to compare performance and customer interest and behavior between the two new TOU rate tariffs. The CPP Pilot program design is meant to encourage business customers to voluntarily reduce their usage based on price signals.

CPP is a two-year pilot beginning in 2023. However, this Plan is including the pilot through 2026 because of additional anticipated analysis and program participation in 2025 and anticipated continuation of the offering in 2026. The Company may present the Department with a modification to the Triennial creating a permanent program depending on pilot outcomes and any related changes to tariffs that will be filed with the MPUC.

<u>Eligibility/Qualification for Participation</u>

Critical Peak Pricing programs attempt to strongly encourage – rather than require – customers to reduce their usage during periods when forecasts indicate the electric grid will experience high system loads as a percentage of available generation capacity. The nomenclature "critical peak" is a reference to such periods. The term "pricing" indicates the Company will charge a high price for usage during these critical periods that will encourage customers to reduce their usage, rather than requiring pre-determined load reductions. During all other hours, customers are assessed lower charges.

The CPP tariff will be available to commercial and industrial customers who have existing interval metering. The CPP offering will; provide an additional customer choice, provide customers an opportunity to reduce their bill by managing their energy usage, and contribute to reducing system costs by reducing system peak via the response price signals. This program provides an alternative for customers who cannot or choose not to participate in the Company's other demand response offerings.

Participating customers will receive day-ahead notification of when "critical peak" periods will occur. To better manage their energy usage during CPP events, participants will be provided with access to their electric load profile data in near real time. Access to this data will not only allow participants to monitor their performance during events, but also provide insight into their energy use throughout the year.

The TOU CPP tariff is available to customers who meet the following criteria:

- Have demand equal to or greater than 50 kW over the last 12 months;

- Have load factor equal to or greater than 30 percent over the last 12 months;
- Are not a participant in another demand response program (customers may, however, switch from another program to the CPP rate if it does not violate the terms and conditions of either program); and
- Have an interval meter or an advanced meter.

Qualifying Upgrades/Measures

The program has one measure designed to capture participation data for events from 12:00pm – 8pm. Price signals will be used to provide an incentive to reduce system costs, including reducing system peak, ultimately reducing costs for all customers.

Rebates

The CPP Pilot program design is meant to encourage business customers to voluntarily reduce their usage based on price signals. The CPP Pilot program would establish four standard time blocks with three different rates.

Table 57: CPP Pilot Standard Time Blocks

12 am – 5:59 am	Off Peak	$0.0204/kWh
6 am – 2:29 pm	Base	$0.0422/kWh
3 pm – 7:59 pm	Peak Period	$0.0797/kWh
8 pm – 11:59 pm	Base	$0.0422/kWh

In addition, on non-holiday weekdays, the Company could call CPP events during the 3pm – 7:59pm Peak Period time block when the electric grid is expected to experience high system loads as a percentage of available generation capacity. Energy cost during a CPP event would be $0.5588 / kWh. Participating customers would receive a one-day advance notification or a minimum of 12 hours' notice of CPP events. CPP events will be a minimum of one hour but could be up to four hours.
Unlike other DSM programs there is no monetary incentive associated with this program under ECO as it falls under a general rate. Rate details can be found in our Electric Rate Book in Section No. 5, beginning at 14th Revised Sheet No. 33.

Events

The Company maintains flexibility regarding its ability to call events during the pilot, but the following three situations are considered to trigger an event:

1. The forecasted total available generation to load ratio falls below 120 percent;
2. Day-ahead locational marginal prices exceeding $120 per MW during peak hours;
3. A weather forecast showing multiple days of 85+ degrees.[44]

[44] Xcel Energy Reply Comments, Docket No. E002/M-20-86, April 28,2023. Page 2-3.

Budget, Participation & Target Considerations
All administrative and implementation costs are included in the annual budget. Unlike other DSM programs there is no monetary incentive associated with this program as it falls under a general rate.

The main budget drivers include the following:

- Utility Administration: This category covers costs associated with day-to day operations of the program. Included in this category are expenses for the third-party implementer assisting with the product.
- Customer Service: This category reflects the cost to purchase and install monitoring equipment at each participant's facility. Most of these expenditures are allocated to new participants and realized by the product during each customer's first year of participation. Future expenditures will reflect costs of growing the product incrementally and any ongoing equipment maintenance for current participants.
- Advertising & Promotion: This category is for marketing campaigns and associated collateral.

Targets and participation were determined through Docket No. E002/M-20-86.

Stakeholder Involvement
The TOU Pilot has gone through an extensive stakeholder process as described in Minnesota Docket No. E002/M-20-86.

3. ELECTRIC RATE SAVINGS

Program Description
Electric Rate Savings was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Electric Rate Savings is designed to target large C&I customers and provide a rate discount in exchange for load shed during dispatched events. The Company is not proposing any changes to the program in this Plan.

The program requires the need for ongoing customer support and communication to ensure the product delivers reliable results year over year. Therefore, marketing is continuous process—not a single event—which includes initial discussion to recruit participants, then ongoing communication to ensure customers know and can continue to evaluate the benefits of the product to retain these customers, and ongoing communication/education about how the product works.

<u>Eligibility/Qualification for Participation</u>
The Electric Rate Savings program is offered to any business customer that can reduce their electric loads by at least 50 kW during control periods initiated by the Company or the Midcontinent Independent System Operator (MISO). In return for committing interruptible load and the ability to reduce their demand, customers receive a monthly discount on their demand charges and can potentially save up to 50 percent on their demand charges over the entire year. The program is promoted directly to customers through our Account Management and Energy Efficient Specialists.

Rebates

In return for reducing their loads, customers receive a monthly discount on their demand charges and can potentially save up to 50 percent on their demand charges over the entire year.

Unlike other DSM programs, there is no monetary incentive associated with Electric Rate Savings under ECO as it falls under a general rate. Rate details can be found in our Electric Rate Book in Section No. 5, beginning at 23rd Revised Sheet No. 40.

Events

Events typically occur on hot summer days with high humidity, but events can happen any time of year. There are three types of events where customers must shed load as a participant of the Electric Rate Savings program. First, an event could be called by MISO due to severe weather conditions and/or major outages as well as reliability issues concerning generation or the grid system. Second, an event can be called by Xcel Energy for the same reasons. Third, participants are requested to voluntarily take part in an annual real power test required by MISO to validate shed performance prior to each planning year. This real power test will typically occur during the summer months but can occur any time during the current planning year for participants. Note that the Real Power event would only be scheduled in the event there was not another MISO event during that summer.

Quality Assurance

Customers are required to allow the Company to inspect and approve load control installation and equipment that monitors actual control during an event. In the event MISO calls an emergency curtailment during the year, the Company uses the customer performance data to modify the registered controllable load. This data can also be collected through a MISO Real Power test event, should there be no emergency event called.

Program Changes

The Company is not proposing any changes to the Electric Rate Savings program.

Budget, Participation and Target Considerations

The program's participation, targets and budgets were estimated using historical program performance and emerging market influences. The budget for this program includes labor costs for associated services and vendor services for maintaining the customer notification system, with the remaining costs attributed to customer communications.

Every year a program information packet is sent to each participating customer, explaining any program changes, reminders of their responsibility as an interruptible customer on a control day, and historical information. Due to the possibility of year-round controls within MISO as well as a required real power test event each year, it is crucial that the customer notification system be maintained to ensure customers are contacted during an event.

The main components of the program budget include:

- Utility Administration: This category includes labor costs for internal sales, sales support and fulfillment, marketing administration and planning, equipment installation and maintenance, project planning and implementation.
- Customer Service: Administrative costs for third party implementer for the development and maintenance of the customer notification system.
- Advertising & Promotion: We have budgeted to conduct an annual customer mailing, test event mailings, customer town meetings, and program collateral materials.

Stakeholder Involvement
Minnesota business customers have played a major role in the on-going dynamics of this product. Additionally, key internal stakeholders such as the Account Management team have provided consistent feedback on product performance and customer satisfaction that continuously influences product design and operations. The Company continues to meet frequently and interact with these business customers and internal stakeholders to encourage their input.

4. PEAK PARTNER REWARDS

Program Description
Peak Partner Rewards was included in the Company's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Company is not proposing to make any changes to the program in this Plan.

The Peak Partner Rewards program is offered to any business customer that can reduce their electric loads during control periods by at least 25 kW between June and September. With Peak Partner Rewards, customers can receive credits on electric bills for agreeing to reduce electric usage during periods of peak energy demand. Customers will receive additional bill credits when they reduce their electric usage by their agreed upon amount or more during control periods. The Peak Partner Rewards program is promoted directly through Account Management and Energy Efficiency Specialists.

The program requires the need for ongoing customer support and communication to ensure the product delivers reliable results year over year. Therefore, marketing is continuous process—not a single event—which includes initial discussion to recruit participants, then ongoing communication to ensure customers know and can continue to evaluate the benefits of the product to retain these customers, and ongoing communication/education about how the product works.

<u>Eligibility/Qualification for Participation</u>
The Peak Partner Rewards product is a Demand Response product designed to provide business customers an incentive for agreeing to reduce their electrical loads when the electric grid experiences peak demand periods.

Participating customers will sign an agreement to reduce load at their facility during peak demand periods. This load reduction will be determined by the customer based on their ability to manage operations within their facility but must be at least 25 kW during summer months, June through September, most likely between the hours of 12 p.m. and 8 p.m. the product is focused on providing an option to customers with smaller loads who do not qualify for other larger interruptible programs.

All agreements for the program shall be for an initial one-year term, with automatic one-year renewal terms. If a participant does not meet their contractual obligation during a Peak Partner Rewards event, they will not receive payment of their performance incentive. If a participant fails to meet their contractual obligation during two PPR events within the same calendar year, they will be dropped from the product. Should a participant elect to leave the product during their initial one-year contract term, a one-time fee of $500 will be assessed to cover costs associated with decommissioning hardware supplied to the participant for this product.

Rebates

Customers will receive a monthly credit (reservation incentive) based on this committed load reduction. When peak period events are dispatched, customers will receive an additional incentive based on their total load reduction, measured in kWh, during the event (performance incentive). Customers who participate in the product will receive an additional benefit of having access to their electric load profile data in near real time. Access to this data will not only allow participants to insure they are complying with their contractual obligations, but also provide insight into their energy use throughout the year.

Customers will receive two distinct incentives for their participation:

Reservation Incentive: The customer will receive a credit on their monthly bill for the capacity they have agreed to supply within their contract. This incentive is designed to keep customers committed to the product over the long term., the Reservation Incentive credit rate is $2.00 per kW of load reduction committed. This rate shall be subject to change annually.

Performance Incentive: Participants will receive an additional incentive based on actual performance during events if they meet or exceed their committed load reduction. This is designed to help ensure customers meet their obligation during actual events. The incentive is based on a participant's total energy reduction during the event period. the Performance Incentive credit rate is $1.35 per kWh reduced during a PPR event. This rate shall be subject to change annually.

Events

Demand response event periods are triggered as a result of capacity, contingency and/or economic constraints upon the electrical system. Based on historical system peaking conditions, events are most likely to be called during the summer months of June through September, but events may occur in any month throughout the year.

Events will be no less than one hour in duration and no more than four hours in duration. Customers will be subject to no more than one event in any 24-hour period. No more than 15 events would be called for any one customer during a given year (60 total event hours annually). In addition to events called for a specific need, each customer may be subject to up to two test events each calendar year. The purpose of test events is to ensure participants are able to deliver the load reductions committed. Participants will receive the same incentive for test events as for actual events.

Should a capacity or contingency situation arise outside of the June – September months product participants may be notified and asked to curtail load on a "best effort" basis.
The customer will be under no obligation to reduce load, but those able to participate will be compensated for energy reductions at the tariffed incentive level.

<u>Quality Assurance</u>
The Company tests load availability at least one time per year to verify capacity.

<u>Program Changes</u>
The Company is not proposing any changes to the Peak Partner Rewards program.

Budget, Participation and Target Consideration
The program's participation, energy savings targets, and budget were developed based on the Company's ongoing experience with a Peak Partner Rewards program. The main budget drivers include the following:

- Participation Incentives: This category includes the Reservation and Performance Incentives paid to participating customers.
- Utility Administration: This category covers costs associated with day-to day operations of the program as well as consulting from Company staff to assist customers in identifying controllable loads and an appropriate load reduction value.
- Customer Service: This category reflects the cost to purchase and install monitoring equipment at each participant's facility. Expenditure is expected to be greatest in the early years of the program as the participant base is built. Future expenditures will reflect costs of growing the program incrementally and any ongoing equipment maintenance for current participants.
- Advertising & Promotion: Marketing and communication materials are created to communicate the features and benefits of the program. These marketing materials include a program guide summarizing key features and benefits and a Peak Partner Rewards website accessible on the Company's website to provide more extensive program information. Additionally, the Company will utilize its program management, account management, and Business Solutions Center teams to recruit customers. However, budget has been included for a third-party recruitment vendor to assist with these efforts if needed.

Stakeholder Involvement
Minnesota business customers have played a major role in the on-going dynamics of this product. Additionally, key internal stakeholders such as the Account Management team have provided consistent feedback on product performance and customer satisfaction that continuously influences product design and operations. The Company continues to meet frequently and interact with these business customers and internal stakeholders to encourage their input.

5. RESIDENTIAL DEMAND RESPONSE

Program Description
Residential Demand Response was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this program as described below in the 2024-2026 triennium. The Company offers four residential demand response products: AC Rewards, Behavioral Demand Response, Saver's Switch®, and Smart Water Heaters. All offerings are primarily promoted through online and TV advertising, email, direct mail, and the Company's customer care organization. Residential Demand Response products offer a mass market opportunity to assist in grid flexibility when dispatched. The Company is proposing to adjust the program in this Plan as described below.

Eligibility/Qualification for Participation

AC Rewards
AC Rewards, which launched in 2017, also seeks to reduce AC load during demand peaks. Participants can receive bill credit incentives for enrolling a qualifying thermostat, and receive annual bill credits, in exchange for allowing the Company to temporarily adjust the set point on the thermostat during control events. Only certain thermostats are eligible for enrollment; however, the Company continues to add further manufactures to the eligibility list. Customers can enroll through the Bring Your Own Thermostat (BYOT) channel or through the direct install channel, in which case customers receive a free smart thermostat and installation on behalf of Xcel Energy.

- Customers joining AC Rewards receive a $100 bill credit (BYOT only).
- The annual participation incentive is $25, paid out in October via a bill credit.

AC Reward participants retain the ability to override individual control events, except in the case of a systems emergency. The Company reserves the right to remove from the product participants that are deemed to be overriding too many events as defined in the customer agreement.

In the Triennial Plan for 2021-2023, the AC Rewards product also included Thermostat Optimization. The Thermostat Optimization product is designed to provide residential customers year-round savings using smart thermostat technology. The product incentivizes residential customers to purchase and install smart thermostats that have earned the ENERGY STAR® Connected Thermostat certification and are compatible with the Residential Demand Response product, resulting in year-round electric and natural gas savings. This product is available to combination electric and natural gas service customers, natural gas service residential customers who have central gas heating or electric service customers who have central air conditioning. For the 2024-2026 triennium, the Company will be moving these measures to the Residential HVAC program. These energy efficiency measures will live under an energy efficiency program, while AC Rewards will focus on demand response measures. This will allow for better alignment and cohesion for both the customer and for the Company to manage internally.

Behavioral Demand Response/Energy Action Days

Behavioral demand response is a mechanism to reach out to customers asking them to voluntarily reduce load during peak times. It does not require specific enrolled equipment for the customer, or control equipment for the Company. Small adjustment to the use of appliances during the event by large numbers of customers has the potential to have a sizeable impact on the grid. Participation is voluntary. There are no incentives or penalties for participation or non-participation.

Behavioral Demand Response was added to the Residential Demand Response via a modification request in the fourth quarter of 2022. The product being offered is called "Energy Action Days" to the customer. The product uses digital communications and behavioral science messaging to encourage residential customers to reduce energy consumption during peak events. To reduce energy use on these days, customers enrolled in the Behavioral Demand Response program receive communications designed to motivate them to be energy efficient during the specified event window.

All residential customers with adequate contact information that have not previously opted out of Xcel Energy communications are eligible and will be enrolled by default. Enrolled customers can opt-out at any time. The overarching strategy is to target a very small change in each participant, but to cast a large enough net that the number of participants, and thus the aggregate savings, are meaningful.

Saver's Switch

Saver's Switch is Xcel Energy's largest residential load management offering. The product gives participating customers bill discounts in exchange for allowing the Company to reduce their air conditioning and, if applicable, water heater usage on days of peak demand. During a control event (typically a hot, humid day or evening), air conditioners are cycled on and off to reduce load on the grid.

Enrolled electric water heater load is shed entirely for the duration of the control event, which can occur at any time of year. Previously heated water would be available for customer use, but water heaters would not heat new water until the end of the event. Unlike the AC program, water heaters can be turned off at any time of system need, not just during the traditional summer afternoon peaks.

Air conditioners and water heaters are controlled via a radio operated switch installed by a licensed electrician on or near the customer's central air conditioning unit. Participants in the air conditioning program have the option of enrolling a qualifying electric water heater; however, customers cannot enroll a water heater on its own. The program's main offerings include the following:

- Customer incentive of $40 per year for participation or $10 per month between June and September.
- Water heater participants receive $2 every billing month (annually) for $24 per year.

The Saver's Switch program has operated in Minnesota since 1990. Many of the switches installed early in the program are now beyond their estimated 15-year useful life. In this Plan, we intend to continue to proactively replace switches more than 15 years old.

Smart Water Heaters
The Smart Water Heating product was a new addition to the previous Triennial plan. Due to the global supply chain issues affecting the supplier of control modules, the product has yet to launch. Upon launch, the product will offer customers with qualifying heat pump water heaters bill savings in exchange for allowing the utility to adjust settings on the water heater.

Smart water heaters are new product to Residential Demand Response. Customers owning qualifying electric heat pump water heaters capable of receiving control signals from the utility are eligible for enrollment. Qualifying enrolled water heaters will be controlled in two ways:

- Morning peak demand load reduction – The temperature setpoint of enrolled water heaters would be increased slowly in the early morning hours with the heat pump mechanism. At the onset of the morning peak period, the water heater would be filled with hotter-than-normal water. Hot water from the water heater would be diluted with a mixing valve to deliver water at standard distribution temperatures. The water heater would rely less, if at all, on electric resistance operation to meet peak morning demand, conserving energy.
- Afternoon peak demand load reduction – In a peak load event, normally on hot summer afternoons, the enrolled water heaters would be turned off for the duration of the control event. Previously heated water would be available for customer use. However, water heaters would not heat new water until the end of the event. This part of the Smart Water Heaters product operates the same way as an electric water heater enrolled in Saver's Switch.

To participate, customers need to have a water heater equipped with a receiver for over the air operating instructions and a mixing valve as a safety measure for when water in the tank is heated beyond the original set point. Participants in the program will receive a one-time $75 enrollment bill credit and an annual $25 bill credit for their participation.

Rebates

Product	Incentive
AC Rewards	$100 enrollment incentive (BYOT only) $25 annual participation incentive
Energy Action Days	No Rebate Provided
Saver's Switch	Participating air conditioning customers receive a 15 percent discount off the electric energy charges on their bills between June and September. Water heater participants receive 2 percent off the same charges year-round.
Smart Water Heaters	$75 enrollment bill credit $25 annual participation incentive

Unlike other DSM programs there is no monetary incentive associated Saver's Switch under ECO as discounts are determined as part of our general rate case for the Control Rider. Rate details can be found in our Electric Rate Book in Section No. 5, beginning at 9h Revised Sheet No. 97.[45]

Xcel Energy will provide Trade Partner incentives to HVAC contractor for the Smart Water Heater product. This is for:

- Installing a mixing valve for qualifying heat pump water heaters ($150)
- Facilitating the customer enrollment in the product, following the water heater installation ($150)

Events
Events are called depending upon product as described above.

Quality Assurance
The program utilizes third-party consultants to conduct data collection for M&V to determine savings per switch for the Saver's Switch and AC Rewards for Business programs. At least one test event per year is conducted to verify load availability.

To be eligible for the Smart Water Heater enrolment, customers must use a participating contractor for the installation of a qualifying heat pump water heater. The HVAC contractor must also install a qualifying mixing valve. Participating installation companies have at least one installer who has taken and passed an online QI assessment. Xcel Energy also accepts, but does not require, North American Technician's Excellence certification to become a participating contractor. A list of participating contractors is available to customers from Xcel Energy.

[45] We further note that incentives will change as reflected in this filing per the Commission's June 1, 2022 hearing in Docket No. E002/GR-21-630.

Program Changes

Change	Rationale
Increase AC Rewards enrollment incentive from $75 to $100	Drive interest and enrollments into the product through a more alluring and competitive incentive for the customer. This change was communicated and approved through a Courtesy Notification on 03/07/2023.
Thermostat Optimization energy efficiency measures have been moved from AC Rewards to the Residential HVAC program	These EE measures will now live under an EE program while AC Rewards will focus on DR measures. This aims to simplify the product offering to the customer and allows for better alignment and cohesion to manage internally.

Budget, Participation and Target Consideration

The program's participation, energy savings targets, and budget were determined by reviewing historical achievement and industry changes.

Saver's Switch was based on equipment and installation costs for the number of switches to be installed and replaced. During this Plan, in addition to recruiting new participants, the Company intends to replace Saver's Switches older than 15 years. We also will conduct inspections of additional older switches to verify functionality and, if needed, replace with new hardware. The overall participant target is met with a combination of new installations and maintenance replacements.

The main budget drivers include the following:

- Utility Administration: This budget category covers the costs of internal labor for program planning and implementation, as well as the costs of external contract labor and software maintenance.
- Customer Service: The program uses a third-party to install the switches. Additionally, ther are third-party reviews for implementation for Energy Action Days.
- Advertising & Promotion: This includes awareness campaigns for Saver's Switch for Business and Commercial AC Control.
- Participant Incentives: Enrollment and ongoing incentives for the AC Rewards product
- Measurement & Verification: The program hires a third-party to conduct data collection for M&V to determine the savings per switch.

Stakeholder Involvement

The Company recognizes that the HVAC community are able to influence customer attitudes towards the product. The HVAC community may also have lingering misconceptions about Saver's Switch being harmful to customers' air conditioners.

EFFICIENT FUEL SWITCHING SEGMENT

Overview

"Fuel switching" refers to a utility program that provides incentives for customers to switch from one fuel type to another to serve the same end use. As an example, encouraging customers to replace a natural gas water heater with an electric water heater would be considered "fuel switching". Historically, utilities were prohibited by Department policies from including fuel-switching incentives in their energy efficiency portfolios, even in cases where the switch resulted in efficiency, cost savings or reduced emissions. With the passage of the ECO Act, however, fuel switching may be allowed under certain conditions provided certain eligibility criteria are met. Measures or programs that meet these criteria, following technical guidance issued by the Department, are referred to as "efficient fuel switching" (EFS).

As Minnesota's only investor-owned combination gas and electric utility, Xcel Energy is uniquely situated with respect to EFS. The Company believes that EFS measures will have a key role in achieving its aggressive emission-reduction goals for both its electric and natural gas businesses. At the same time, the market for many EFS measures is nascent and their long-term impact on both the gas and electric systems is not yet certain.

Minn. Stat. 216B.241 creates some key controls on the implementation of EFS, particularly in the short term. Specifically, utility spending on EFS is limited over the course of the 2024-2026 Triennium; the technical requirements for measures to qualify as EFS are deliberately rigorous; and the statute makes clear distinctions between EFS and energy conservation. Related to this last point, electric and natural gas utilities are treated slightly differently regarding energy savings that result from EFS: Electric utilities may not claim savings resulting from EFS towards their energy savings targets nor include their impact in calculation of shareholder incentives. Natural gas utilities, however, may claim gas savings from measures that seek to move customers from gas to electricity, and may include such savings in the calculation of performance incentives – provided in both cases that the gas utility achieves energy savings of at least one percent of sales through non-EFS measures.[46]

As a result of these requirements, the Company has carefully considered which measures and programs to offer, the appropriate source of funding for each, and the Company's experience with early electrification programs in our Colorado service territory. The result is the incorporation of over 20 proposed EFS measures, many of them integrated as additional measures within existing energy efficiency programs. There are also two dedicated EFS programs, described in more detail below, aimed at market transformation efforts to support broader adoption of EFS and at an equipment segment for which the Company has not previously offered incentives: outdoor equipment. The

[46] Certain additional criteria also apply to EFS. A detailed demonstration of how the Company's proposed EFS measures and programs comply with the established criteria is provided in the Appendix under "EFS Screening Criteria". Here, the Company highlights only these two key provisions of ECO – spending caps and treatment of savings – to discuss how they have informed its incorporation of EFS into the portfolio.

Company's proposed policies (for both EFS measures broadly and the two dedicated programs) are also detailed below, including how the Company proposes to allocate different types of spending between gas and electric budgets. This is particularly important given both the spending caps and the fact that many EFS technologies include both fuel-switching and traditional energy-efficiency aspects.[47]

While roughly 80 percent of the Company's natural gas customers also receive their electricity from Xcel Energy, about seventy percent of Xcel Energy electric customers are not Xcel Energy natural gas customers. Many – likely the majority – of these receive natural gas service from CenterPoint Energy, while the remainder either have another natural gas utility or no natural gas service at all (relying on either delivered fuels or electric heating). A critical piece of successfully moving customers to adopt EFS measures will be ensuring that incentives are consistent across a variety of utility service territories – including across combinations of utilities.[48] Accordingly, the Company has sought to collaborate with CenterPoint Energy with the goal of establishing similar technical assumptions, program policies, and incentive levels. In many cases, the two utilities were able to reach agreement on very similar, if not identical, approaches. Both utilities also recognize the value of continuing to collaborate in the implementation of programs for our shared customers.

However, the two companies could not reach agreement on the appropriate level of incentive for certain EFS measures, including air-source heat pumps (ASHP). Based on experience in Colorado since 2021, the Company believes that the rebate necessary to move the market for these measures is higher than the amount proposed by CenterPoint Energy. The incentive amounts proposed in this Plan for ASHP and other measures – and the cost allocations described for those incentives – are the ones that the Company intends to offer to its combination customers who receive both natural gas and electricity from Xcel Energy. CenterPoint Energy, and possibly other natural gas utilities, may offer their gas customers a smaller gas EFS rebate than the amount proposed here. To ensure that all Xcel Energy customers – natural gas, electric, or combination – are able to receive the same rebate amount for the same measure, the Company proposes a "Geographic Consistency" policy. Through this policy, the Company will use electric EFS funding to make up the difference between the incentive paid by a customer's gas utility for a given EFS measure and the amount the customer would have received if they received natural gas service from Xcel Energy. No savings will be claimed by Xcel Energy for these rebates, consistent with the statutory prohibition on electric utilities claiming savings for EFS. Further detail on the implementation of this policy is presented below, under "Overall Policies" for the EFS segment.
The Company also recognizes that many EFS measures – space heating measures in particular – bring both up-front and operating costs for customers. While overall energy use (and associated emissions)

[47] For example, installation of an air-source heat pump creates an opportunity for both an EFS rebate – to encourage switching away from gas for heating – and an electric energy-efficiency rebate to reflect the value of the more-efficient cooling of the heat pump compared to a traditional air conditioner.
[48] The Deputy Commissioner has also determined that to the extent possible, utilities shall work together to coordinate offerings that overlap service territories. See, *Decision, In the Matter of Technical Guidance for the Inclusion of Efficient Fuel-Switching, Load Management, and Pre-Weatherization Measures in CIP*, Docket No. E,G999/CIP-21-837, March 15, 2022, Appendix A. (Technical Guidance).

may decrease, the difference in per-unit-of-energy costs between natural gas and electricity has the potential to result in gas bill savings that are significantly diminished or even eclipsed by increases in electricity bills.[49] This argues for two important considerations related to EFS. First, it is important to ensure that customers (as well as trade allies) are given clear information about the systems they are considering installing to make sure they meet the customer's needs and are both installed and operated correctly. This is particularly important in the context of income-qualified programs. The Company proposes to make EFS measures available through its income-qualified offerings, and the Company and its implementers will carefully consider each installation to ensure that the equipment installed is appropriate and likely to result in cost savings for the customer.

Second, the Company continues to consider how its existing electric rates may need to change to ensure that the benefit that EFS measures bring to the electric grid is reflected in their value proposition to customers. Because those potential rate changes are not certain at this time, the evaluation of residential EFS measures for space heating conducted for this filing is based simply on an assumption that the customer installing the measure would move from a standard residential rate to the currently approved residential electric space heating rate.

In considering how to promote and incentivize the measures included in the EFS component of this Plan, the Company needed to consider (among other things) which sorts of costs would be allocated to electric EFS versus gas EFS. This is important both for ensuring the appropriate customers are paying for a given program or measure, and for tracking spending against the statutory spending caps for EFS. The Company proposes to fund direct customer incentives for measures that would shift consumption away from natural gas provided by Xcel Energy using gas EFS dollars. Other types of spending, such as contractor training, incentives for electric panel upgrades, and incentives that involve switching away from a fuel that Xcel Energy does not deliver (including the "Geographic Consistency" rebates described above), would be funded with electric EFS spending.

As noted above, the Company has offered its Colorado customers incentives for fuel-switching (or "beneficial electrification," as it is referred to in that state) since 2021. In that time, customer participation and interest has grown substantially, albeit from a modest initial level. The Company is excited to bring similar offerings – and some entirely new ones – to benefit its Minnesota customers and believes that its experience in Colorado will provide valuable insights as EFS grows as a market segment.

Measures and Targets

In the 2024-2026 ECO Triennial, the Company proposes new fuel-switching measures and two dedicated EFS programs. Table 58 summarizes the proposed EFS measures along with noting which program(s) and segment(s) will offer the measure. Please see the Appendix for further details on cost-effectiveness and EFS screening.

[49] For any given customer, the impact of fuel switching on operating costs will depend on a variety of factors including weather, usage habits, natural gas commodity costs, overall building efficiency, and possibly others.

Table 58: 2024-2026 Proposed EFS Measures

Measure	Program(s)	Segment
Custom Efficient Fuel Switching	Custom Efficiency, Business Energy Assessments, Process & Commercial Efficiency	Business
EDA for Efficient Fuel Switching, gas to electric	Business New Construction	Business
EDA for Low Income efficient fuel switching projects, gas to electric	Business New Construction	Business
EEB for Efficient Fuel Switching, Gas to Electric	Business New Construction	Business
EEB for Low Income efficient fuel switching projects, gas to electric	Business New Construction	Business
Electric Commercial Lawn Mower	Outdoor Equipment	EFS
Lithium-Ion battery forklift	Compressed Air	Business
Centrally ducted dual fuel ASHP	Residential Heating and Cooling, HESP, LI Multi-family, Whole Home Efficiency	Residential/Income Qualified
Centrally ducted dual fuel cold climate ASHP	Residential Heating and Cooling, HESP, LI Multi-family, Whole Home Efficiency	Residential/Income Qualified
Non-ducted cold climate Mini-Split Heat Pump w/ Gas Furnace backup	Residential Heating and Cooling, HESP, LI Multi-family, Whole Home Efficiency	Residential/Income Qualified
Non-ducted dual fuel MSHP w/ gas furnace backup	Residential Heating and Cooling, HESP, LI Multi-family, Whole Home Efficiency	Residential/Income Qualified
Dual Fuel RTUs < 5.4 tons	HVAC+R	Business
Dual Fuel RTUs 5.4 - 11.3 tons	HVAC+R	Business
Dual Fuel RTUs 11.4 - 19.9 tons	HVAC+R	Business
Dual Fuel RTUs 20 - 63.3 tons	HVAC+R	Business
Dual Fuel RTUs >= 63.3 tons	HVAC+R	Business
Commercial Size Heat Pump Water Heater EFS	HVAC+R	Business
Residential Style Heat Pump Water Heater EFS	HVAC+R	Business
Push Lawn Mower - EFS between electric and gasoline fuel	Outdoor Equipment	EFS
Riding Lawn Mower - EFS between electric and gasoline fuel	Outdoor Equipment	EFS
Heating Portion - GSHP replacing Gas Furnace & AC	Residential Heating and Cooling, Whole Home Efficiency	Residential

Measure	Program(s)	Segment
Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat	Residential Heating and Cooling, Whole Home Efficiency	Residential
Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat	Residential Heating and Cooling, Whole Home Efficiency	Residential
Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	Residential Heating and Cooling, Whole Home Efficiency	Residential
Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	Residential Heating and Cooling, Whole Home Efficiency	Residential

Table 59a: 2024 EFS Segment Targets

	Electric		Natural Gas		
2024	**Participants**	**Budget**	**Participants**	**Budget**	**Claimable Dth**
Efficient Fuel Switching Training & Support	550	$ 1,700,000	-	-	-
Outdoor Equipment	550	$186,250	-	-	-
Total EFS Segment	**1,100**	**$1,886,250**	**-**	**-**	**-**
Residential EFS Total	726	$186,469	719	$672,657	9,754
Business EFS Total	66	$90,622	63	$78,634	1,912
Income-Qualified EFS Total	5	-	3	$148,064	16
Total EFS	**1,897**	**$2,686,633**	**785**	**$1,029,405**	**11,682**

Table 59b: 2025 EFS Segment Targets

	Electric		Natural Gas		
2025	**Participants**	**Budget**	**Participants**	**Budget**	**Claimable Dth**
Efficient Fuel Switching Training & Support	650	1,930,000	-	-	-
Outdoor Equipment	550	$161,250	-	-	-
Total EFS Segment	**1,200**	**$2,091,250**	**-**	**-**	**-**
Residential EFS Total	1,458	$376,695	1,422	$1,331,370	19,557
Business EFS Total	107	$108,033	102	$182,197	4,980
Income-Qualified EFS Total	8	-	4	$141,425	(8)
Total EFS	**2,773**	**$3,108,046**	**1,551**	**$1,813,320**	**24,529**

Table 59c: 2026 EFS Segment Targets

	Electric		Natural Gas		
2026	**Participants**	**Budget**	**Participants**	**Budget**	**Claimable Dth**
Efficient Fuel Switching Training & Support	750	$2,160,000	-	-	-
Outdoor Equipment	550	$151,250	-	-	-
Total EFS Segment	**1,300**	**$2,311,250**	**-**	**-**	**-**
Residential EFS Total	2,897	$754,043	2,878	$2,709,947	38,969
Business EFS Total	133	$128,341	128	$288,460	7,254
Income-Qualified EFS Total	10	-	6	$257,158	26
Total EFS	**4,340**	**$3,734,666**	**3,012**	**$3,389,110**	**46,249**

The participation, budget, and savings figures presented in the tables 59a -59c reflect the combination of 1) the targets and budgets of the two dedicated EFS programs; and 2) the portion of the target and budgets from "non-dedicated" programs that is allocated to supporting EFS measures. These are called out more specifically in the Executive Summaries. For further information on savings, the Company has provided Tables 34-45 in our Compliance Section.

Market Analysis

The Company's market insights regarding EFS are limited due to the relatively recent policy change permitting EFS in ECO plans. The Company did conduct an evaluation of the water heating rebates measures within Residential HVAC in 2018 that included asking both electric and natural gas customers about electric water heaters (including heat pump water heater), primarily related to demand response measures. However, the Company also believes the findings in that evaluation are informative of customers' attitudes toward EFS for water heating as well. In 2023, the Company is evaluating the residential heating measures within the Residential HVAC program, and we anticipate leveraging that opportunity to understand the market awareness, customer preference, and barriers to adoption for efficient heating equipment including heat pumps for space heating. Though the results are not available to inform this filing, they will help guide future marketing efforts as well as any modifications or future plan filings.

Despite limited empirical market research in Minnesota, the Company believes its experience with similar programs in Colorado will be useful and relevant. Among the key learnings from Colorado are the importance of substantial up-front rebates for EFS measures; this is among the factors leading to the Company's proposed strategy. The Company's Colorado experience also underscores the importance of well-informed installers and trade allies; this is reflected in the significant investment in the Efficient Fuel-Switching Training & Support program.

The Company believes – again, supported by experience in Colorado – that participation in EFS is likely to be low initially but could grow very rapidly as customer and contractor education efforts take hold. In addition, it is worth noting the expected availability of significant additional incentives for many EFS measures during the 2024-2026 ECO Triennial period. These include rebates from both state funding (through HF 2310) and federal programs under the Inflation Reduction Act of 2022. These additional incentives have not been included in the cost-effectiveness analyses for EFS measures since eligibility requirements and timing of incentive availability may not align. However, the combined effect of these incentives has the potential to significantly increase customer participation in the Company's EFS offerings. The Company will closely monitor the market to ensure that increases in participation do not risk exceeding the statutory spending cap for EFS and may adjust rebate amounts or take other measures as necessary.

Marketing/Advertising/Promotion
Most marketing and promotion of EFS will occur through the Efficient Fuel Switching Training & Support program, though some activity may also occur through individual programs to communicate the availability of EFS incentives. Given the importance of trade allies in the customer's decision to invest in these measures, the Company's primary marketing strategy in these early years of EFS implementation will be ensuring that trade allies are well-educated and knowledgeable about the capabilities and installation best-practices of equipment as well as the various incentives available to customers.

Overall Policies

Measure Eligibility
Measures are required to meet certain criteria to be considered "efficient fuel-switching" under Minnesota statute. Each of the measures proposed for inclusion meets these criteria; analysis demonstrating eligibility following the Department's established technical guidance can be found in the Appendix.

Funding Allocation
The following information is intended to provide transparency about how the Company plans to allocate various types of spending between its natural gas EFS and electric EFS budgets. The approach below is intended to achieve alignment between the groups of customers paying for programs and the programs for which they are eligible. In addition, it will facilitate monitoring to ensure that statutory spending limits are not exceeded.

Natural gas EFS spending will be focused on providing incentives to Xcel Energy natural gas customers to adopt measures that move from natural gas to electricity. Most of these are expected to be space and water heating measures in the residential sector, along with some business participation. Because of the limited amount of gas EFS spending allowed under the statutory spending caps, the Company plans to focus this spending on providing rebates and fund most if not all advertising and promotional activities through electric EFS spending.

Electric EFS dollars will be used for the following purposes:

- *Education and Awareness*, including installer training as well as general consumer education about the benefits of and best applications for heat pump and other non-combustion technologies;
- *Make-Ready Support*, such as incentives to reduce the cost of electric upgrades necessary to support new appliances; and
- *Non-Gas End Uses*, encompassing electrification of measures not currently fueled by natural gas such as propane furnaces or gasoline-powered yard equipment.

Electric EFS dollars will also be used to support the "Geographic Consistency" policy to ensure that Xcel Energy electric customers who receive natural gas service from a different utility, or who use delivered fuels, can receive the same rebate as Xcel Energy's combination gas and electric customers. The use of electric EFS dollars for this purpose is justified by two primary factors: First, since these customers have not contributed to the gas EFS budget, it would not be reasonable to allocate costs for these incentives to the Company's natural gas customers. Second, the measures promoted are expected to bring benefit to the electric grid in the form of additional load, creating downward pressure on electric rates for all customers. By using electric EFS dollars to support the measures' installation, the Company can share a portion of that benefit back with the participating customer.

New Construction

For new construction, the funding source for EFS incentives will be dependent on where the new building is located. New construction that is served by Xcel Energy natural gas – or, in the case of all-electric buildings, that would have been an Xcel Energy natural gas customer – will be funded with gas EFS dollars and the Company will claim gas savings. New construction that is located outside Xcel Energy's natural gas service area (but inside the Company's electric service territory) may be eligible to receive incentives funded by electric EFS, if the customer's gas utility (or the company that would have been the customer's gas utility, for all-electric buildings) offers either no incentive at all or a lower incentive than the customer would have received had they been an Xcel Energy gas customer (or potential customer). No energy savings associated with EFS will be claimed for projects receiving electric EFS funding, though electric energy efficiency and demand response incentives and savings will remain available, and the Company will claim the associated savings. The Company notes that its new construction programs do not include a proposed budget for electric EFS spending. The Company's expectation is that most EFS participation from new construction will be "partial electrification" projects, eligible for gas EFS funding.

"Geographic Consistency"

As noted above, the "Geographic Consistency" policy is intended to support consistency of incentives for customers considering EFS measures that would lead to increased use of electricity provided by Xcel Energy, regardless of the provider of the fuel the customer is switching away from. In addition to any electric energy efficiency rebate, the Company will compare the incentive (if any) provided by the incumbent fuel provider to the incentive offered for the same measure through Xcel Energy's natural gas EFS programming. If the incumbent's incentive is lower than Xcel Energy's, the Company will use electric EFS dollars to make up the difference, increasing the total rebate paid to the customer.

The Company is proposing this policy based on its interest in ensuring that EFS measures broadly receive a level of incentive that is adequate to move the market. Experience in Colorado suggests that at this early stage, many EFS measures require a higher level of incentive than is typical for more traditional measures. If adoption of EFS is faster than anticipated, the Company may revisit this policy to consider whether it is still necessary. The Company will also monitor closely to ensure compliance with the EFS spending cap, and may reduce or eliminate its incentives under the policy if necessary to avoid exceeding the cap.

No energy savings will be claimed in association with this spending (though electric savings associated with any energy efficiency rebate would be claimed as normal). The Company notes, however, that the Department's Efficient Fuel-Switching Cost-Effectiveness Technical Guidance appears to suggest that in cases where a customer receives incentives from both a non-Xcel gas utility and from Xcel Energy under the Geographic Consistency policy, there should be an "apportionment" of savings between the utilities:

> In cases where multiple utilities invest in joint programs in overlapping service territories, it is expected that the utilities will report impacts and incorporate them into cost-effectiveness analyses based on their respective financial contributions to programs and projects. For example, if a gas and an electric utility jointly offer an EFS program that provides incentives for air source heat pumps and the gas utility contributes 30 percent to the overall program's costs, the gas utility would claim 30 percent of savings and incorporate 30 percent of program costs and savings into its cost-effectiveness evaluations. "Savings" would be based on the program's BTU savings, with apportionment to the respective utilities based on their fuels.[50]

The Company is unclear how to implement this guidance in practice and is uncertain how to reconcile it with the statutory language preventing electric utilities from claiming savings resulting from EFS. The Company respectfully requests additional direction from the Deputy Commissioner on the interpretation and implementation of the language quoted above.

Energy Savings

Savings associated with electric and natural gas EFS will be claimed as consistent with statute and guidance. Natural gas savings claimed will be the net savings after consideration of the increased electric energy consumption associated with the measure. Natural gas EFS savings is included in the gas savings targets for each program that includes gas EFS measures.

[50] 2023 Cost-Effectiveness Decision, p. 225.

Involvement with Interested Individuals and Entities

The Company has worked with several stakeholders during the development of the EFS portfolio; specifically, we have worked with CenterPoint Energy to identify savings opportunities and rebate development, Center for Energy and Environment regarding heat pump rebates and the City of Minneapolis regarding technologies of interest. Although we were not able to reach complete alignment with all of these parties on all questions, we appreciate the collaborative spirit of the discussions and look forward to working with these and other stakeholders as we begin implementing EFS programming.

1. EFFICIENT FUEL SWITCHING TRAINING & SUPPORT

Program Description

The Efficient Fuel Switching Training and Support program is an indirect-impact offering which provides funding to support growth in the market for EFS measures and address potential barriers to adoption. The Company expects the activities under this program to be a primary means of motivating and educating both customers and trade allies. In addition, we propose to use the program to support customers in implementing necessary home upgrades to safely install EFS measures. The primary areas of spending under the program are:

- *Advertising and Promotion* – includes funding for the promotion and advertising of electrification efforts; this could be in combination with other utilities or working with additional parties as a result of state or federal funding.
- *Trade Partner Training* – we will work with contractors and partnering with agencies to help identify best practices, ensure proper installation, and develop strategies to engage customers in these new opportunities.
- *Panel upgrades* – one potential barrier to implementation of new electric equipment is panel upgrades in older homes. The Company proposes to include funds for these types of promotional incentives to help lower these barriers to participation.

<u>Program Changes</u>

Efficient Fuel Switching Training and Support is a new program in the newly created EFS segment.

Budget, Participation & Target Considerations

This budget allows for the on-going support of electrification to increase educational opportunities, training and reduce additional barriers to implementation. The main budget drivers include utility administration which includes internal labor and advertising and promotion.

The Company plans to offer an incentive for customers performing circuit panel upgrades associated with the installation of a new EFS measure. The Company may introduce additional rebates if there appears to be a need for further support to address other barriers.

Stakeholder Involvement
As the program grows, the Company looks forward for additional feedback from our stakeholders to improve our process as we endeavor to provide new options to customers.

2. OUTDOOR EQUIPMENT PROGRAM

Program Description
The Outdoor Equipment program is a new program proposed for the 2024-2026 Triennial. The Outdoor Equipment program is designed to provide alternatives to end-uses traditionally met with gasoline motors. Additionally, the Company will provide messaging to rebate recipients encouraging off-peak charging to help improve system load factor and reduce customer bills. The Company proposes this program to creatively explore options to support efficient fuel-switching opportunities.

Eligibility/Qualification for Participation
The program is available to customers who have electric or combination service by the Company. These rebates are provided from our electric budget so natural gas only customers are ineligible. Only new equipment is eligible for a rebate. Rebates must be submitted by September 30 of the year following the invoice date.

Qualifying Upgrades/Measures
Three types of measures are available as part of the Outdoor Equipment program.

- *Residential Lawn Mowers:* Customer must purchase a new electric powered riding or push lawn mower to replace an equivalent gasoline powered mower.
- *Commercial Lawn Mower:* Customer must purchase a new commercial grade electric powered riding mower to replace an equivalent commercial grade gasoline powered mower.

The most recent version of Minnesota's Technical Reference Manual (TRM) for Energy Conservation Improvement Programs (version 4.0, January 31, 2023) includes measure definitions for both residential and commercial lawnmowers as fuel-switching measures. The Company has used the TRM measure definitions for this equipment.

Rebates
Rebates will be paid according to upgrade type and cost in the schedule below:

Table 60: Proposed Outdoor Equipment Rebates

Measure	Rebate
Residential Electric Push Lawn Mower	$75
Residential Electric Riding Lawn Mower	$200
Commercial Electric Push Lawn Mower	$300
Commercial Electric Riding Lawn Mower	$800

Program Changes
The Company is proposing to add Outdoor Equipment as a new program in the 2024-2026 triennium.

Budget, Participation & Target Considerations
The program budget was developed based on expected participation levels as well as similar programs in other jurisdictions.

The main budget drivers include the following:
- Utility Administration: This category funds administration labor, materials, postage and rebate processing labor and measure and verification.
- Advertising & Promotion: The program will utilize low-cost promotions including bill onserts, email marketing, direct mail marketing, and social media.
- Participant Incentives: These funds customer rebates for qualifying products.

Stakeholder Involvement
As the program grows, the Company looks forward to additional feedback from our stakeholders to improve the process and rebate levels. In particular, the Company anticipates developing relationships with bicycle retailers and deepening existing relationships with hardware stores and other vendors of lawn equipment, which may lead to the addition of further measures in the program.

INDIRECT PRODUCTS AND SERVICES SEGMENT

Overview
The Indirect Products and Services Segment includes other CIP projects that do not directly result in energy savings but do support the overall success of the portfolio. These projects support innovation and improvements through research and development, provide software and hardware tools as well as training to increase internal efficiencies, increases awareness of programs through general marketing and promotions and supports regulatory compliance and planning required by CIP.

Programs
This Segment includes Advertising & Promotion, Application Development and Maintenance, CIP Training, Community Energy Reporting, Energy Benchmarking, Efficient Technology Accelerator, Electric Utility Infrastructure, Partners in Energy, and Planning & Regulatory Affairs.

Targets

Table 61: 2024-2026 Indirect Segment Budgets

	Electric		Natural Gas	
Plan Year	**Participation**	**Budget**	**Participation**	**Budget**
2024	697,494	$ 13,342,290	347,474	$ 3,205,173
2025	698,754	$ 15,025,429	347,944	$ 3,547,562
2026	699,864	$ 15,915,893	348,259	$ 3,738,343

Policies
As the Indirect Products and Services Segment program are focused on providing support to our programs and do not have specific policies related to customer participation.

Involvement with Interested Individuals and Entities
Most community engagement and involvement is conducted through our direct impact programs. The Regulatory Affairs team regularly engages with various interested individuals and entities and often through processes managed by the Minnesota Department of Commerce.

1. ADVERTISING & PROMOTION

Program Description
Advertising & Promotion provides funding to drive awareness of electric and gas energy solutions options with broad appeal among all types of customers. The advertising and promotion strategy objectives are to ensure that the Company's energy solutions are top-of mind during customer energy-related purchasing decisions, and to encourage energy saving action for their homes and businesses. In

this Plan, the Company will expand our customer reach by developing a targeted strategy to Black, Indigenous and People of Color (BIPOC) organizations and businesses.

Program Details

Various media types help us reach customers at different stages of the efficiency decision-making process. Through these various media channels, the Company strives to build awareness via broadcast media, develop targeted strategies to BIPOC organizations and businesses through broadcasting and other networks to increase access to large business rebates and incentives, capture attention through print and digital media, sponsorship, and events, and create engagement via interactive media and direct marketing.

Through our advertising and promotion efforts, we support our portfolio by:

- Driving web visits for program information and educational content;
- Encouraging engagement with our digital media and direct-marketing efforts;
- Maintaining awareness, likeability and favorable opinion of our offerings;
- Creating an emotional connection by appealing to individual needs and barriers;
- Sponsoring cost-effective events and outreach; and
- Maintaining traditional outreach via marketing tactics that deliver the most cost-effective impact.

Program Changes

The Company will be expanding our advertising strategic tactics beyond the traditional target audience to BIPOC communities, associations, groups and demographics.

Budget, Participation & Target Considerations

The budget was determined by using cost estimates from past projects, vendor proposals, current customer counts, current conservation advertising budgets, known costs for creating new campaigns, and other general industry pricing knowledge. As the Company continues to optimize the marketing mix, the budget gives us the flexibility to choose the tactics and tools necessary to effectively promote customer solutions in balance with increasing costs.

The main budget drivers include the following:

- Utility Administration: This category covers the internal labor necessary for advertising and promotion marketing campaigns.
- Advertising & Promotion: These funds are spent directly on the Company's advertising and promotional strategies to support individual programs and cross-marketing among programs.

The budget is allocated internally between residential and business segments to support their respective program objectives.

2. APPLICATION DEVELOPMENT & MAINTENANCE

Program Description

The Application Development & Maintenance (ADM) provides funding to support the Company's extensive data and process management tools for the marketing and delivery of energy efficiency programs and reporting on program achievements. In this Plan, we intend to perform enhancements to our current systems and system updates to maintain the quality of our reporting. These changes are necessary to introduce additional reporting flexibility and efficiencies, improve back-office processes and improve process management by injecting efficiencies into current operations.

<u>Program Details</u>

ADM is an internal Information Technology (IT) program to support the Company's software and maintenance data and reporting capabilities and is not marketed externally or offers rebates to customers. The Company's ADM work is performed by a combination of in-house software developers and system administrators, and by contracted external resources. The budgets for this work represent software purchases and the labor required to configure the software to integrate with existing systems and processes.

<u>Program Changes</u>

The Company is not proposing any changes to the ADM program.

Budget, Participation & Target Considerations

The budgets were developed using historical trends for existing system maintenance work and by identifying project-specific funds for new system development work for the Company to ensure that as technology advances, the costs incurred also increase. This budget allows for the on-going exploration of technology solutions for identifying electric fuel switching opportunities in and reflects increases to ensure our ability to keep our existing systems and processes at optimum performance.

The main budget drivers include utility administration which includes internal labor, software licenses, and application development and maintenance are covered by this budget category.

3. CIP TRAINING

Program Description

The CIP Training program was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The CIP Training program is designed to allow the Company's staff the opportunity for continued education and training in energy efficiency. This training is necessary to enhance the Company's knowledge base for current staff and update new staff on energy efficiency. Continued training enables the Company to stay current in the energy efficiency industry in addition to keeping staff informed about future technologies, industry trends and industry behavioral shifts.

Program Details

The CIP Training program is available to internal employees within marketing, engineering, regulatory, operations and sales interested in opportunities for continued education and training in energy efficiency. These educational opportunities include learning more about electric and natural gas energy-efficient equipment and new advances in technology and changes in the energy efficiency industry. The Company's staff may attend internal or external training sessions, conferences and seminars on various technologies, industry best practices, and energy efficiency topics.

Program Changes

The Company is not proposing any additional changes to the CIP Training program.

Budget, Participation & Target Considerations

The program budget was developed by evaluating historical spending trends from the past three years for staff to attend both internal and external conferences and seminars on energy efficiency. Expenses covered under this budget include internal and external labor, materials, and travel expenses for the Company's staff to attend internal and external conferences, seminars, and training sessions.

4. COMMUNITY ENERGY REPORTING

Program Description

The Community Energy Reporting is a new program in the Company's 2024-2026 filing. Previously, this program existed under the Energy Benchmarking program. As a result of increased participation, the Company has broken out this funding to account for specific costs for Community Energy Reporting.

Program Details

The focus of the Community Energy Reporting program is to provide aggregated data at the city, county, and state levels in the form of Community Energy Reports, which are published on the Company's website each year by June 1. These Community Energy Reports contain a variety of useful data tables such as: energy consumption, utility systems characteristics, renewable program participation, demand management program participation, energy efficiency program participation and electric vehicle program participation. These reports are automatically produced for cities with populations larger than 50,000 residents and counties with populations larger than 100,000 residents. New cities and counties can be added to the annual production upon request,[51] and the Company

[51] Any city or county wanting to be included may request to be added to the annual list by sending an email to communityreporting@xcelenergy.com.

anticipates a significant growth in this program over the next several years. There are blank key processes that are followed in the production of the annual Community Energy Reports:

Boundary Mapping
The Company has received requests in the past from several cities to use a specially curated boundary map for running the respective city/county community energy report. Each year during annual development, the Community Energy Reporting Team reaches out to this running list of communities and asks for an updated shapefile of the community boundary or for confirmation that the previous shapefile is still current. All custom shapefiles are mapped by the Company's Geospatial Team and a premise list is generated based off the customized boundary. Any community may request to be added to this list and provide a customized shapefile. All boundary mapping done for communities without a customized boundary will have their premises gathered based off jurisdictional tax code.

Data Privacy Rule Implementation
The community energy reporting system is designed to implement thresholds based on both the premise count and individual premise usage percentage. Currently there must be at least four premises or more aggregated with no individual premise using more than 50 percent of the aggregated total consumption. Any violators will be removed from the data set and the number of failures will be noted next to its respective data table.

Data Quality & Accuracy Checks
A key process in the final stages of community energy report development is data quality and accuracy checks. Prior to any publication of community energy reports, a group of city and county community energy reports will be analyzed for data accuracy and consistency from the previous two years.

Additionally, the Company processes community-level ad hoc requests that may fall outside of the traditional report structure that is published annually. Each request is vetted, and all data provided in these ad hoc requests are subject to the Company's aggregated data privacy standards.

Program Changes
Community Energy Reporting is a new program in this Plan.

Budget, Participation & Target Considerations
The Community Energy Reporting program's participation and budgets were determined by current participation rates of cities and counties, anticipated increases in participation and the labor associated with creating community energy reports.

The main budget drivers include administration for labor for building set-up and customer service as well as ongoing software upgrades and maintenance.

Stakeholder Involvement
The Community Energy Reporting team engages community sustainability coordinators and third-party service providers across the Company's service territories regarding the development and output of the community energy reports and ad hoc community-level data requests.

5. ELECTRIC UTILITY INFRASTRUCTURE

Program Description
The Minnesota Next Generation Energy Act of 2007 ("Act") created the opportunity for an electric utility to claim savings from projects that improve the efficiency of the utility's infrastructure or system towards its electric savings targets, provided that the utility files a plan to achieve savings of at least one percent of retail sales through direct energy conservation programs. The Act also authorized a new rate schedule for recovery of electric utility infrastructure project costs but does not require that a utility create a specific rate schedule in order to claim the related energy savings.

<u>Program Details</u>
Electric utility infrastructure ("EUI") projects are defined in Minn. Stat. § 216B.1636 as electric utility-owned projects that:

1) Replace or modify existing electric utility infrastructure, including utility-owned buildings, if the replacement or modification is shown to conserve energy or use energy more efficiently, consistent with section 216B.241, subd. 1c; or
2) Conserve energy or use energy more efficiently by using waste heat recovery converted into electricity as defined in section 216B.241, subd. 1, paragraph (n).

Minn. Stat. § 216B.241, subd. 1c, also clarifies that EUI projects "must result in increased energy efficiency greater than that which would have occurred through normal maintenance activity." Sample projects include distribution system improvements that reduce line losses and heat rate improvements that increase the efficiency of energy production, such as process optimization and equipment design modifications.
In addition to contributing towards our CIP portfolio, EUI projects typically have the following benefits:

- Direct energy consumption savings;
- Reduced maintenance costs;
- Extended equipment life; and
- Better power plant performance.

The energy savings translate to less natural gas or coal that is needed to produce electricity, which reduces greenhouse gas emissions and fuel costs, thereby lowering the environmental impact and overall cost of generation.

Program Changes

The Company is not proposing any changes to the Electric Utility Infrastructure program.

Budget, Participation & Target Considerations

Because we are expecting to meet the 1.5 percent requirement through customer programs, EUI projects will likely play a minor role in this Triennial Plan. However, savings from EUI projects may become increasingly important over time as the savings potential from traditional programs declines. Given the minor role expected for EUI in this Plan and uncertainties in project funding and timing, we are not proposing specific savings targets or budgets for this Segment. Should we complete any EUI projects during the Plan, we will report the results in our annual status report, following established CIP guidelines, as applicable. For example, for large custom-type projects, we propose to submit the relevant analysis and supporting documentation to the Department prior to submitting the Status Report. For each project, we provide a cost-benefit analysis showing that the project is in the public interest.

Stakeholder Involvement

Because this is an internal program, we do not anticipate the involvement of community energy organizations.

6. ENERGY BENCHMARKING

Program Description

The Energy Benchmarking program provides aggregated whole building usage data to commercial and multifamily buildings, utilizing an internal benchmarking platform in combination with the EPA's Energy Star Portfolio Manager. The majority of participants are in territories with benchmarking ordinances, but the program serves any customer of the Company who wishes to obtain benchmarking data.

Program Details

The Energy Benchmarking program offers a streamlined and consistent approach to access aggregated whole building energy data. The service relies upon the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager (ESPM) to assist customers in benchmarking their buildings. The program is primarily marketed to those customers falling under a municipal benchmarking ordinance, such as Minneapolis' Commercial Building Energy Benchmarking and Transparency ordinance. This ordinance currently covers commercial and multifamily buildings 50,000 square feet and greater. Several other cities in Minnesota have implemented similar ordinances while others have launched pilot programs with similar targets. As a result, the Company expects program participation to expand continually over the next several years.

The Company participated in a U.S. Department of Energy (DOE) effort under the Better Buildings Initiative called "Energy Data Accelerator," which is designed to bring utilities and municipal leaders together to "demonstrate streamlined, best-practice approaches for building owners to access whole building energy usage data—with a specific focus on providing building owners with aggregated energy usage information across multiple tenants." The Company gained valuable insights from both its municipal partner, the City of Minneapolis, as well as from DOE Facilitators and Utility collaborators across the country.

The design implemented by the Company is a product of these accumulated insights and is representative of best practices identified through this effort. Key features of the Energy Benchmarking program include Building Owner Authorization, Tenant Identification, Data Privacy Rule Implementation, Consumption and Cost Data Aggregation and Normalization, and Automated Data Transfer to the ESPM. Each of these elements is discussed in more detail below.

Building Owner Authorization
Upon registration to an online portal, building owners or their contracted agents will be verified using publicly available records as well as information available within the Company's Customer Information Systems.

Tenant Identification
Using the property address, the Company will return a list of tenants' premises that appear to be associated with the building. If verified as accurate by the building owner, this list will be used to permanently associate those premises to the property in the Company's Customer Information Systems.

Data Privacy Rule Implementation
The system is designed to implement thresholds based on both the tenant count and individual tenant usage percentage. Currently there must be four tenants or more aggregated with no individual tenant using more than 50 percent of the aggregated total consumption. No energy data will be shared with the building owner or agents until these rules have been satisfied, or until requestors have obtained validated, signed consent forms from each tenant at the building.

Consumption and Cost Data Aggregation and Normalization
Acknowledging that most building owners seek whole-building aggregate data, the Company will automatically combine data across meter readings and normalize those readings to a common calendar month cycle. Building owners can also request data for individual tenants, or sub-sets of tenants as desired; however, these requests will be subject to aggregation methodologies outlined in Rule 3034 and will be more likely to require individual tenant consent.

Automated Data Transfer to ENERGY STAR Portfolio Manager (ESPM)
The service relies upon ESPM to standardize the transfer of energy data from the Company's systems. This decision was made primarily from the fact that ESPM is well-established as the industry standard tool to perform energy benchmarking, and that this standard further allows a consistent, free, robust option for building owners to gain valuable information about their buildings.

The Energy Benchmarking program is also comprised of the Rental Usage Reporting Program, which stemmed from the Minneapolis Time of Rent Ordinance that went into effect in September 2021. This program allows building owners and their authorized agents to obtain utility cost estimates at a dollar/sq.ft. and dollar/bedroom level for their prospective tenants.

Program Changes
There are no changes planned for program operation. Strategic developments are made on a yearly basis to enhance the flow, accuracy, and timing of data for energy benchmarking customers. Additionally, there are ongoing discussions surrounding the potential of adding solar and demand data to the program, though these potential changes are still being vetted internally.

Budget, Participation & Target Considerations
The Benchmarking program's participation and budgets were determined by current participation rates of buildings under a benchmarking ordinance, future ordinances recently implemented or anticipated to be implemented, and the labor associated with setting up a new building.

The main budget drivers include administration for labor for building set-up and customer service as well as ongoing software upgrades and maintenance.

Stakeholder Involvement
The Energy Benchmarking Program Team works directly with several community energy organizations to promote, train, and educate customers on the program.

7. PARTNERS IN ENERGY

Partners in Energy was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. The Company proposes no changes to this successful program as part of this Plan; however, will begin to track spend as part of our low-income spending requirement.

Program Details
Partners in Energy is designed to target the communities served by the Company and provide support for identifying and achieving their goals for energy. Achieving these goals includes facilitating the development of community-owned energy action plans, supporting launch and implementation of

these plans, working with communities on projects and strategies previously developed, and resources to assist participating communities stay current on emerging technologies, outreach and education best practices and a platform learn from each other. This program drives efficiency projects throughout the community. The segments impacted vary by community and depend on the targets identified by each community in their plans. The Company is proposing to add additional resources to support the income qualified market within participating communities. We detail these more specifically below.

The Partners in Energy program is designed to provide the communities we serve with the tools and resources necessary to be successful in defining their energy future. The portion of this support that aligns with driving energy-efficiency and incremental participation in our conservation programs in the community is covered through the Company's ECO. The offering provides planning services, implementation support, reporting services and participant resources.

Planning services are normally a series of facilitated workshops designed to develop content for inclusion in an energy action plan. These workshops are held with a local stakeholder team developed by the community with the support of Partners in Energy. The structure of this workshop series includes establishing a baseline for a community and a profile of their energy use including how much electricity and natural gas a community uses and the current level of program participation seen in their population. There are instances where a full series of workshops is not necessary depending on the breadth and resources a community has prior to engaging with the program. There is also the ability for communities who have historically participated in the program to re-engage in the planning process to update the content of their energy action plan.

Implementation support is customized to align with the resources a community needs to be successful with their energy related plans. It traditionally falls into the categories of marketing communications, project management, and education and outreach resources. As a critical part of implementation Partners in Energy provides data support. Examples of what this includes are working with communities to identify target markets and reporting services where the program generates dashboards every six months to track how a community is performing versus the baseline established during planning and to track their progress to goals.

Participant resources include newsletters, webinars, networking events, and a web portal that serves as a resource library and central storage for a community's work products.

Eligibility/Qualification for Participation

Communities within the Company's service territory qualify to participate in the program.

Program Changes

Change	Rationale
Track implementation support targeted at engaging the low-income market in saving energy.	These costs will be tracked and reported as part of the Company's spend to support the low income market.

Budget, Participation & Target Considerations
The participation and budget for the program is based on historical activity. Additional considerations were made for expanding the resources to deliver outreach and education to support the low-income market.

The main budget drivers include implementer costs for delivering planning and implementation support.

Stakeholder Involvement
This program incorporates stakeholders at various points within the program.

- Local stakeholders are incorporated into the planning teams that are formed in the individual communities. They are incorporated into the process to provide access and information, as well as to represent the voice of underrepresented community members who are hesitant to participate in the planning process.
- Community agencies are leveraged in tactics to deliver outreach and educational materials. By engaging with local service providers, we are able to reach target markets at sites where they already attend versus trying to engage them in energy focused events.

8. PLANNING & REGULATORY AFFAIRS

Program Description
Planning & Regulatory Affairs provides funding for all the Company's DSM regulatory filings, directs and prepares cost-benefit analyses, provides results of energy conservation achievements, manages electric and gas potential studies and analyzes and prepares cost recovery reports. The fund was included in Xcel Energy's previous Triennial Plan for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium with no fundamental changes.

Program Details
Regulatory Affairs manages all the Company's DSM regulatory filings, directs and prepares cost-benefit analyses, provides results of energy conservation achievements, manages electric and gas potential studies and analyzes and prepares cost recovery reports. The group also provides procedures for effectively addressing requirements for the DSM regulatory process. These functions are needed to ensure a cohesive and high-quality DSM portfolio that meets legal requirements, as well as the expectations of Xcel Energy's customers, regulators, and staff.

In addition, Regulatory Affairs supports the DSM component of resource planning, rate cases, and certificates of need and provides strategic evaluation planning and internal policy guidance. These functions are needed to ensure the cost-effectiveness of DSM, to ensure the quality of DSM impact estimates, help generate ideas for future DSM projects, establish programmatic consistency, and manage DSM-related marketing information.

Program Changes

The Company is not proposing any changes to Planning & Regulatory Affairs.

Budget, Participation & Target Considerations

Program budgets were developed based on historical spending. Included in the Regulatory Affairs budgets are materials, administration, and outside consulting costs. As regulatory reporting requirements have increased in recent years, and with the additional complexity brought to portfolio management with the various requirements created by ECO, the Company proposes an increased budget in this Triennium to ensure it has the necessary staff to manage the significant increase in workload. The program's budget is allocated to the Utility Administration category.

Stakeholder Involvement

The Regulatory Affairs group works with third-party alternative CIP filers, community organizations, and other interested parties as applicable. In addition, we regularly attend energy efficiency stakeholder meetings and assist with legislative policy.

RESEARCH, EVALUATIONS & PILOTS SEGMENT

Overview
The Research, Evaluations, and Pilots Segment includes indirect research and development efforts that are not directly affiliated with a specific direct impact program. This Segment provides research, evaluation, and screening of new DSM products and concept testing.
Under this Segment, Market Research and Product Development:

- Evaluates achieved energy and demand savings;
- Quantifies the various levels of market potential for programs;
- Analyzes overall effects of Xcel Energy's ECO portfolio on customer usage and overall system peak demand and system energy usage;
- Develops new customer programs;
- Researches, pilots and monitors new conservation products and efficient fuel switching to determine conservation opportunity;
- Provide overall informational support for the portfolio;
- Evaluate the processes and impacts of ECO Programs;
- Measure overall customer satisfaction with Xcel Energy's various ECO efforts;
- Provide segment and target market information; and
- Examine in further depth the various assumptions used within program design and management.

Portions of this Segment are subject to the Research and Development (R&D) spending cap of 10 percent of our total amount spent and invested on energy conservation improvements. For the most part, Market Research projects fall outside of Research & Development, except for market potential studies, as the information is not intended exclusively to assist in developing new programs and mainly addresses existing programs through efforts such as program evaluations. All of Product Development projects and costs are included within the R&D category and subject to the cap, except for pilot programs.

In addition, the Company is separately tracking R&D spend for energy efficient fuel switching as these costs are accounted for differently in Minn. Stat. §216B.241 and are subject to the EFS spending cap until June 2026.

Programs
This Segment is comprised of the Market Research and Product Development programs.

Targets
The budgets for Market Research and Product Development were based on past spending and adjusted for planned expenditures. Pilot projects may be proposed as either direct or indirect impact; the Company is not proposing any direct impact pilots as part of our 2024-2026 Triennial Plan at this time.

Table 62: 2024-2026 Research, Evaluations & Pilots Segment Budget

	Electric			Natural Gas		
	2024	2025	2026	2024	2025	2026
Market Research	$2,146,287	$ 2,333,545	$2,469,193	$525,579	$550,837	$574,548
Product Development	$5,756,208	$5,852,763	$ 5,951,351	$328,102	$331,536	$335,090
PD Energy Efficiency	$5,232,917	$ 5,320,694	$5,410,319	$198,051	$199,768	$201,545
PD EFS	$23,291	$ 532,069	$541,032	$130,051	$131,768	$ 133,545
Total	**$7,379,204**	**$7,654,239**	**$ 7,879,512**	**$723,630**	**$750,605**	**$ 776,093**

Market Analysis
Not applicable.

Marketing/Advertising/Promotion
Not applicable.

Overall Policies
Not applicable.

Involvement with Interested Individuals and Entities
We involve external parties (government, manufacturers, vendors, installers) in our product development process. We also seek the input of manufacturers, vendors, and installers as we build the technical assumptions for each product to test for cost effectiveness.

1. MARKET RESEARCH

Program Description
Market Research drives a variety of ECO-specific projects that are used to support effective design and implementation of energy conservation programs and services. This enhances understanding of current and potential customers, market segmentation, and engagement drivers. Additional research is conducted through procurement of third-party consultants who review primary and secondary data while purchased market research subscriptions offer energy efficiency and/or marketing resources that provide strategic information regarding customers, ECO products, and business direction for our efforts towards furthering customer programs and opportunities. This research falls into two categories:

- *Program Support Activities* which primarily provide overall DSM informational support for several programs or segments; and
- *Program and Portfolio Evaluations* which provide process and / or impact studies of products or groups of products and characterizing and/or modeling of market potential for adoption of energy efficiency measures.

Program Details

Although research needs may change during the Plan, we plan to continue the procurement of the following market research resources in 2024, 2025, and 2026:

Program Support Activities

- E-Source membership provides unbiased, objective research and advisory services that help advance efficiency programs, improve the customer experience, and use energy more efficiently.
- Dun & Bradstreet list purchase provides specific demographic information helpful in effectively identifying potential business customers capable of benefiting from existing and planned DSM programs.
- Data purchase and development and maintenance of an energy-focused segmentation system to assist in marketing energy efficiency to residential customers.
- Home Use Study provides valuable information regarding saturation of various home appliances and technologies in residential homes.
- Residential and Business Advertising Tracking data ensures the effectiveness and reach of DSM advertising efforts by asking customers reactions and recall of specific campaigns.
- Update business lighting saturation models with primary data that reflect new equipment that has become more prevalent since initial data was gathered in 2018.
- Like the 2021-2023 Triennial, the Company has assumed a modest potential study update or other sector specific saturation and adoption modeling will be needed in 2025 and 2026 anticipation of a future Upper Midwest Integrated Resource Plan (IRP). Since the next IRP will be filed early in 2024, it is unknown what research may be ordered by the Commission and when that future IRP will be filed. The Company has also included a smaller amount of budget set aside in 2024 for possible natural gas-focused energy efficiency and efficient fuel switching research to inform IRP, NGIA, rate, or other filings.

Program and Portfolio Evaluations

Comprehensive program evaluations are completed by independent third-party consultants for specific programs each year. The Company establishes the evaluation priorities based on several factors including program budgets, savings, time since previous evaluations, and strategic role of programs within the portfolio. In this Plan, the Company plans to continue efforts to build a portfolio evaluation approach that would establish metrics (in addition to Dth, kWh, kW, and participation) to track program performance in between the in-depth evaluations that are listed below. The Company plans to conduct the following program-specific evaluations during the Plan:

- 2024: Data Center Efficiency; Business Education; Whole Home Efficiency; Home Energy Audit; and Refrigerator Recycling
- 2025: Efficiency Controls; HVAC+R; Multi-Family Building Efficiency; and Water Heater Rebates

The Company is not proposing specific program evaluations for 2026 in lieu of leveraging the data gathered by the portfolio evaluation approach during 2024 and 2025. The Company has included the estimated cost of four comprehensive evaluations in the proposed budget. The Company proposes to file a courtesy notice before 2026 evaluations commence identifying the programs for evaluation in 2026. The Company expects there will be some evaluation costs for the energy code support market transformation activities at various points in the Triennial. As noted in the program description within the Business and Residential segment, the timing of these evaluation activities depends on when code updates are adopted. The Company proposes that additional details can be provided in the 2024 Status Report or other modifications to further clarify the evaluation activities not included in the initial program design filed by the collaborating utilities.

In 2024-2026 the Company has also added direct support, via a third-party, for a team that will focus on equity and underserved communities in all evaluation planning and execution. This is intended to guide future research toward increasing actions to support customers and trade partners who have historically been underserved by the portfolio.

In each year the Company proposes to allocate $225,000 for dedicated Income-Qualified Segment evaluation activities ($150,000 electric and $75,000 natural gas). These will not be part of the portfolio evaluations above but will instead focus on specific research questions that are unique to the Income-Qualified Segment programs and/or income qualified customers that could benefit from the programs but are not currently participating. We propose to separately document these projects and report them as part of the Income-Qualified Segment spend in the compliance section of our yearly Status Reports.

<u>Program Changes</u>
Starting in 2024 and continuing through 2026 the Company proposes inclusion of a dedicated Income-Qualified component to this program.

Budget, Participation & Target Considerations
The Market Research budget was developed based on historical project costs for similar research and /or studies of similar scope.

The main budget drivers include the following:

- Purchased/subscription data and research;
- Third party evaluation and research consulting; and
- Administration which covers the internal staff and external professional services needed for project planning and implementation.

2. MEASUREMENT AND VERIFICATION

This section documents our efforts to measure and verify direct savings of electric and gas programs to ensure that reported savings accurately represent impacts on the electric and natural gas system within the defined levels of statistical precision. Measurement & Verification (M&V) costs are generally budgeted within each program's overall budget.

Prescriptive projects are monitored to ensure that there is not a deviation from the assumed savings for the project. All custom projects adhere to a pre-established M&V policy and threshold under Docket Number E, G999/CIP-06-1591. For programs not specifically listed in this document, project M&V is not conducted due to budgetary or logistical constraints but may be validated in periodic program evaluations.

Rebate Application Validation (All Programs)

- Step 1: Applications are validated prior to data entry and sent back to the customer or account manager if any data is missing or incorrect.
- Step 2: Daily audit is conducted on all rebates after data entry but before rebate is issued. Errors are corrected and rebate is paid.

Measurement & Verification (General)

Verifies on an ongoing basis during performance year the gross energy and demand savings.

- **Prescriptive programs** using deemed savings technical assumptions have random sample field inspections to verify that the measure is installed and operating, and the key parameters of the technical assumption match the rebate.
- **Custom programs** go through stages of engineering review of the savings calculations. Random samples are sent to an outside engineering firm for further review. Projects with savings greater than 1 GWh or 20,000 Dth are pre- and post-metered, as are some projects that are metered at engineering discretion to verify assumptions for new technologies or other variables.
- **Exception programs** conduct M&V as it makes sense from a financial, accuracy, logistical and customer investment standpoint.

Prescriptive Process

For most of the programs, the verification contractor selects a statistically valid number of projects to verify through field inspections or phone surveys. The sample size is designed to achieve accuracy levels of between 10 percent and 20 percent given a confidence level of 90 percent around the realization rate and is weighted to select larger projects. The number of randomly selected participants in the sample may increase or decrease during the year depending on program participation to ensure precision goals for the program. Sampling bias caused by poor response rates and deliberate exclusion of sample projects is reduced through a quality control process. Rebate forms notify all customers that their respective premises and measures are subject to verification inspections.

The process is as follows:

- Step 1: Customer submits rebate application and required documentation to the Company after measure is installed.
- Step 2: Rebate Operations reviews all business and residential program rebate applications, supporting documentation, and vendor invoices. They check the customer information, equipment eligibility and proper rebate amounts. If information is missing or incorrect, the application is sent back to the account representative or customer to make changes.
- Step 3: If project qualifies for rebate, Rebate Operations enters rebate application form data into the rebate tracking system and authorizes rebate payment. Prior to authorizing rebates, all applications are verified in a daily audit.
- Step 4: On a monthly basis the third-party verification contractor (VC) pulls a list of all projects completed during the previous month.
- Step 5: VC selects random samples, notifies the Company of the sample selections, and manages statistically valid sample process to achieve a 90% confidence level with 10% precision.
- If it is not possible to achieve 90/10, a confidence and precision level of 90/20 is acceptable.
- Step 6: VC contacts customer to schedule the inspection.
- Step 7: VC visits site and verifies the savings factors and equipment information for that measure.
- Step 8: VC documents discrepancies and submits report to the Company.
- Step 9: Product management and technical staff evaluate the nature of the discrepancy and take appropriate follow-up actions.
- Step 10: Corrective action such as communication of program requirements, changes to program rules or identification of intentional misuse of the programs are undertaken based on these audit results as necessary.

Applicable Prescriptive Programs
Including prescriptive projects of programs with prescriptive and custom components.

Business Programs

- Data Center Efficiency
- Efficiency Controls
- Compressed Air
- Foodservice Equipment
- HVAC+R
- Lighting Efficiency
- Load Strategy Analysis
- Process and Commercial Efficiency

Residential Programs

- Insulation Rebates
- Low-Income Home Energy Savings
- Multi-Family Energy Savings
- Residential Heating and Cooling
- Residential Demand Response (Smart Thermostat measures)

Programs and/or Components with Variation from Prescriptive Process

- **The Boiler Tune-Up and Tune-Up Plus** measures in the HVAC+R program do not have audits performed.
- **Business New Construction - Energy Efficient Buildings (EEB) component**, EEB differs from the prescriptive process in that preapproval is required prior to equipment install, invoices are not required, and all projects are field verified by the third-party implementer.
- **Home Energy Insights, Whole Home Efficiency, Home Energy Squad, Low-Income Home Energy Squad, Refrigerator & Freezer Recycling**, **Multi-Family Building Efficiency,** the third-party implementers are responsible for ensuring verification of measures according to the practices reviewed by a third party during a pilot and/or periodically during implementation.
- For **Efficient New Home Construction**, 100 percent of homes are verified through the Residential Energy Services Network (RESNET) rating and quality assurance protocols.
- For **Home Lighting**, all retailers provide sales data on quantity and type of bulbs sold.
- Select programs utilize third-party program implementers or survey companies to complete follow-up surveys to a sample of the participants to confirm and track whether the equipment was installed. An installation rate is applied to the program's annual savings.
- For **School Education Kits**, participants conduct and submit surveys.
- For **Energy Efficient Showerhead** program, third-party implementer reports on quantity of showerheads distributed. The company reports on installation rates through surveys that are periodically distributed via either a third party or its enterprise customer experience measurement system.

General Custom Process

Project Identification

- Step 1: Project identification and scoping.
- Step 2: Customer submits preapproval application to the Company.

Preapproval

- Step 3: An engineer (or outside engineering firm) reviews the application and calculates the energy and demand savings based on the technical assumptions specific to that measure and the resulting rebate.
- Step 4: Xcel Energy engineers review the calculations, regardless of whether internal or external engineers completed Step 3.
- Step 5: We select a random sample of committed projects and send this list to an outside engineering firm (if Xcel Energy engineer performed Step 3) to review the calculations.
- Step 6: If the outside engineering firm disagrees with our engineer's analysis, they

discuss the project and reach a consensus on the calculations.

- Step 7: We send out a preapproval or rejection letter stating the preapproved demand and energy savings along with the rebate amount.

Monitoring

- Step 8: If monitoring is needed, an Xcel Energy engineer drafts an M&V plan and sends a monitoring agreement for customer review and approval signature.
- Step 9: If the customer does not have the appropriate meter structure, a third-party engineering firm installs metering equipment and collects the pre-data as set forth in the monitoring agreement.
- Step 10: After the designated pre-monitoring period, the customer completes the project installation and contacts the account manager.
- Step 11: The third-party engineering firm collects post-installation monitoring data and sends pre- and post-data to the Company.

Site Verification

- Step 12: For managed accounts, the customer's account manager works with the customer to verify project installation and removal of old equipment and obtain invoices or alternate cost documentation for submission to our staff.

Approval and Rebate Payment

- Step 13: For non-monitored projects, the invoices are reviewed and if the installed measure specifications match the proposed measure specifications, then the preapproved rebate is awarded. If project incremental costs changed by >10%, or the scope changed, the project is reevaluated (return to Step 3).
- Step 14: For monitored projects, an engineer (or third-party engineering firm) determines actual savings based on monitoring results.
- Step 15: For monitored projects, if an Xcel Energy engineer completes the analysis, 100% of projects are sent to third-party engineering firm for review.
- Step 16: If the third-party engineering firm disagrees with our engineer's analysis, they discuss the project and reach consensus on the calculations.
- Step 17: For monitored projects, a new analysis is conducted with monitoring results. The rebate paid is based on actual savings, and we claim the post-monitored results.
- Step 18: Project savings are reported in the year that the rebate is awarded.

Applicable Custom Programs
Including custom and behavioral projects of programs with these components.

- Business Energy Assessments
- Custom Efficiency
- Data Center Efficiency
- Efficiency Controls
- Compressed Air
- HVAC+R
- Lighting Efficiency
- Process and Commercial Efficiency

<u>Exceptions</u>
Programs with special design elements are verified using processes unique to the program. The M&V process for these products is described below.

- *Business New Construction* – We contract with a third-party consultant to develop the energy efficiency recommendations and M&V. Field verification is performed to ensure that the strategies are installed per the design intent. The rebate is not paid until savings are verified.

The following process shows the steps taken throughout the EDA process to ensure proper installation and energy savings:

  - Step 1: Application submittal.
  - Step 2: Meetings take place with the customer and design team.
  - Step 3: Consultant completes energy modeling to identify conservation packages.
  - Step 4: Construction documents are reviewed for measures identified through the energy model. The design team and customer are notified whether these measures were found within these documents. (Enhanced Track only)
  - Step 5: The customer completes construction.
  - Step 6: Consultant visits site and verifies that specified measures were installed. Selected
  - equipment and systems are monitored for a two-week timeframe, as appropriate, to evaluate.
  - performance variables against modeling assumptions.
  - Step 7: For projects with individual measures that have savings greater than or equal to 1.0 GWh or 20,000 Dth per year, the individual measures must be considered "selected equipment" as defined in Step 6 above.
  - Step 8: The actual results are used to determine the final rebate.
  - Step 9: Rebate is issued to customer based on final savings.

- *Business Energy Assessments, Heating and Study Driven Program (general process):* The customer hires an engineering firm to conduct a study of the building to determine energy savings for each measure. An Xcel Energy engineer then reviews and verifies 100 percent of the identified opportunities for savings calculation accuracy prior to approving and paying a rebate for the study.

When opportunities are implemented, an Xcel Energy engineer verifies that the implemented measures match what was approved and edits any changes implemented that do not exactly match the approved study.

For Business Energy Assessments, the customer needs to notify us when this happens. For other programs, the quantity/equipment detail on the invoices may be used.

- *Self-Direct Program:* Qualifying customers submit M&V plans with their applications. M&V plans, which may include pre-installation monitoring, are reviewed and approved by an Xcel Energy engineer (or outside engineering firm).

- *Electric Rate Savings and Peak Flex Credit:* Customer participation and compliance is verified via the specialized meters deployed. This allows us to confirm the amount of load shed at each control event.

- *Residential Demand Response and Commercial AC Control:* The Residential Demand Response (Saver's Switch and AC Rewards) and Business Saver's Switch programs contract with a third-party to conduct annual load research on a sample of participant sites. This research measures the amount of load relief realized when a control is implemented.

  In areas where the automated meter reading system is available, we are able to test residential Saver's Switches remotely to identify sites with failed switches. We anticipate continuing this process annually going forward to ensure a healthy switch population.

3. PRODUCT DEVELOPMENT

Program Description

Product Development was included in Xcel Energy's previous *Triennial Plan* for 2021-2023. The Company proposes to continue this project as described below in the 2024-2026 triennium. Product Development identifies, assesses, and develops new energy efficiency, demand response, and efficient fuel switching products and services for eventual inclusion as new programs, products, and measures. This work enables Xcel Energy to stay current and advance important new energy saving technologies for customers. The group also develops improvements to existing products.

The product development process begins with ideas for new energy conservation and efficient fuel switching programs or measures from customers, regulators, energy professionals, Xcel Energy staff, and others. Before a new product is approved, the group research new ideas, evaluates them for savings potential, screens, and sometimes tests specific product ideas as we work through the development process.

During this triennial period, Product Development will continue to develop new products and expand existing products to help meet Xcel Energy's conservation and efficient fuel switching targets. Products or programs are selected for development based on several criteria including, but not limited to, energy efficiency potential, level of effort to development, longevity of the offering (i.e. how long until a product becomes the industry standard), market barriers, and risk (technological, market) among others.

<u>Program Changes</u>
The Company is proposing to add an efficient fuel switching budget for development of measures.

Budget, Participation & Target Considerations
Product Development is an indirect-impact program and, therefore, generally does not set any participation or energy savings targets. Product Development, on occasion, develops pilots with savings targets. We seek approval to claim direct-impact savings in those cases. The program budgets were developed by reviewing historical program expenditures and estimating the time involved in completing future efforts.

The main budget drivers include the following:

- Utility Administration: Product Development contracts with external, third-party consultants to assist in project planning and implementation. Additionally, administration funds internal Product Development staff.

ASSESSMENTS SEGMENT

Overview
The Assessment Segment includes state assessments as identified in Minn. Stat. §216B.241.

Programs
There are two programs outlined in the Assessments Segment including State Assessments and the Minnesota Efficient Technology Accelerator (META).

Targets

Table 63: 2024-2026 Assessment Segment Budgets

	Electric		Natural Gas	
Plan Year	**Participation**	**Budget**	**Participation**	**Budget**
2024	-	$4,973,841	-	$896,826
2025	-	$7,425,406	-	$1,414,206
2026	-	$7,622,477	-	$1,485,845

1. MINNESOTA ASSESSMENTS

Program Description
The Minnesota Assessment fund accounts for monetary assessments from the Minnesota Department of Commerce. Minn. Stat. §216B.241, subd(s). 1d, e and f assess each utility a fee for technical assistance, applied research and development grants, and facility energy efficiency.

<u>Program Changes</u>
Not applicable.

Targets, Participants & Budget
Budgets were developed based on direct and indirect assessments invoices received during the 2020 CIP Extension and 2021-2023 Triennial Plan period. The main driver of costs for Assessments is technical assistance, applied research and development grants and facility energy efficiency as assessed by the Department of Commerce.

Stakeholder Involvement
Not applicable.

2. MINNESOTA EFFICIENT TECHNOLOGY ACCELERATOR

Program Description

The Efficient Technology Accelerator (ETA) is a new market transformation program that is run by the Center for Energy and Environment under contract from the Department of Commerce[52]; Department of Energy Resources in coordination with investor-owned utilities and co-ops in Minnesota. This program centers around three central goals:

1. Accelerate deployment and reduce the cost of emerging and innovative efficient technologies and approaches.
2. Bring a statewide, holistic market transformation approach to ECO.
3. Provide utilities claimable energy savings above and beyond current ECO program savings.

Our Plan includes the approved assessments from CEE as defined in Minn. Stat. §216B.241, sub. 14 and confirmed by the Department's April 15, 2022, Decision.

Program Details

The ETA implements a market-transformation approach to bringing high-potential measures with limited market adoption into ECO portfolios. This is achieved by working with key market actors to increase awareness, reduce upfront costs, and/or remove other barriers to greater acceptance of the targeted measures.

The key features of ETA are cost effectiveness being measured over a longer period, creating a framework for capturing savings from market transformation efforts, and a focus on driving supply chain intervention strategies. ETA is launching in 2023 with a starter portfolio of five initiatives: Dual-fuel air source heat pumps, Luminaire-level lighting controls (LLLCs), High-performance windows, High-performance RTUs, and Gas-fired heat pump technologies.

Program Changes

ETA is a new program in the Plan.

Targets, Participants & Budget

The Company has filed the META program as an indirect program. However, we anticipate savings to be assessed to the Company as part of the CEE process. These savings will be reviewed and included as part of our annual reporting process.

Fees for META were determined by the Department's April 14, 2022, Decision which stated costs to be assessed as follows:

[52] Pursuant to Minn. Stat. §216B.241, sub. 14, qualified nonprofit may file a proposal with the Department for a program to "accelerate deployment and reduce the cost of the emerging and innovative efficient technologies and approaches." In the Department's April 15, 2022 Decision, Docket No. E, G999/CIP-21-548, the Center for Energy and Environment was found to have met the statutory requirements, as such, their proposal for a META program was approved for an initial term of five years (2023-2027).

The Deputy Commissioner finds that the proposed budget is within the limits of 216B.241 subdivision 14(h) spending caps – 2% in years 1 and 2 of the META programs, 3.5% in years 3 and 4, and 5% in year 5, based on the utility's spending approved by the Department in the CIP plan filed under subdivision 2 of Minnesota 216B.241.[53]

53 https://www.edockets.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId=%7b703FBA81-0000-C910-A628-35547DDCB63F%7d&documentTitle=20227-187142-01, page 7.

COST BENEFIT ANALYSIS

This section documents the cost-effectiveness of our 2024-2026 ECO Triennial Plan by portfolio and segment. These analyses include the Minnesota Test as approved by the Deputy Commissioner *In the Matter of 2024-2026 CIP Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities*, dated March 31, 2023, in Docket No. E,G999/CIP-23-46.

RESIDENTIAL SEGMENT TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	39,113,522	39,113,522	N/A	45,077,109	45,077,109
Transmission and Distribution Capacity	N/A	4,478,829	4,478,829	N/A	5,182,205	5,182,205
Energy Generation	N/A	50,714,285	50,714,285	N/A	58,389,283	58,389,283
Market Effects and Ancilary Services	N/A	1,886,133	1,886,133	N/A	2,172,972	2,172,972
Subtotal	N/A	96,192,768	96,192,768	N/A	110,821,569	110,821,569
Gas System Impacts						
Commodity Cost	N/A	24,126,594	N/A	24,126,594	27,818,639	27,818,639
Variable O&M	N/A	207,695	N/A	207,695	239,415	239,415
Demand	N/A	5,894,026	N/A	5,894,026	6,792,417	6,792,417
Environmental Compliance	N/A	337,772	N/A	337,772	389,461	389,461
Subtotal	N/A	30,566,087	N/A	30,566,087	35,239,932	35,239,932
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	12,870,507	12,870,507
Gas Environmental Externalities	N/A	N/A	N/A	N/A	22,301,119	22,301,119
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(6,131,289)	(4,519,647)	(1,611,643)	(6,131,289)	(6,131,289)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(6,131,289)	(4,519,647)	(1,611,643)	29,040,337	29,040,337
Participant Impacts						
Electric Bill	207,252,740	N/A	(179,610,604)	N/A	N/A	N/A
Gas Bill	46,625,423	N/A	N/A	(40,458,871)	N/A	N/A
Participant Rebates and Incentives	26,522,669	N/A	N/A	N/A	26,522,669	N/A
Incremental Capital	(56,083,488)	N/A	N/A	N/A	(56,083,488)	N/A
Incremental O&M	11,553,267	N/A	N/A	N/A	11,553,267	N/A
Subtotal	235,870,612	N/A	(179,610,604)	(40,458,871)	(18,007,552)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,113,936)	(781,293)	(332,643)	(1,113,936)	(1,113,936)
Utility Administration	N/A	(12,489,287)	(8,694,461)	(3,794,826)	(12,489,287)	(12,489,287)
Advertising & Promotion	N/A	(4,154,328)	(2,834,900)	(1,319,428)	(4,154,328)	(4,154,328)
Measurement & Verification	N/A	(46,000)	(31,500)	(14,500)	(46,000)	(46,000)
Rebates	N/A	(26,522,669)	(18,116,646)	(8,406,023)	(26,522,669)	(26,522,669)
Other	N/A	(75,323)	(34,142)	(41,182)	(75,323)	(75,323)
Subtotal	N/A	(44,401,543)	**(30,492,942)**	**(13,908,602)**	(44,401,543)	(44,401,543)
Benefits	291,954,100	126,758,855	96,192,768	30,566,087	219,309,064	181,233,127
Costs	(56,083,488)	(50,532,833)	(214,623,193)	(55,979,115)	(106,616,321)	(50,532,833)
Net Benefit (Cost)	**235,870,612**	**76,226,022**	**(118,430,425)**	**(25,413,028)**	**112,692,743**	**130,700,295**
Benefit/Cost Ratio	**5.21**	**2.51**	**0.45**	**0.55**	**2.06**	**3.59**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	12.2 years
Lifetime (Weighted on Dth)	13.8 years
T & D Loss Factor (Energy)	8.52%
T & D Loss Factor (Demand)	10.40%
System Coincident kW Saved at Generator	**35,083 kW**
Annual kWh Saved at Customer	128,769,672 kWh
Annual kWh Saved at Generator	**135,748,086 kWh**
Annual Dth Saved	**443,477 Dth**
Electric Participants	**2,536,389**
Gas Participants	**665,778**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.6 years
Lifetime (Weighted on Dth)	16.6 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	10.56%
System Coincident kW Saved at Generator	**-6.38 kW**
Annual kWh Saved at Customer	-1,633,580 kWh
Annual kWh Saved at Generator	**-1,789,245 kWh**
Annual Dth Saved	**15,859 Dth**
Electric Participants	**726**
Gas Participants	**719**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	41,235 tons CO2
Gas Energy Efficiency	32,343 tons CO2
Electric Electrification	-492 tons CO2
Gas Electrification	1,157 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	74,242 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	278,548 tons CO2
Gas Energy Efficiency	444,715 tons CO2
Electric Electrification	-4,140 tons CO2
Gas Electrification	19,246 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	738,369 tons CO2

RESIDENTIAL SEGMENT TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	40,411,366	40,411,366	N/A	46,545,879	46,545,879
Transmission and Distribution Capacity	N/A	4,658,757	4,658,757	N/A	5,387,318	5,387,318
Energy Generation	N/A	52,452,716	52,452,716	N/A	60,069,612	60,069,612
Market Effects and Ancilary Services	N/A	1,950,457	1,950,457	N/A	2,240,056	2,240,056
Subtotal	N/A	99,473,296	99,473,296	N/A	114,242,866	114,242,866
Gas System Impacts						
Commodity Cost	N/A	26,538,010	N/A	26,538,010	30,599,605	30,599,605
Variable O&M	N/A	228,137	N/A	228,137	263,051	263,051
Demand	N/A	6,477,267	N/A	6,477,267	7,464,744	7,464,744
Environmental Compliance	N/A	371,532	N/A	371,532	428,394	428,394
Subtotal	N/A	33,614,946	N/A	33,614,946	38,755,794	38,755,794
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	11,313,540	11,313,540
Gas Environmental Externalities	N/A	N/A	N/A	N/A	24,250,197	24,250,197
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(6,151,954)	(4,542,266)	(1,609,688)	(6,151,954)	(6,151,954)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(6,151,954)	(4,542,266)	(1,609,688)	29,411,783	29,411,783
Participant Impacts						
Electric Bill	209,152,569	N/A	(180,861,835)	N/A	N/A	N/A
Gas Bill	51,240,561	N/A	N/A	(44,461,948)	N/A	N/A
Participant Rebates and Incentives	27,778,977	N/A	N/A	N/A	27,778,977	N/A
Incremental Capital	(61,681,790)	N/A	N/A	N/A	(61,681,790)	N/A
Incremental O&M	12,454,639	N/A	N/A	N/A	12,454,639	N/A
Subtotal	238,944,955	N/A	(180,861,835)	(44,461,948)	(21,448,174)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,384,191)	(1,014,084)	(370,106)	(1,384,191)	(1,384,191)
Utility Administration	N/A	(13,207,027)	(9,175,987)	(4,031,040)	(13,207,027)	(13,207,027)
Advertising & Promotion	N/A	(4,420,951)	(3,024,470)	(1,396,481)	(4,420,951)	(4,420,951)
Measurement & Verification	N/A	(50,250)	(34,500)	(15,750)	(50,250)	(50,250)
Rebates	N/A	(27,778,977)	(18,455,177)	(9,323,800)	(27,778,977)	(27,778,977)
Other	N/A	(151,657)	(68,833)	(82,823)	(151,657)	(151,657)
Subtotal	N/A	(46,993,053)	**(31,773,051)**	**(15,220,001)**	(46,993,053)	(46,993,053)
Benefits	300,626,745	133,088,242	99,473,296	33,614,946	228,796,012	188,562,397
Costs	(61,681,790)	(53,145,007)	(217,177,153)	(61,291,637)	(114,826,797)	(53,145,007)
Net Benefit (Cost)	**238,944,955**	**79,943,236**	**(117,703,857)**	**(27,676,691)**	**113,969,216**	**135,417,390**
Benefit/Cost Ratio	**4.87**	**2.50**	**0.46**	**0.55**	**1.99**	**3.55**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	12.2 years
Lifetime (Weighted on Dth)	13.7 years
T & D Loss Factor (Energy)	8.50%
T & D Loss Factor (Demand)	10.40%
System Coincident kW Saved at Generator	**35,935 kW**
Annual kWh Saved at Customer	128,935,229 kWh
Annual kWh Saved at Generator	**135,820,489 kWh**
Annual Dth Saved	**456,271 Dth**
Electric Participants	**2,421,077**
Gas Participants	**634,978**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.6 years
Lifetime (Weighted on Dth)	16.6 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	10.56%
System Coincident kW Saved at Generator	**-12.51 kW**
Annual kWh Saved at Customer	-3,270,426 kWh
Annual kWh Saved at Generator	**-3,582,066 kWh**
Annual Dth Saved	**31,780 Dth**
Electric Participants	**1,458**
Gas Participants	**1,445**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	41,235 tons CO2
Gas Energy Efficiency	32,343 tons CO2
Electric Electrification	-611 tons CO2
Gas Electrification	2,318 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	75,284 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	278,548 tons CO2
Gas Energy Efficiency	457,449 tons CO2
Electric Electrification	-7,683 tons CO2
Gas Electrification	38,552 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	766,866 tons CO2

RESIDENTIAL SEGMENT TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	43,054,271	43,054,271	N/A	49,630,918	49,630,918
Transmission and Distribution Capacity	N/A	4,999,448	4,999,448	N/A	5,786,239	5,786,239
Energy Generation	N/A	56,513,276	56,513,276	N/A	64,883,291	64,883,291
Market Effects and Ancilary Services	N/A	2,091,340	2,091,340	N/A	2,406,009	2,406,009
Subtotal	N/A	106,658,335	106,658,335	N/A	122,706,457	122,706,457
Gas System Impacts						
Commodity Cost	N/A	30,681,510	N/A	30,681,510	35,390,325	35,390,325
Variable O&M	N/A	263,636	N/A	263,636	303,974	303,974
Demand	N/A	7,481,185	N/A	7,481,185	8,625,373	8,625,373
Environmental Compliance	N/A	429,541	N/A	429,541	495,465	495,465
Subtotal	N/A	38,855,872	N/A	38,855,872	44,815,137	44,815,137
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	11,783,852	11,783,852
Gas Environmental Externalities	N/A	N/A	N/A	N/A	27,639,312	27,639,312
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(6,729,478)	(5,054,262)	(1,675,216)	(6,729,478)	(6,729,478)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(6,729,478)	(5,054,262)	(1,675,216)	32,693,686	32,693,686
Participant Impacts						
Electric Bill	232,973,100	N/A	(200,580,418)	N/A	N/A	N/A
Gas Bill	59,207,417	N/A	N/A	(51,354,244)	N/A	N/A
Participant Rebates and Incentives	30,574,958	N/A	N/A	N/A	30,574,958	N/A
Incremental Capital	(72,196,988)	N/A	N/A	N/A	(72,196,988)	N/A
Incremental O&M	13,071,585	N/A	N/A	N/A	13,071,585	N/A
Subtotal	263,630,072	N/A	(200,580,418)	(51,354,244)	(28,550,445)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,662,384)	(1,253,820)	(408,564)	(1,662,384)	(1,662,384)
Utility Administration	N/A	(14,083,875)	(9,769,504)	(4,314,371)	(14,083,875)	(14,083,875)
Advertising & Promotion	N/A	(4,629,030)	(3,164,764)	(1,464,266)	(4,629,030)	(4,629,030)
Measurement & Verification	N/A	(54,750)	(37,750)	(17,000)	(54,750)	(54,750)
Rebates	N/A	(30,574,958)	(19,686,346)	(10,888,613)	(30,574,958)	(30,574,958)
Other	N/A	(303,223)	(137,667)	(165,557)	(303,223)	(303,223)
Subtotal	N/A	(51,308,221)	**(34,049,850)**	**(17,258,370)**	(51,308,221)	(51,308,221)
Benefits	335,827,061	145,514,207	106,658,335	38,855,872	250,591,301	206,944,757
Costs	(72,196,988)	(58,037,698)	(239,684,530)	(70,287,831)	(130,234,687)	(58,037,698)
Net Benefit (Cost)	**263,630,072**	**87,476,509**	**(133,026,195)**	**(31,431,959)**	**120,356,614**	**148,907,059**
Benefit/Cost Ratio	**4.65**	**2.51**	**0.44**	**0.55**	**1.92**	**3.57**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	12.5 years
Lifetime (Weighted on Dth)	13.9 years
T & D Loss Factor (Energy)	8.51%
T & D Loss Factor (Demand)	10.39%
System Coincident kW Saved at Generator	**37,360 kW**
Annual kWh Saved at Customer	140,013,211 kWh
Annual kWh Saved at Generator	**147,770,554 kWh**
Annual Dth Saved	**474,266 Dth**
Electric Participants	**2,394,484**
Gas Participants	**606,787**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.6 years
Lifetime (Weighted on Dth)	16.6 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	10.56%
System Coincident kW Saved at Generator	**-24.29 kW**
Annual kWh Saved at Customer	-6,461,848 kWh
Annual kWh Saved at Generator	**-7,077,599 kWh**
Annual Dth Saved	**63,118 Dth**
Electric Participants	**2,897**
Gas Participants	**2,878**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	41,235 tons CO2
Gas Energy Efficiency	32,343 tons CO2
Electric Electrification	-1,165 tons CO2
Gas Electrification	4,603 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	77,016 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	278,548 tons CO2
Gas Energy Efficiency	479,804 tons CO2
Electric Electrification	-14,722 tons CO2
Gas Electrification	76,562 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	820,191 tons CO2

BUSINESS SEGMENT TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	91,751,864	91,751,864	N/A	107,044,347	107,044,347
Transmission and Distribution Capacity	N/A	10,535,124	10,535,124	N/A	12,342,973	12,342,973
Energy Generation	N/A	212,310,336	212,310,336	N/A	248,762,451	248,762,451
Market Effects and Ancilary Services	N/A	6,291,946	6,291,946	N/A	7,362,995	7,362,995
Subtotal	N/A	320,889,271	320,889,271	N/A	375,512,767	375,512,767
Gas System Impacts						
Commodity Cost	N/A	31,991,269	N/A	31,991,269	36,790,599	36,790,599
Variable O&M	N/A	275,566	N/A	275,566	316,775	316,775
Demand	N/A	7,816,428	N/A	7,816,428	8,984,426	8,984,426
Environmental Compliance	N/A	447,878	N/A	447,878	515,068	515,068
Subtotal	N/A	40,531,141	N/A	40,531,141	46,606,868	46,606,868
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	45,952,654	45,952,654
Gas Environmental Externalities	N/A	N/A	N/A	N/A	29,561,845	29,561,845
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	22,484	22,484
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	115,984	N/A	N/A	N/A	115,984	115,984
Utility Performance Incentives	N/A	(21,970,227)	(19,670,033)	(2,300,194)	(21,970,227)	(21,970,227)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	115,984	(21,970,227)	(19,670,033)	(2,300,194)	53,682,740	53,682,740
Participant Impacts						
Electric Bill	568,461,556	N/A	(565,050,606)	N/A	N/A	N/A
Gas Bill	51,144,966	N/A	N/A	(50,252,959)	N/A	N/A
Participant Rebates and Incentives	38,973,244	N/A	N/A	N/A	38,973,244	N/A
Incremental Capital	(140,205,725)	N/A	N/A	N/A	(140,205,725)	N/A
Incremental O&M	89,421,655	N/A	N/A	N/A	101,996,330	N/A
Subtotal	607,795,697	N/A	(565,050,606)	(50,252,959)	763,849	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(126,933)	(106,933)	(20,000)	(126,933)	(126,933)
Utility Administration	N/A	(18,389,544)	(15,924,279)	(2,465,265)	(18,389,544)	(18,389,544)
Advertising & Promotion	N/A	(1,234,731)	(1,020,378)	(214,353)	(1,234,731)	(1,234,731)
Measurement & Verification	N/A	(589,344)	(525,543)	(63,801)	(589,344)	(589,344)
Rebates	N/A	(38,973,244)	(35,549,662)	(3,423,582)	(38,973,244)	(38,973,244)
Other	N/A	(1,843,863)	(1,554,217)	(289,646)	(1,843,863)	(1,843,863)
Subtotal	N/A	(61,157,659)	**(54,681,012)**	**(6,476,647)**	(61,157,659)	(61,157,659)
Benefits	748,117,406	361,420,413	320,889,271	40,531,141	638,742,177	497,772,603
Costs	(140,205,725)	(83,127,886)	(639,401,651)	(59,029,800)	(223,333,611)	(83,127,886)
Net Benefit (Cost)	**607,911,681**	**278,292,527**	**(318,512,380)**	**(18,498,659)**	**415,408,566**	**414,644,716**
Benefit/Cost Ratio	**5.34**	**4.35**	**0.50**	**0.69**	**2.86**	**5.99**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	16.8 years
Lifetime (Weighted on Dth)	13.8 years
T & D Loss Factor (Energy)	7.43%
T & D Loss Factor (Demand)	8.83%
System Coincident kW Saved at Generator	**69,551 kW**
Annual kWh Saved at Customer	398,695,033 kWh
Annual kWh Saved at Generator	**428,456,974 kWh**
Annual Dth Saved	**606,408 Dth**
Electric Participants	**251,886**
Gas Participants	**114,984**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	19.1 years
Lifetime (Weighted on Dth)	19.9 years
T & D Loss Factor (Energy)	7.40%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-6.14 kW**
Annual kWh Saved at Customer	-345,571 kWh
Annual kWh Saved at Generator	**-373,187 kWh**
Annual Dth Saved	**3,035 Dth**
Electric Participants	**66**
Gas Participants	**63**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	123,842 tons CO2
Gas Energy Efficiency	44,225 tons CO2
Electric Electrification	-113 tons CO2
Gas Electrification	221 tons CO2
Other Fuel Electification	34 tons CO2
TOTAL	168,209 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,000,807 tons CO2
Gas Energy Efficiency	609,250 tons CO2
Electric Electrification	-1,032 tons CO2
Gas Electrification	4,405 tons CO2
Other Fuel Electification	545 tons CO2
TOTAL	1,613,975 tons CO2

BUSINESS SEGMENT TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	90,151,617	90,151,617	N/A	105,042,495	105,042,495
Transmission and Distribution Capacity	N/A	10,407,731	10,407,731	N/A	12,179,053	12,179,053
Energy Generation	N/A	214,492,599	214,492,599	N/A	250,438,149	250,438,149
Market Effects and Ancilary Services	N/A	6,301,039	6,301,039	N/A	7,353,194	7,353,194
Subtotal	N/A	321,352,986	321,352,986	N/A	375,012,890	375,012,890
Gas System Impacts						
Commodity Cost	N/A	36,689,676	N/A	36,689,676	42,330,580	42,330,580
Variable O&M	N/A	315,675	N/A	315,675	363,941	363,941
Demand	N/A	8,954,635	N/A	8,954,635	10,326,234	10,326,234
Environmental Compliance	N/A	513,655	N/A	513,655	592,628	592,628
Subtotal	N/A	46,473,641	N/A	46,473,641	53,613,383	53,613,383
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	41,379,960	41,379,960
Gas Environmental Externalities	N/A	N/A	N/A	N/A	33,528,140	33,528,140
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	52,294	52,294
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	284,870	N/A	N/A	N/A	284,870	284,870
Utility Performance Incentives	N/A	(22,052,863)	(19,477,500)	(2,575,363)	(22,052,863)	(22,052,863)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	284,870	(22,052,863)	(19,477,500)	(2,575,363)	53,192,402	53,192,402
Participant Impacts						
Electric Bill	568,712,424	N/A	(565,037,538)	N/A	N/A	N/A
Gas Bill	58,512,192	N/A	N/A	(57,533,608)	N/A	N/A
Participant Rebates and Incentives	37,939,368	N/A	N/A	N/A	37,939,368	N/A
Incremental Capital	(137,997,402)	N/A	N/A	N/A	(137,997,402)	N/A
Incremental O&M	89,681,514	N/A	N/A	N/A	102,083,705	N/A
Subtotal	616,848,097	N/A	(565,037,538)	(57,533,608)	2,025,672	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(126,825)	(106,825)	(20,000)	(126,825)	(126,825)
Utility Administration	N/A	(18,941,260)	(16,245,499)	(2,695,762)	(18,941,260)	(18,941,260)
Advertising & Promotion	N/A	(1,291,488)	(1,052,719)	(238,769)	(1,291,488)	(1,291,488)
Measurement & Verification	N/A	(547,887)	(466,228)	(81,659)	(547,887)	(547,887)
Rebates	N/A	(37,939,368)	(34,445,532)	(3,493,836)	(37,939,368)	(37,939,368)
Other	N/A	(1,736,727)	(1,386,430)	(350,297)	(1,736,727)	(1,736,727)
Subtotal	N/A	(60,583,555)	**(53,703,233)**	**(6,880,322)**	(60,583,555)	(60,583,555)
Benefits	755,130,369	367,826,627	321,352,986	46,473,641	643,894,611	503,871,538
Costs	(137,997,402)	(82,636,418)	(638,218,271)	(66,989,294)	(220,633,819)	(82,636,418)
Net Benefit (Cost)	**617,132,968**	**285,190,209**	**(316,865,285)**	**(20,515,653)**	**423,260,792**	**421,235,120**
Benefit/Cost Ratio	**5.47**	**4.45**	**0.50**	**0.69**	**2.92**	**6.10**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	16.7 years
Lifetime (Weighted on Dth)	14.2 years
T & D Loss Factor (Energy)	7.43%
T & D Loss Factor (Demand)	8.83%
System Coincident kW Saved at Generator	**68,214 kW**
Annual kWh Saved at Customer	396,663,212 kWh
Annual kWh Saved at Generator	**425,867,852 kWh**
Annual Dth Saved	**653,773 Dth**
Electric Participants	**263,646**
Gas Participants	**121,208**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	19.2 years
Lifetime (Weighted on Dth)	19.9 years
T & D Loss Factor (Energy)	7.40%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-39.51 kW**
Annual kWh Saved at Customer	-719,065 kWh
Annual kWh Saved at Generator	**-776,528 kWh**
Annual Dth Saved	**7,284 Dth**
Electric Participants	**107**
Gas Participants	**102**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	123,842 tons CO2
Gas Energy Efficiency	44,225 tons CO2
Electric Electrification	-150 tons CO2
Gas Electrification	531 tons CO2
Other Fuel Electification	75 tons CO2
TOTAL	168,524 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,000,807 tons CO2
Gas Energy Efficiency	675,695 tons CO2
Electric Electrification	-1,930 tons CO2
Gas Electrification	10,556 tons CO2
Other Fuel Electification	1,251 tons CO2
TOTAL	1,686,379 tons CO2

BUSINESS SEGMENT TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	93,902,529	93,902,529	N/A	109,459,854	109,459,854
Transmission and Distribution Capacity	N/A	10,912,829	10,912,829	N/A	12,776,592	12,776,592
Energy Generation	N/A	220,244,727	220,244,727	N/A	257,686,094	257,686,094
Market Effects and Ancilary Services	N/A	6,501,202	6,501,202	N/A	7,598,451	7,598,451
Subtotal	N/A	331,561,286	331,561,286	N/A	387,520,991	387,520,991
Gas System Impacts						
Commodity Cost	N/A	41,700,105	N/A	41,700,105	48,143,557	48,143,557
Variable O&M	N/A	358,523	N/A	358,523	413,630	413,630
Demand	N/A	10,167,551	N/A	10,167,551	11,733,157	11,733,157
Environmental Compliance	N/A	583,801	N/A	583,801	674,010	674,010
Subtotal	N/A	52,809,982	N/A	52,809,982	60,964,353	60,964,353
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	41,350,461	41,350,461
Gas Environmental Externalities	N/A	N/A	N/A	N/A	37,565,148	37,565,148
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	66,498	66,498
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	389,339	N/A	N/A	N/A	389,339	389,339
Utility Performance Incentives	N/A	(23,125,784)	(20,061,070)	(3,064,714)	(23,125,784)	(23,125,784)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	389,339	(23,125,784)	(20,061,070)	(3,064,714)	56,245,663	56,245,663
Participant Impacts						
Electric Bill	591,528,311	N/A	(587,571,755)	N/A	N/A	N/A
Gas Bill	66,365,273	N/A	N/A	(65,294,752)	N/A	N/A
Participant Rebates and Incentives	38,144,046	N/A	N/A	N/A	38,144,046	N/A
Incremental Capital	(136,819,437)	N/A	N/A	N/A	(136,819,437)	N/A
Incremental O&M	91,412,109	N/A	N/A	N/A	104,280,588	N/A
Subtotal	650,630,301	N/A	(587,571,755)	(65,294,752)	5,605,196	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(126,100)	(106,100)	(20,000)	(126,100)	(126,100)
Utility Administration	N/A	(19,629,070)	(16,771,302)	(2,857,768)	(19,629,070)	(19,629,070)
Advertising & Promotion	N/A	(1,308,508)	(1,057,295)	(251,214)	(1,308,508)	(1,308,508)
Measurement & Verification	N/A	(564,781)	(478,098)	(86,684)	(564,781)	(564,781)
Rebates	N/A	(38,144,046)	(34,629,500)	(3,514,545)	(38,144,046)	(38,144,046)
Other	N/A	(1,559,420)	(1,205,046)	(354,374)	(1,559,420)	(1,559,420)
Subtotal	N/A	(61,331,925)	**(54,247,340)**	**(7,084,584)**	(61,331,925)	(61,331,925)
Benefits	787,839,077	384,371,268	331,561,286	52,809,982	670,281,423	527,856,790
Costs	(136,819,437)	(84,457,708)	(661,880,165)	(75,444,050)	(221,277,145)	(84,457,708)
Net Benefit (Cost)	**651,019,640**	**299,913,560**	**(330,318,879)**	**(22,634,068)**	**449,004,278**	**443,399,082**
Benefit/Cost Ratio	**5.76**	**4.55**	**0.50**	**0.70**	**3.03**	**6.25**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts

Lifetime (Weighted on Generator kWh)	16.8 years
Lifetime (Weighted on Dth)	14.3 years
T & D Loss Factor (Energy)	7.44%
T & D Loss Factor (Demand)	8.83%
System Coincident kW Saved at Generator	**70,086 kW**
Annual kWh Saved at Customer	408,168,261 kWh
Annual kWh Saved at Generator	**438,091,129 kWh**
Annual Dth Saved	**710,059 Dth**
Electric Participants	**276,057**
Gas Participants	**127,810**

Beneficial Electrification Impacts

Lifetime (Weighted on Generator kWh)	19.4 years
Lifetime (Weighted on Dth)	19.8 years
T & D Loss Factor (Energy)	7.40%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-87.93 kW**
Annual kWh Saved at Customer	-1,032,486 kWh
Annual kWh Saved at Generator	**-1,114,995 kWh**
Annual Dth Saved	**10,667 Dth**
Electric Participants	**133**
Gas Participants	**128**

First year Carbon Emissions Reductions

Electric Energy Efficiency	123,842 tons CO2
Gas Energy Efficiency	44,225 tons CO2
Electric Electrification	-215 tons CO2
Gas Electrification	778 tons CO2
Other Fuel Electification	91 tons CO2
TOTAL	168,721 tons CO2

Lifetime Carbon Emissions Reductions

Electric Energy Efficiency	1,000,807 tons CO2
Gas Energy Efficiency	741,593 tons CO2
Electric Electrification	-2,643 tons CO2
Gas Electrification	15,436 tons CO2
Other Fuel Electification	1,573 tons CO2
TOTAL	1,756,764 tons CO2

INCOME QUALIFIED SEGMENT TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	1,039,833	1,039,833	N/A	1,153,608	1,153,608
Transmission and Distribution Capacity	N/A	116,784	116,784	N/A	130,051	130,051
Energy Generation	N/A	2,272,804	2,272,804	N/A	2,623,496	2,623,496
Market Effects and Ancilary Services	N/A	68,267	68,267	N/A	77,761	77,761
Subtotal	N/A	3,497,688	3,497,688	N/A	3,984,916	3,984,916
Gas System Impacts						
Commodity Cost	N/A	1,793,211	N/A	1,793,211	2,092,657	2,092,657
Variable O&M	N/A	15,439	N/A	15,439	18,006	18,006
Demand	N/A	437,862	N/A	437,862	510,696	510,696
Environmental Compliance	N/A	25,105	N/A	25,105	29,297	29,297
Subtotal	N/A	2,271,617	N/A	2,271,617	2,650,657	2,650,657
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	549,055	549,055
Gas Environmental Externalities	N/A	N/A	N/A	N/A	1,665,892	1,665,892
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(339,550)	(207,451)	(132,099)	(339,550)	(339,550)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(339,550)	(207,451)	(132,099)	1,875,397	1,875,397
Participant Impacts						
Electric Bill	9,467,845	N/A	(8,200,585)	N/A	N/A	N/A
Gas Bill	3,126,571	N/A	N/A	(2,896,037)	N/A	N/A
Participant Rebates and Incentives	6,864,726	N/A	N/A	N/A	6,864,726	N/A
Incremental Capital	(6,142,326)	N/A	N/A	N/A	(6,142,326)	N/A
Incremental O&M	560,626	N/A	N/A	N/A	560,619	N/A
Subtotal	13,877,442	N/A	(8,200,585)	(2,896,037)	1,283,020	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(4,011,602)	(2,971,980)	(1,039,622)	(4,011,602)	(4,011,602)
Advertising & Promotion	N/A	(1,613,400)	(1,234,100)	(379,300)	(1,613,400)	(1,613,400)
Measurement & Verification	N/A	(52,000)	(42,000)	(10,000)	(52,000)	(52,000)
Rebates	N/A	(6,864,726)	(4,210,444)	(2,654,282)	(6,864,726)	(6,864,726)
Other	N/A	(865,709)	(730,877)	(134,832)	(865,709)	(865,709)
Subtotal	N/A	(13,407,437)	**(9,189,401)**	**(4,218,036)**	(13,407,437)	(13,407,437)
Benefits	20,019,767	5,769,304	3,497,688	2,271,617	16,275,866	8,850,520
Costs	(6,142,326)	(13,746,987)	(17,597,437)	(7,246,172)	(19,889,312)	(13,746,987)
Net Benefit (Cost)	**13,877,442**	**(7,977,682)**	**(14,099,749)**	**(4,974,555)**	**(3,613,446)**	**(4,896,467)**
Benefit/Cost Ratio	**3.26**	**0.42**	**0.20**	**0.31**	**0.82**	**0.64**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	13.7 years
Lifetime (Weighted on Dth)	16.1 years
T & D Loss Factor (Energy)	8.60%
T & D Loss Factor (Demand)	10.47%
System Coincident kW Saved at Generator	**1,363 kW**
Annual kWh Saved at Customer	5,084,204 kWh
Annual kWh Saved at Generator	**5,542,337 kWh**
Annual Dth Saved	**29,681 Dth**
Electric Participants	**11,188**
Gas Participants	**2,849**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	17.1 years
Lifetime (Weighted on Dth)	16.1 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	-28,764 kWh
Annual kWh Saved at Generator	**-31,505 kWh**
Annual Dth Saved	**124 Dth**
Electric Participants	**5**
Gas Participants	**3**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	1,627 tons CO2
Gas Energy Efficiency	2,165 tons CO2
Electric Electrification	-9 tons CO2
Gas Electrification	9 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	3,791 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	11,933 tons CO2
Gas Energy Efficiency	34,870 tons CO2
Electric Electrification	-83 tons CO2
Gas Electrification	145 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	46,865 tons CO2

INCOME QUALIFIED SEGMENT TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	1,281,220	1,281,220	N/A	1,422,948	1,422,948
Transmission and Distribution Capacity	N/A	144,860	144,860	N/A	161,504	161,504
Energy Generation	N/A	2,903,830	2,903,830	N/A	3,345,655	3,345,655
Market Effects and Ancilary Services	N/A	86,271	86,271	N/A	98,214	98,214
Subtotal	N/A	4,416,181	4,416,181	N/A	5,028,321	5,028,321
Gas System Impacts						
Commodity Cost	N/A	2,081,119	N/A	2,081,119	2,423,617	2,423,617
Variable O&M	N/A	17,892	N/A	17,892	20,826	20,826
Demand	N/A	507,728	N/A	507,728	590,978	590,978
Environmental Compliance	N/A	29,136	N/A	29,136	33,931	33,931
Subtotal	N/A	2,635,874	N/A	2,635,874	3,069,351	3,069,351
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	619,903	619,903
Gas Environmental Externalities	N/A	N/A	N/A	N/A	1,908,171	1,908,171
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(409,214)	(258,050)	(151,165)	(409,214)	(409,214)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(409,214)	(258,050)	(151,165)	2,118,859	2,118,859
Participant Impacts						
Electric Bill	11,969,640	N/A	(10,358,567)	N/A	N/A	N/A
Gas Bill	3,658,573	N/A	N/A	(3,369,492)	N/A	N/A
Participant Rebates and Incentives	8,369,767	N/A	N/A	N/A	8,369,767	N/A
Incremental Capital	(7,609,794)	N/A	N/A	N/A	(7,609,794)	N/A
Incremental O&M	665,392	N/A	N/A	N/A	665,668	N/A
Subtotal	17,053,578	N/A	(10,358,567)	(3,369,492)	1,425,642	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(5,183,083)	(3,869,239)	(1,313,844)	(5,183,083)	(5,183,083)
Advertising & Promotion	N/A	(1,469,100)	(1,107,700)	(361,400)	(1,469,100)	(1,469,100)
Measurement & Verification	N/A	(42,000)	(32,000)	(10,000)	(42,000)	(42,000)
Rebates	N/A	(8,369,767)	(5,143,699)	(3,226,068)	(8,369,767)	(8,369,767)
Other	N/A	(994,490)	(844,085)	(150,405)	(994,490)	(994,490)
Subtotal	N/A	(16,058,440)	**(10,996,722)**	**(5,061,718)**	(16,058,440)	(16,058,440)
Benefits	24,663,372	7,052,055	4,416,181	2,635,874	19,661,181	10,625,746
Costs	(7,609,794)	(16,467,654)	(21,613,339)	(8,582,375)	(24,077,448)	(16,467,654)
Net Benefit (Cost)	**17,053,578**	**(9,415,600)**	**(17,197,158)**	**(5,946,501)**	**(4,416,267)**	**(5,841,909)**
Benefit/Cost Ratio	**3.24**	**0.43**	**0.20**	**0.31**	**0.82**	**0.65**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	13.9 years
Lifetime (Weighted on Dth)	15.9 years
T & D Loss Factor (Energy)	8.60%
T & D Loss Factor (Demand)	10.47%
System Coincident kW Saved at Generator	**1,637 kW**
Annual kWh Saved at Customer	6,235,261 kWh
Annual kWh Saved at Generator	**6,799,722 kWh**
Annual Dth Saved	**33,832 Dth**
Electric Participants	**13,067**
Gas Participants	**3,337**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	17.1 years
Lifetime (Weighted on Dth)	15.8 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	-45,926 kWh
Annual kWh Saved at Generator	**-50,302 kWh**
Annual Dth Saved	**163 Dth**
Electric Participants	**8**
Gas Participants	**4**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	1,627 tons CO2
Gas Energy Efficiency	2,165 tons CO2
Electric Electrification	-9 tons CO2
Gas Electrification	12 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	3,795 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	11,933 tons CO2
Gas Energy Efficiency	39,187 tons CO2
Electric Electrification	-123 tons CO2
Gas Electrification	188 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	51,185 tons CO2

INCOME QUALIFIED SEGMENT TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	1,584,237	1,584,237	N/A	1,763,882	1,763,882
Transmission and Distribution Capacity	N/A	180,618	180,618	N/A	201,888	201,888
Energy Generation	N/A	3,605,222	3,605,222	N/A	4,167,096	4,167,096
Market Effects and Ancilary Services	N/A	107,069	107,069	N/A	122,262	122,262
Subtotal	N/A	5,477,146	5,477,146	N/A	6,255,128	6,255,128
Gas System Impacts						
Commodity Cost	N/A	2,490,186	N/A	2,490,186	2,894,891	2,894,891
Variable O&M	N/A	21,401	N/A	21,401	24,866	24,866
Demand	N/A	606,996	N/A	606,996	705,311	705,311
Environmental Compliance	N/A	34,863	N/A	34,863	40,528	40,528
Subtotal	N/A	3,153,446	N/A	3,153,446	3,665,597	3,665,597
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	751,833	751,833
Gas Environmental Externalities	N/A	N/A	N/A	N/A	2,249,272	2,249,272
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(509,739)	(319,439)	(190,299)	(509,739)	(509,739)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(509,739)	(319,439)	(190,299)	2,491,367	2,491,367
Participant Impacts						
Electric Bill	15,158,230	N/A	(13,090,491)	N/A	N/A	N/A
Gas Bill	4,424,965	N/A	N/A	(4,044,777)	N/A	N/A
Participant Rebates and Incentives	10,507,715	N/A	N/A	N/A	10,507,715	N/A
Incremental Capital	(9,711,320)	N/A	N/A	N/A	(9,711,320)	N/A
Incremental O&M	693,763	N/A	N/A	N/A	694,323	N/A
Subtotal	21,073,354	N/A	(13,090,491)	(4,044,777)	1,490,718	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(5,579,343)	(4,181,665)	(1,397,678)	(5,579,343)	(5,579,343)
Advertising & Promotion	N/A	(1,480,000)	(1,107,700)	(372,300)	(1,480,000)	(1,480,000)
Measurement & Verification	N/A	(43,000)	(33,000)	(10,000)	(43,000)	(43,000)
Rebates	N/A	(10,507,715)	(6,070,536)	(4,437,179)	(10,507,715)	(10,507,715)
Other	N/A	(1,122,325)	(956,770)	(165,555)	(1,122,325)	(1,122,325)
Subtotal	N/A	(18,732,383)	**(12,349,670)**	**(6,382,712)**	(18,732,383)	(18,732,383)
Benefits	30,784,674	8,630,592	5,477,146	3,153,446	24,123,869	12,921,831
Costs	(9,711,320)	(19,242,121)	(25,759,601)	(10,617,788)	(28,953,441)	(19,242,121)
Net Benefit (Cost)	**21,073,354**	**(10,611,529)**	**(20,282,455)**	**(7,464,342)**	**(4,829,572)**	**(6,320,290)**
Benefit/Cost Ratio	**3.17**	**0.45**	**0.21**	**0.30**	**0.83**	**0.67**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	14.0 years
Lifetime (Weighted on Dth)	15.8 years
T & D Loss Factor (Energy)	8.59%
T & D Loss Factor (Demand)	10.46%
System Coincident kW Saved at Generator	**1,957 kW**
Annual kWh Saved at Customer	7,651,972 kWh
Annual kWh Saved at Generator	**8,346,718 kWh**
Annual Dth Saved	**39,448 Dth**
Electric Participants	**15,111**
Gas Participants	**3,981**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	17.1 years
Lifetime (Weighted on Dth)	16.1 years
T & D Loss Factor (Energy)	8.70%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	-59,170 kWh
Annual kWh Saved at Generator	**-64,808 kWh**
Annual Dth Saved	**247 Dth**
Electric Participants	**10**
Gas Participants	**6**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	1,627 tons CO2
Gas Energy Efficiency	2,165 tons CO2
Electric Electrification	-12 tons CO2
Gas Electrification	18 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	3,798 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	11,933 tons CO2
Gas Energy Efficiency	45,318 tons CO2
Electric Electrification	-155 tons CO2
Gas Electrification	290 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	57,386 tons CO2

DEMAND RESPONSE SEGMENT TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	39,965,345	39,965,345	N/A	43,616,392	43,616,392
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	153,217	153,217	N/A	166,840	166,840
Market Effects and Ancilary Services	N/A	802,371	802,371	N/A	875,665	875,665
Subtotal	N/A	40,920,933	40,920,933	N/A	44,658,897	44,658,897
Gas System Impacts						
Commodity Cost	N/A	25,844	N/A	25,844	28,205	28,205
Variable O&M	N/A	223	N/A	223	243	243
Demand	N/A	6,329	N/A	6,329	6,905	6,905
Environmental Compliance	N/A	362	N/A	362	395	395
Subtotal	N/A	32,757	N/A	32,757	35,749	35,749
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	36,707	36,707
Gas Environmental Externalities	N/A	N/A	N/A	N/A	23,470	23,470
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(13,328)	(11,554)	(1,774)	(13,328)	(13,328)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(13,328)	(11,554)	(1,774)	46,849	46,849
Participant Impacts						
Electric Bill	11,884,228	N/A	(10,992,444)	N/A	N/A	N/A
Gas Bill	40,074	N/A	N/A	(40,074)	N/A	N/A
Participant Rebates and Incentives	3,244,647	N/A	N/A	N/A	3,244,647	N/A
Incremental Capital	(460,307)	N/A	N/A	N/A	(460,307)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	14,708,642	N/A	(10,992,444)	(40,074)	2,784,340	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(37,000)	(37,000)	0	(37,000)	(37,000)
Utility Administration	N/A	(13,526,427)	(13,503,427)	(23,000)	(13,526,427)	(13,526,427)
Advertising & Promotion	N/A	(980,328)	(980,328)	0	(980,328)	(980,328)
Measurement & Verification	N/A	(365,000)	(360,000)	(5,000)	(365,000)	(365,000)
Rebates	N/A	(3,244,647)	(3,239,882)	(4,765)	(3,244,647)	(3,244,647)
Other	N/A	(25,000)	(25,000)	0	(25,000)	(25,000)
Subtotal	N/A	(18,178,402)	**(18,145,637)**	**(32,765)**	(18,178,402)	(18,178,402)
Benefits	15,168,950	40,953,690	40,920,933	32,757	47,999,470	44,754,823
Costs	(460,307)	(18,191,731)	(29,149,636)	(74,613)	(18,652,038)	(18,191,731)
Net Benefit (Cost)	**14,708,642**	**22,761,960**	**11,771,297**	**(41,856)**	**29,347,432**	**26,563,092**
Benefit/Cost Ratio	**32.95**	**2.25**	**1.40**	**0.44**	**2.57**	**2.46**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	6.8 years
Lifetime (Weighted on Dth)	10.0 years
T & D Loss Factor (Energy)	7.49%
T & D Loss Factor (Demand)	9.55%
System Coincident kW Saved at Generator	**100,963 kW**
Annual kWh Saved at Customer	580,717 kWh
Annual kWh Saved at Generator	**627,721 kWh**
Annual Dth Saved	**639 Dth**
Electric Participants	**828,602**
Gas Participants	**83**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	198 tons CO2
Gas Energy Efficiency	47 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	244 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	726 tons CO2
Gas Energy Efficiency	466 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	1,192 tons CO2

DEMAND RESPONSE SEGMENT TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	41,983,098	41,983,098	N/A	45,673,761	45,673,761
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	220,376	220,376	N/A	238,845	238,845
Market Effects and Ancilary Services	N/A	844,069	844,069	N/A	918,252	918,252
Subtotal	N/A	43,047,543	43,047,543	N/A	46,830,859	46,830,859
Gas System Impacts						
Commodity Cost	N/A	48,282	N/A	48,282	52,702	52,702
Variable O&M	N/A	416	N/A	416	454	454
Demand	N/A	11,810	N/A	11,810	12,889	12,889
Environmental Compliance	N/A	676	N/A	676	738	738
Subtotal	N/A	61,183	N/A	61,183	66,783	66,783
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	43,419	43,419
Gas Environmental Externalities	N/A	N/A	N/A	N/A	43,182	43,182
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(19,413)	(16,147)	(3,267)	(19,413)	(19,413)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(19,413)	(16,147)	(3,267)	67,188	67,188
Participant Impacts						
Electric Bill	11,711,484	N/A	(10,819,621)	N/A	N/A	N/A
Gas Bill	74,782	N/A	N/A	(74,782)	N/A	N/A
Participant Rebates and Incentives	3,607,736	N/A	N/A	N/A	3,607,736	N/A
Incremental Capital	(621,960)	N/A	N/A	N/A	(621,960)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	14,772,042	N/A	(10,819,621)	(74,782)	2,985,776	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(87,000)	(87,000)	0	(87,000)	(87,000)
Utility Administration	N/A	(14,245,084)	(14,220,084)	(25,000)	(14,245,084)	(14,245,084)
Advertising & Promotion	N/A	(980,228)	(980,228)	0	(980,228)	(980,228)
Measurement & Verification	N/A	(365,000)	(360,000)	(5,000)	(365,000)	(365,000)
Rebates	N/A	(3,607,736)	(3,599,596)	(8,140)	(3,607,736)	(3,607,736)
Other	N/A	(25,000)	(25,000)	0	(25,000)	(25,000)
Subtotal	N/A	(19,310,048)	**(19,271,908)**	**(38,140)**	(19,310,048)	(19,310,048)
Benefits	15,394,002	43,108,726	43,047,543	61,183	50,591,979	46,984,243
Costs	(621,960)	(19,329,462)	(30,107,676)	(116,189)	(19,951,421)	(19,329,462)
Net Benefit (Cost)	**14,772,042**	**23,779,265**	**12,939,867**	**(55,005)**	**30,640,558**	**27,654,781**
Benefit/Cost Ratio	**24.75**	**2.23**	**1.43**	**0.53**	**2.54**	**2.43**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	6.8 years
Lifetime (Weighted on Dth)	10.0 years
T & D Loss Factor (Energy)	7.47%
T & D Loss Factor (Demand)	9.43%
System Coincident kW Saved at Generator	**117,664 kW**
Annual kWh Saved at Customer	805,123 kWh
Annual kWh Saved at Generator	**870,164 kWh**
Annual Dth Saved	**1,155 Dth**
Electric Participants	**836,175**
Gas Participants	**150**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	198 tons CO2
Gas Energy Efficiency	47 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	244 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	726 tons CO2
Gas Energy Efficiency	842 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	1,568 tons CO2

DEMAND RESPONSE SEGMENT TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	43,745,979	43,745,979	N/A	47,464,276	47,464,276
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	286,446	286,446	N/A	310,701	310,701
Market Effects and Ancilary Services	N/A	880,649	880,649	N/A	955,500	955,500
Subtotal	N/A	44,913,074	44,913,074	N/A	48,730,476	48,730,476
Gas System Impacts						
Commodity Cost	N/A	50,031	N/A	50,031	54,592	54,592
Variable O&M	N/A	431	N/A	431	470	470
Demand	N/A	12,223	N/A	12,223	13,336	13,336
Environmental Compliance	N/A	700	N/A	700	764	764
Subtotal	N/A	63,386	N/A	63,386	69,162	69,162
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	54,118	54,118
Gas Environmental Externalities	N/A	N/A	N/A	N/A	43,948	43,948
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	(24,840)	(21,278)	(3,562)	(24,840)	(24,840)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	(24,840)	(21,278)	(3,562)	73,226	73,226
Participant Impacts						
Electric Bill	11,570,493	N/A	(10,678,581)	N/A	N/A	N/A
Gas Bill	77,400	N/A	N/A	(77,400)	N/A	N/A
Participant Rebates and Incentives	3,907,999	N/A	N/A	N/A	3,907,999	N/A
Incremental Capital	(796,764)	N/A	N/A	N/A	(796,764)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	14,759,127	N/A	(10,678,581)	(77,400)	3,111,235	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(97,000)	(97,000)	0	(97,000)	(97,000)
Utility Administration	N/A	(14,666,221)	(14,638,221)	(28,000)	(14,666,221)	(14,666,221)
Advertising & Promotion	N/A	(980,118)	(980,118)	0	(980,118)	(980,118)
Measurement & Verification	N/A	(365,000)	(360,000)	(5,000)	(365,000)	(365,000)
Rebates	N/A	(3,907,999)	(3,899,693)	(8,307)	(3,907,999)	(3,907,999)
Other	N/A	(25,000)	(25,000)	0	(25,000)	(25,000)
Subtotal	N/A	(20,041,338)	**(20,000,031)**	**(41,307)**	(20,041,338)	(20,041,338)
Benefits	15,555,892	44,976,459	44,913,074	63,386	52,805,704	48,897,705
Costs	(796,764)	(20,066,178)	(30,699,890)	(122,269)	(20,862,943)	(20,066,178)
Net Benefit (Cost)	**14,759,127**	**24,910,281**	**14,213,183**	**(58,883)**	**31,942,762**	**28,831,526**
Benefit/Cost Ratio	**19.52**	**2.24**	**1.46**	**0.52**	**2.53**	**2.44**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	6.9 years
Lifetime (Weighted on Dth)	10.0 years
T & D Loss Factor (Energy)	7.46%
T & D Loss Factor (Demand)	9.34%
System Coincident kW Saved at Generator	**133,746 kW**
Annual kWh Saved at Customer	1,051,071 kWh
Annual kWh Saved at Generator	**1,135,859 kWh**
Annual Dth Saved	**1,155 Dth**
Electric Participants	**842,320**
Gas Participants	**150**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	198 tons CO2
Gas Energy Efficiency	47 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	244 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	726 tons CO2
Gas Energy Efficiency	842 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	1,568 tons CO2

EFFICIENT FUEL SWITCHING TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	(3,334)	(3,334)	N/A	(3,631)	(3,631)
Transmission and Distribution Capacity	N/A	(375)	(375)	N/A	(409)	(409)
Energy Generation	N/A	(19,008)	(19,008)	N/A	(20,763)	(20,763)
Market Effects and Ancilary Services	N/A	(454)	(454)	N/A	(496)	(496)
Subtotal	N/A	(23,171)	(23,171)	N/A	(25,299)	(25,299)
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	(4,490)	(4,490)
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	51,328	51,328
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	384,953	N/A	N/A	N/A	384,953	384,953
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	384,953	0	0	0	431,791	431,791
Participant Impacts						
Electric Bill	(55,410)	N/A	52,887	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	1,061,250	N/A	N/A	N/A	1,061,250	N/A
Incremental Capital	(81,125)	N/A	N/A	N/A	(81,125)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	924,715	N/A	52,887	0	980,125	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(650,000)	(650,000)	0	(650,000)	(650,000)
Advertising & Promotion	N/A	(175,000)	(175,000)	0	(175,000)	(175,000)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	(1,061,250)	(1,061,250)	0	(1,061,250)	(1,061,250)
Other	N/A	0	0	0	0	0
Subtotal	N/A	(1,886,250)	**(1,886,250)**	**0**	(1,886,250)	(1,886,250)
Benefits	1,446,203	0	52,887	0	1,497,531	436,281
Costs	(136,535)	(1,909,421)	(1,909,421)	0	(1,997,164)	(1,916,039)
Net Benefit (Cost)	**1,309,668**	**(1,909,421)**	**(1,856,534)**	**0**	**(499,634)**	**(1,479,759)**
Benefit/Cost Ratio	**10.59**	**0.00**	**0.03**	**INF**	**0.75**	**0.23**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.000 kW**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	10.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	7.89%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-3.75 kW**
Annual kWh Saved at Customer	-49,970 kWh
Annual kWh Saved at Generator	**-54,251 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**1,100**
Gas Participants	**0**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-16 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	119 tons CO2
TOTAL	102 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-90 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	1,186 tons CO2
TOTAL	1,096 tons CO2

EFFICIENT FUEL SWITCHING TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	(3,389)	(3,389)	N/A	(3,691)	(3,691)
Transmission and Distribution Capacity	N/A	(384)	(384)	N/A	(418)	(418)
Energy Generation	N/A	(19,356)	(19,356)	N/A	(21,081)	(21,081)
Market Effects and Ancilary Services	N/A	(463)	(463)	N/A	(504)	(504)
Subtotal	N/A	(23,592)	(23,592)	N/A	(25,695)	(25,695)
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	(3,927)	(3,927)
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	52,255	52,255
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	391,305	N/A	N/A	N/A	391,305	391,305
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	391,305	0	0	0	439,633	439,633
Participant Impacts						
Electric Bill	(56,410)	N/A	53,843	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	1,261,250	N/A	N/A	N/A	1,261,250	N/A
Incremental Capital	(81,125)	N/A	N/A	N/A	(81,125)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	1,123,715	N/A	53,843	0	1,180,125	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(670,000)	(670,000)	0	(670,000)	(670,000)
Advertising & Promotion	N/A	(160,000)	(160,000)	0	(160,000)	(160,000)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	(1,261,250)	(1,261,250)	0	(1,261,250)	(1,261,250)
Other	N/A	0	0	0	0	0
Subtotal	N/A	(2,091,250)	**(2,091,250)**	**0**	(2,091,250)	(2,091,250)
Benefits	1,652,555	0	53,843	0	1,704,810	443,560
Costs	(137,535)	(2,114,842)	(2,114,842)	0	(2,201,997)	(2,120,872)
Net Benefit (Cost)	**1,515,020**	**(2,114,842)**	**(2,060,998)**	**0**	**(497,187)**	**(1,677,312)**
Benefit/Cost Ratio	**12.02**	**0.00**	**0.03**	**INF**	**0.77**	**0.21**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**#DIV/0!**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	10.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	7.89%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-3.75 kW**
Annual kWh Saved at Customer	-49,970 kWh
Annual kWh Saved at Generator	**-54,251 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**1,200**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-12 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	119 tons CO2
TOTAL	106 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-80 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	1,186 tons CO2
TOTAL	1,106 tons CO2

EFFICIENT FUEL SWITCHING TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	(3,445)	(3,445)	N/A	(3,752)	(3,752)
Transmission and Distribution Capacity	N/A	(393)	(393)	N/A	(428)	(428)
Energy Generation	N/A	(19,129)	(19,129)	N/A	(20,864)	(20,864)
Market Effects and Ancilary Services	N/A	(459)	(459)	N/A	(501)	(501)
Subtotal	N/A	(23,426)	(23,426)	N/A	(25,545)	(25,545)
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	(3,768)	(3,768)
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	53,182	53,182
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	397,761	N/A	N/A	N/A	397,761	397,761
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	397,761	0	0	0	447,175	447,175
Participant Impacts						
Electric Bill	(57,433)	N/A	54,822	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	1,461,250	N/A	N/A	N/A	1,461,250	N/A
Incremental Capital	(81,125)	N/A	N/A	N/A	(81,125)	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	1,322,692	N/A	54,822	0	1,380,125	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(700,000)	(700,000)	0	(700,000)	(700,000)
Advertising & Promotion	N/A	(150,000)	(150,000)	0	(150,000)	(150,000)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	(1,461,250)	(1,461,250)	0	(1,461,250)	(1,461,250)
Other	N/A	0	0	0	0	0
Subtotal	N/A	(2,311,250)	**(2,311,250)**	**0**	(2,311,250)	(2,311,250)
Benefits	1,859,011	0	54,822	0	1,912,193	450,943
Costs	(138,558)	(2,334,676)	(2,334,676)	0	(2,421,688)	(2,340,563)
Net Benefit (Cost)	**1,720,453**	**(2,334,676)**	**(2,279,854)**	**0**	**(509,495)**	**(1,889,620)**
Benefit/Cost Ratio	**13.42**	**0.00**	**0.02**	**INF**	**0.79**	**0.19**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts

Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**#DIV/0!**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

Beneficial Electrification Impacts

Lifetime (Weighted on Generator kWh)	10.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	7.89%
T & D Loss Factor (Demand)	8.80%
System Coincident kW Saved at Generator	**-3.75 kW**
Annual kWh Saved at Customer	-49,970 kWh
Annual kWh Saved at Generator	**-54,251 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**1,300**
Gas Participants	**0**

First year Carbon Emissions Reductions

Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-12 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	119 tons CO2
TOTAL	107 tons CO2

Lifetime Carbon Emissions Reductions

Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	-75 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	1,186 tons CO2
TOTAL	1,111 tons CO2

INDIRECT PRODUCTS & SERVICES TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(9,791,343)	(7,833,151)	(1,958,192)	(9,791,343)	(9,791,343)
Advertising & Promotion	N/A	(6,756,120)	(5,509,139)	(1,246,981)	(6,756,120)	(6,756,120)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	0	0	0	0	0
Other	N/A	0	0	0	0	0
Subtotal	N/A	(16,547,463)	**(13,342,290)**	**(3,205,173)**	(16,547,463)	(16,547,463)
Benefits	0	0	0	0	0	0
Costs	0	(16,547,463)	(13,342,290)	(3,205,173)	(16,547,463)	(16,547,463)
Net Benefit (Cost)	**0**	**(16,547,463)**	**(13,342,290)**	**(3,205,173)**	**(16,547,463)**	**(16,547,463)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.000 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**697,494**
Gas Participants	**347,474**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

INDIRECT PRODUCTS & SERVICES TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(10,673,422)	(8,472,390)	(2,201,033)	(10,673,422)	(10,673,422)
Advertising & Promotion	N/A	(7,457,482)	(6,110,953)	(1,346,529)	(7,457,482)	(7,457,482)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	0	0	0	0	0
Other	N/A	(442,086)	(442,086)	0	(442,086)	(442,086)
Subtotal	N/A	(18,572,990)	**(15,025,429)**	**(3,547,562)**	(18,572,990)	(18,572,990)
Benefits	0	0	0	0	0	0
Costs	0	(18,572,990)	(15,025,429)	(3,547,562)	(18,572,990)	(18,572,990)
Net Benefit (Cost)	**0**	**(18,572,990)**	**(15,025,429)**	**(3,547,562)**	**(18,572,990)**	**(18,572,990)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.000 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**698,754**
Gas Participants	**347,944**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

INDIRECT PRODUCTS & SERVICES TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(11,458,827)	(9,173,955)	(2,284,872)	(11,458,827)	(11,458,827)
Advertising & Promotion	N/A	(8,195,409)	(6,741,938)	(1,453,471)	(8,195,409)	(8,195,409)
Measurement & Verification	N/A	0	0	0	0	0
Rebates	N/A	0	0	0	0	0
Other	N/A	0	0	0	0	0
Subtotal	N/A	(19,654,236)	**(15,915,893)**	**(3,738,343)**	(19,654,236)	(19,654,236)
Benefits	0	0	0	0	0	0
Costs	0	(19,654,236)	(15,915,893)	(3,738,343)	(19,654,236)	(19,654,236)
Net Benefit (Cost)	**0**	**(19,654,236)**	**(15,915,893)**	**(3,738,343)**	**(19,654,236)**	**(19,654,236)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.000 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**699,864**
Gas Participants	**348,259**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

RESEARCH, EVALUATIONS & PILOTS TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(6,706,957)	(6,214,682)	(492,275)	(6,706,957)	(6,706,957)
Advertising & Promotion	N/A	0	0	0	0	0
Measurement & Verification	N/A	(2,001,719)	(1,660,313)	(341,406)	(2,001,719)	(2,001,719)
Rebates	N/A	0	0	0	0	0
Other	N/A	(47,500)	(27,500)	(20,000)	(47,500)	(47,500)
Subtotal	N/A	(8,756,176)	**(7,902,495)**	**(853,681)**	(8,756,176)	(8,756,176)
Benefits	0	0	0	0	0	0
Costs	0	(8,756,176)	(7,902,495)	(853,681)	(8,756,176)	(8,756,176)
Net Benefit (Cost)	**0**	**(8,756,176)**	**(7,902,495)**	**(853,681)**	**(8,756,176)**	**(8,756,176)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.000 kW**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

RESEARCH, EVALUATIONS & PILOTS TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(7,055,652)	(6,523,730)	(531,921)	(7,055,652)	(7,055,652)
Advertising & Promotion	N/A	0	0	0	0	0
Measurement & Verification	N/A	(1,965,530)	(1,635,078)	(330,451)	(1,965,530)	(1,965,530)
Rebates	N/A	0	0	0	0	0
Other	N/A	(47,500)	(27,500)	(20,000)	(47,500)	(47,500)
Subtotal	N/A	(9,068,681)	**(8,186,308)**	**(882,373)**	(9,068,681)	(9,068,681)
Benefits	0	0	0	0	0	0
Costs	0	(9,068,681)	(8,186,308)	(882,373)	(9,068,681)	(9,068,681)
Net Benefit (Cost)	**0**	**(9,068,681)**	**(8,186,308)**	**(882,373)**	**(9,068,681)**	**(9,068,681)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**#DIV/0!**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

RESEARCH, EVALUATIONS & PILOTS TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	0	0	N/A	0	0
Transmission and Distribution Capacity	N/A	0	0	N/A	0	0
Energy Generation	N/A	0	0	N/A	0	0
Market Effects and Ancilary Services	N/A	0	0	N/A	0	0
Subtotal	N/A	0	0	N/A	0	0
Gas System Impacts						
Commodity Cost	N/A	0	N/A	0	0	0
Variable O&M	N/A	0	N/A	0	0	0
Demand	N/A	0	N/A	0	0	0
Environmental Compliance	N/A	0	N/A	0	0	0
Subtotal	N/A	0	N/A	0	0	0
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Gas Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	0	0
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	0	N/A	N/A	N/A	0	0
Utility Performance Incentives	N/A	0	0	0	0	0
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Participant Impacts						
Electric Bill	0	N/A	0	N/A	N/A	N/A
Gas Bill	0	N/A	N/A	0	N/A	N/A
Participant Rebates and Incentives	0	N/A	N/A	N/A	0	N/A
Incremental Capital	0	N/A	N/A	N/A	0	N/A
Incremental O&M	0	N/A	N/A	N/A	0	N/A
Subtotal	0	N/A	0	0	0	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	0	0	0	0	0
Utility Administration	N/A	(7,226,549)	(6,676,837)	(549,713)	(7,226,549)	(7,226,549)
Advertising & Promotion	N/A	0	0	0	0	0
Measurement & Verification	N/A	(2,056,132)	(1,716,207)	(339,925)	(2,056,132)	(2,056,132)
Rebates	N/A	0	0	0	0	0
Other	N/A	(47,500)	(27,500)	(20,000)	(47,500)	(47,500)
Subtotal	N/A	(9,330,182)	**(8,420,544)**	**(909,638)**	(9,330,182)	(9,330,182)
Benefits	0	0	0	0	0	0
Costs	0	(9,330,182)	(8,420,544)	(909,638)	(9,330,182)	(9,330,182)
Net Benefit (Cost)	**0**	**(9,330,182)**	**(8,420,544)**	**(909,638)**	**(9,330,182)**	**(9,330,182)**
Benefit/Cost Ratio	**INF**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**#DIV/0!**
Annual kWh Saved at Customer	#DIV/0!
Annual kWh Saved at Generator	**#DIV/0!**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	0.0 years
Lifetime (Weighted on Dth)	0.0 years
T & D Loss Factor (Energy)	0.00%
T & D Loss Factor (Demand)	0.00%
System Coincident kW Saved at Generator	**0.00 kW**
Annual kWh Saved at Customer	0 kWh
Annual kWh Saved at Generator	**0 kWh**
Annual Dth Saved	**0 Dth**
Electric Participants	**0**
Gas Participants	**0**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	0 tons CO2
Gas Energy Efficiency	0 tons CO2
Electric Electrification	0 tons CO2
Gas Electrification	0 tons CO2
Other Fuel Electification	0 tons CO2
TOTAL	0 tons CO2

PORTFOLIO TOTAL	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	171,867,229	171,867,229	N/A	196,887,825	196,887,825
Transmission and Distribution Capacity	N/A	15,130,362	15,130,362	N/A	17,654,821	17,654,821
Energy Generation	N/A	265,431,635	265,431,635	N/A	309,921,307	309,921,307
Market Effects and Ancilary Services	N/A	9,048,263	9,048,263	N/A	10,488,897	10,488,897
Subtotal	N/A	461,477,489	461,477,489	N/A	534,952,850	534,952,850
Gas System Impacts						
Commodity Cost	N/A	57,936,918	N/A	57,936,918	66,730,101	66,730,101
Variable O&M	N/A	498,924	N/A	498,924	574,440	574,440
Demand	N/A	14,154,644	N/A	14,154,644	16,294,444	16,294,444
Environmental Compliance	N/A	811,117	N/A	811,117	934,221	934,221
Subtotal	N/A	73,401,602	N/A	73,401,602	84,533,206	84,533,206
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	59,404,433	59,404,433
Gas Environmental Externalities	N/A	N/A	N/A	N/A	53,552,325	53,552,325
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	73,811	73,811
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	500,937	N/A	N/A	N/A	500,937	500,937
Utility Performance Incentives	N/A	(28,454,394)	(24,408,684)	(4,045,710)	(28,454,394)	(28,454,394)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	500,937	(28,454,394)	(24,408,684)	(4,045,710)	85,077,113	85,077,113
Participant Impacts						
Electric Bill	797,010,960	N/A	(763,801,353)	N/A	N/A	N/A
Gas Bill	100,937,034	N/A	N/A	(93,647,941)	N/A	N/A
Participant Rebates and Incentives	76,666,537	N/A	N/A	N/A	76,666,537	N/A
Incremental Capital	(202,972,970)	N/A	N/A	N/A	(202,972,970)	N/A
Incremental O&M	101,535,548	N/A	N/A	N/A	114,110,216	N/A
Subtotal	873,177,108	N/A	(763,801,353)	(93,647,941)	(12,196,217)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,277,869)	(925,226)	(352,643)	(1,277,869)	(1,277,869)
Utility Administration	N/A	(65,565,160)	(55,791,980)	(9,773,180)	(65,565,160)	(65,565,160)
Advertising & Promotion	N/A	(14,913,908)	(11,753,845)	(3,160,063)	(14,913,908)	(14,913,908)
Measurement & Verification	N/A	(3,054,063)	(2,619,356)	(434,707)	(3,054,063)	(3,054,063)
Rebates	N/A	(76,666,537)	(62,177,884)	(14,488,653)	(76,666,537)	(76,666,537)
Other	N/A	(2,857,395)	(2,371,736)	(485,659)	(2,857,395)	(2,857,395)
Subtotal	N/A	(164,334,931)	**(135,640,027)**	**(28,694,904)**	(164,334,931)	(164,334,931)
Benefits	1,076,651,016	534,879,092	461,477,489	73,401,602	923,794,317	733,017,564
Costs	(202,972,970)	(192,789,325)	(923,850,064)	(126,388,554)	(395,762,296)	(192,789,325)
Net Benefit (Cost)	**873,678,045**	**342,089,767**	**(462,372,575)**	**(52,986,952)**	**528,032,021**	**540,228,239**
Benefit/Cost Ratio	**5.30**	**2.77**	**0.50**	**0.58**	**2.33**	**3.80**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	15.7 years
Lifetime (Weighted on Dth)	13.8 years
T & D Loss Factor (Energy)	7.71%
T & D Loss Factor (Demand)	9.46%
System Coincident kW Saved at Generator	**206,960 kW**
Annual kWh Saved at Customer	533,129,626 kWh
Annual kWh Saved at Generator	**570,375,117 kWh**
Annual Dth Saved	**1,080,205 Dth**
Electric Participants	**4,325,559**
Gas Participants	**1,131,167**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.9 years
Lifetime (Weighted on Dth)	17.2 years
T & D Loss Factor (Energy)	8.46%
T & D Loss Factor (Demand)	9.49%
System Coincident kW Saved at Generator	**-16.26 kW**
Annual kWh Saved at Customer	-2,057,886 kWh
Annual kWh Saved at Generator	**-2,248,188 kWh**
Annual Dth Saved	**19,018 Dth**
Electric Participants	**1,897**
Gas Participants	**785**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-630 tons CO2
Gas Electrification	1,387 tons CO2
Other Fuel Electification	152 tons CO2
TOTAL	246,589 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,089,302 tons CO2
Electric Electrification	-5,345 tons CO2
Gas Electrification	23,795 tons CO2
Other Fuel Electification	1,731 tons CO2
TOTAL	2,401,496 tons CO2

PORTFOLIO TOTAL	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	173,823,911	173,823,911	N/A	198,681,392	198,681,392
Transmission and Distribution Capacity	N/A	15,210,965	15,210,965	N/A	17,727,457	17,727,457
Energy Generation	N/A	270,050,164	270,050,164	N/A	314,071,180	314,071,180
Market Effects and Ancilary Services	N/A	9,181,374	9,181,374	N/A	10,609,212	10,609,212
Subtotal	N/A	468,266,414	468,266,414	N/A	541,089,241	541,089,241
Gas System Impacts						
Commodity Cost	N/A	65,357,086	N/A	65,357,086	75,406,504	75,406,504
Variable O&M	N/A	562,119	N/A	562,119	648,272	648,272
Demand	N/A	15,951,440	N/A	15,951,440	18,394,844	18,394,844
Environmental Compliance	N/A	914,999	N/A	914,999	1,055,691	1,055,691
Subtotal	N/A	82,785,644	N/A	82,785,644	95,505,311	95,505,311
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	53,352,895	53,352,895
Gas Environmental Externalities	N/A	N/A	N/A	N/A	59,729,691	59,729,691
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	104,549	104,549
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	676,175	N/A	N/A	N/A	676,175	676,175
Utility Performance Incentives	N/A	(28,633,444)	(24,293,962)	(4,339,482)	(28,633,444)	(28,633,444)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	676,175	(28,633,444)	(24,293,962)	(4,339,482)	85,229,865	85,229,865
Participant Impacts						
Electric Bill	801,489,707	N/A	(767,023,718)	N/A	N/A	N/A
Gas Bill	113,486,108	N/A	N/A	(105,439,830)	N/A	N/A
Participant Rebates and Incentives	78,957,098	N/A	N/A	N/A	78,957,098	N/A
Incremental Capital	(207,992,070)	N/A	N/A	N/A	(207,992,070)	N/A
Incremental O&M	102,801,545	N/A	N/A	N/A	115,204,012	N/A
Subtotal	888,742,388	N/A	(767,023,718)	(105,439,830)	(13,830,959)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,598,016)	(1,207,909)	(390,106)	(1,598,016)	(1,598,016)
Utility Administration	N/A	(69,975,529)	(59,176,929)	(10,798,600)	(69,975,529)	(69,975,529)
Advertising & Promotion	N/A	(15,779,250)	(12,436,070)	(3,343,179)	(15,779,250)	(15,779,250)
Measurement & Verification	N/A	(2,970,666)	(2,527,806)	(442,860)	(2,970,666)	(2,970,666)
Rebates	N/A	(78,957,098)	(62,905,254)	(16,051,845)	(78,957,098)	(78,957,098)
Other	N/A	(3,397,459)	(2,793,934)	(603,525)	(3,397,459)	(3,397,459)
Subtotal	N/A	(172,678,018)	**(141,047,902)**	**(31,630,116)**	(172,678,018)	(172,678,018)
Benefits	1,097,410,633	551,052,058	468,266,414	82,785,644	944,618,972	750,457,861
Costs	(207,992,070)	(201,311,462)	(932,365,583)	(141,409,428)	(409,303,532)	(201,311,462)
Net Benefit (Cost)	**889,418,563**	**349,740,596**	**(464,099,169)**	**(58,623,784)**	**535,315,439**	**549,146,399**
Benefit/Cost Ratio	**5.28**	**2.74**	**0.50**	**0.59**	**2.31**	**3.73**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	15.6 years
Lifetime (Weighted on Dth)	14.0 years
T & D Loss Factor (Energy)	7.71%
T & D Loss Factor (Demand)	9.41%
System Coincident kW Saved at Generator	**223,451 kW**
Annual kWh Saved at Customer	532,638,825 kWh
Annual kWh Saved at Generator	**569,358,227 kWh**
Annual Dth Saved	**1,145,031 Dth**
Electric Participants	**4,232,719**
Gas Participants	**1,107,617**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	17.0 years
Lifetime (Weighted on Dth)	17.2 years
T & D Loss Factor (Energy)	8.46%
T & D Loss Factor (Demand)	9.19%
System Coincident kW Saved at Generator	**-55.76 kW**
Annual kWh Saved at Customer	-4,085,387 kWh
Annual kWh Saved at Generator	**-4,463,147 kWh**
Annual Dth Saved	**39,226 Dth**
Electric Participants	**2,773**
Gas Participants	**1,551**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-782 tons CO2
Gas Electrification	2,861 tons CO2
Other Fuel Electification	194 tons CO2
TOTAL	247,953 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,173,173 tons CO2
Electric Electrification	-9,816 tons CO2
Gas Electrification	49,297 tons CO2
Other Fuel Electification	2,437 tons CO2
TOTAL	2,507,104 tons CO2

PORTFOLIO TOTAL	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	182,283,571	182,283,571	N/A	208,315,177	208,315,177
Transmission and Distribution Capacity	N/A	16,092,502	16,092,502	N/A	18,764,291	18,764,291
Energy Generation	N/A	280,630,541	280,630,541	N/A	327,026,318	327,026,318
Market Effects and Ancilary Services	N/A	9,579,800	9,579,800	N/A	11,081,720	11,081,720
Subtotal	N/A	488,586,414	488,586,414	N/A	565,187,507	565,187,507
Gas System Impacts						
Commodity Cost	N/A	74,921,833	N/A	74,921,833	86,483,366	86,483,366
Variable O&M	N/A	643,991	N/A	643,991	742,939	742,939
Demand	N/A	18,267,956	N/A	18,267,956	21,077,177	21,077,177
Environmental Compliance	N/A	1,048,906	N/A	1,048,906	1,210,767	1,210,767
Subtotal	N/A	94,882,686	N/A	94,882,686	109,514,249	109,514,249
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	53,936,496	53,936,496
Gas Environmental Externalities	N/A	N/A	N/A	N/A	67,497,681	67,497,681
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	119,681	119,681
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	787,100	N/A	N/A	N/A	787,100	787,100
Utility Performance Incentives	N/A	(30,389,841)	(25,456,050)	(4,933,791)	(30,389,841)	(30,389,841)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	787,100	(30,389,841)	(25,456,050)	(4,933,791)	91,951,117	91,951,117
Participant Impacts						
Electric Bill	851,172,700	N/A	(811,866,423)	N/A	N/A	N/A
Gas Bill	130,075,055	N/A	N/A	(120,771,173)	N/A	N/A
Participant Rebates and Incentives	84,595,968	N/A	N/A	N/A	84,595,968	N/A
Incremental Capital	(219,605,634)	N/A	N/A	N/A	(219,605,634)	N/A
Incremental O&M	105,177,457	N/A	N/A	N/A	118,046,495	N/A
Subtotal	951,415,547	N/A	(811,866,423)	(120,771,173)	(16,963,171)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,885,484)	(1,456,920)	(428,564)	(1,885,484)	(1,885,484)
Utility Administration	N/A	(73,343,883)	(61,911,483)	(11,432,401)	(73,343,883)	(73,343,883)
Advertising & Promotion	N/A	(16,743,065)	(13,201,815)	(3,541,251)	(16,743,065)	(16,743,065)
Measurement & Verification	N/A	(3,083,664)	(2,625,055)	(458,609)	(3,083,664)	(3,083,664)
Rebates	N/A	(84,595,968)	(65,747,324)	(18,848,643)	(84,595,968)	(84,595,968)
Other	N/A	(3,057,468)	(2,351,982)	(705,486)	(3,057,468)	(3,057,468)
Subtotal	N/A	(182,709,533)	**(147,294,579)**	**(35,414,954)**	(182,709,533)	(182,709,533)
Benefits	1,171,808,281	583,469,100	488,586,414	94,882,686	999,685,177	797,042,714
Costs	(219,605,634)	(213,099,374)	(984,617,051)	(161,119,919)	(432,705,008)	(213,099,374)
Net Benefit (Cost)	**952,202,647**	**370,369,726**	**(496,030,637)**	**(66,237,233)**	**566,980,169**	**583,943,340**
Benefit/Cost Ratio	**5.34**	**2.74**	**0.50**	**0.59**	**2.31**	**3.74**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	15.7 years
Lifetime (Weighted on Dth)	14.2 years
T & D Loss Factor (Energy)	7.72%
T & D Loss Factor (Demand)	9.36%
System Coincident kW Saved at Generator	**243,149 kW**
Annual kWh Saved at Customer	556,884,516 kWh
Annual kWh Saved at Generator	**595,344,260 kWh**
Annual Dth Saved	**1,224,928 Dth**
Electric Participants	**4,227,837**
Gas Participants	**1,086,988**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.9 years
Lifetime (Weighted on Dth)	17.1 years
T & D Loss Factor (Energy)	8.52%
T & D Loss Factor (Demand)	9.17%
System Coincident kW Saved at Generator	**-115.96 kW**
Annual kWh Saved at Customer	-7,603,474 kWh
Annual kWh Saved at Generator	**-8,311,654 kWh**
Annual Dth Saved	**74,032 Dth**
Electric Participants	**4,340**
Gas Participants	**3,012**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-1,403 tons CO2
Gas Electrification	5,399 tons CO2
Other Fuel Electification	210 tons CO2
TOTAL	249,886 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,267,556 tons CO2
Electric Electrification	-17,596 tons CO2
Gas Electrification	92,288 tons CO2
Other Fuel Electification	2,759 tons CO2
TOTAL	2,637,020 tons CO2

PORTFOLIO TOTAL W ALTERNATIVE FILINGS	DSM TOTAL	2024	GOAL

2024 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	180,306,345	180,306,345	N/A	206,450,611	206,450,611
Transmission and Distribution Capacity	N/A	16,091,249	16,091,249	N/A	18,747,231	18,747,231
Energy Generation	N/A	284,062,151	284,062,151	N/A	331,163,221	331,163,221
Market Effects and Ancilary Services	N/A	9,328,568	9,328,568	N/A	10,807,868	10,807,868
Subtotal	N/A	489,788,313	489,788,313	N/A	567,168,931	567,168,931
Gas System Impacts						
Commodity Cost	N/A	58,441,576	N/A	58,441,576	67,676,499	67,676,499
Variable O&M	N/A	498,924	N/A	498,924	574,440	574,440
Demand	N/A	14,154,644	N/A	14,154,644	16,294,444	16,294,444
Environmental Compliance	N/A	811,117	N/A	811,117	934,221	934,221
Subtotal	N/A	73,906,260	N/A	73,906,260	85,479,604	85,479,604
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	63,555,141	63,555,141
Gas Environmental Externalities	N/A	N/A	N/A	N/A	53,552,325	53,552,325
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	73,811	73,811
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	500,937	N/A	N/A	N/A	500,937	500,937
Utility Performance Incentives	N/A	(28,454,394)	(24,408,684)	(4,045,710)	(28,454,394)	(28,454,394)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	500,937	(28,454,394)	(24,408,684)	(4,045,710)	89,227,821	89,227,821
Participant Impacts						
Electric Bill	797,010,960	N/A	(763,801,353)	N/A	N/A	N/A
Gas Bill	100,937,034	N/A	N/A	(93,647,941)	N/A	N/A
Participant Rebates and Incentives	84,236,870	N/A	N/A	N/A	84,236,870	N/A
Incremental Capital	(202,972,970)	N/A	N/A	N/A	(202,972,970)	N/A
Incremental O&M	101,535,548	N/A	N/A	N/A	114,110,216	N/A
Subtotal	880,747,441	N/A	(763,801,353)	(93,647,941)	(4,625,884)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,277,869)	(925,226)	(352,643)	(1,277,869)	(1,277,869)
Utility Administration	N/A	(78,631,356)	(67,794,915)	(10,836,441)	(78,631,356)	(78,631,356)
Advertising & Promotion	N/A	(14,913,908)	(11,753,845)	(3,160,063)	(14,913,908)	(14,913,908)
Measurement & Verification	N/A	(3,054,063)	(2,619,356)	(434,707)	(3,054,063)	(3,054,063)
Rebates	N/A	(84,236,870)	(69,685,695)	(14,551,175)	(84,236,870)	(84,236,870)
Other	N/A	(2,857,395)	(2,371,736)	(485,659)	(2,857,395)	(2,857,395)
Subtotal	N/A	(184,971,460)	**(155,150,773)**	**(29,820,687)**	(184,971,460)	(184,971,460)
Benefits	1,084,221,349	563,694,574	489,788,313	73,906,260	968,677,837	770,330,751
Costs	(202,972,970)	(213,425,854)	(943,360,810)	(127,514,337)	(416,398,825)	(213,425,854)
Net Benefit (Cost)	**881,248,378**	**350,268,720**	**(453,572,497)**	**(53,608,077)**	**552,279,012**	**556,904,897**
Benefit/Cost Ratio	**5.34**	**2.64**	**0.52**	**0.58**	**2.33**	**3.61**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	14.5 years
Lifetime (Weighted on Dth)	13.8 years
T & D Loss Factor (Energy)	7.71%
T & D Loss Factor (Demand)	9.46%
System Coincident kW Saved at Generator	**206,960 kW**
Annual kWh Saved at Customer	533,129,626 kWh
Annual kWh Saved at Generator	**615,431,718 kWh**
Annual Dth Saved	**1,080,205 Dth**
Electric Participants	**4,327,477**
Gas Participants	**1,131,386**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.9 years
Lifetime (Weighted on Dth)	17.2 years
T & D Loss Factor (Energy)	8.46%
T & D Loss Factor (Demand)	9.49%
System Coincident kW Saved at Generator	**-16.26 kW**
Annual kWh Saved at Customer	-2,057,886 kWh
Annual kWh Saved at Generator	**-2,248,188 kWh**
Annual Dth Saved	**19,018 Dth**
Electric Participants	**1,897**
Gas Participants	**785**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-630 tons CO2
Gas Electrification	1,387 tons CO2
Other Fuel Electification	152 tons CO2
TOTAL	246,589 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,089,302 tons CO2
Electric Electrification	-5,345 tons CO2
Gas Electrification	23,795 tons CO2
Other Fuel Electification	1,731 tons CO2
TOTAL	2,401,496 tons CO2

PORTFOLIO TOTAL W ALTERNATIVE FILINGS	DSM TOTAL	2025	GOAL

2025 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	182,425,553	182,425,553	N/A	208,429,239	208,429,239
Transmission and Distribution Capacity	N/A	16,197,224	16,197,224	N/A	18,848,820	18,848,820
Energy Generation	N/A	289,229,666	289,229,666	N/A	335,883,278	335,883,278
Market Effects and Ancilary Services	N/A	9,469,048	9,469,048	N/A	10,936,025	10,936,025
Subtotal	N/A	497,321,491	497,321,491	N/A	574,097,362	574,097,362
Gas System Impacts						
Commodity Cost	N/A	65,858,362	N/A	65,858,362	76,351,883	76,351,883
Variable O&M	N/A	562,119	N/A	562,119	648,272	648,272
Demand	N/A	15,951,440	N/A	15,951,440	18,394,844	18,394,844
Environmental Compliance	N/A	914,999	N/A	914,999	1,055,691	1,055,691
Subtotal	N/A	83,286,920	N/A	83,286,920	96,450,690	96,450,690
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	57,082,107	57,082,107
Gas Environmental Externalities	N/A	N/A	N/A	N/A	59,729,691	59,729,691
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	104,549	104,549
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	676,175	N/A	N/A	N/A	676,175	676,175
Utility Performance Incentives	N/A	(28,633,444)	(24,293,962)	(4,339,482)	(28,633,444)	(28,633,444)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	676,175	(28,633,444)	(24,293,962)	(4,339,482)	88,959,077	88,959,077
Participant Impacts						
Electric Bill	801,489,707	N/A	(767,023,718)	N/A	N/A	N/A
Gas Bill	113,486,108	N/A	N/A	(105,439,830)	N/A	N/A
Participant Rebates and Incentives	86,546,641	N/A	N/A	N/A	86,546,641	N/A
Incremental Capital	(207,992,070)	N/A	N/A	N/A	(207,992,070)	N/A
Incremental O&M	102,801,545	N/A	N/A	N/A	115,204,012	N/A
Subtotal	896,331,931	N/A	(767,023,718)	(105,439,830)	(6,241,416)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,598,016)	(1,207,909)	(390,106)	(1,598,016)	(1,598,016)
Utility Administration	N/A	(86,082,865)	(73,698,360)	(12,384,505)	(86,082,865)	(86,082,865)
Advertising & Promotion	N/A	(15,779,250)	(12,436,070)	(3,343,179)	(15,779,250)	(15,779,250)
Measurement & Verification	N/A	(2,970,666)	(2,527,806)	(442,860)	(2,970,666)	(2,970,666)
Rebates	N/A	(86,546,641)	(70,432,275)	(16,114,367)	(86,546,641)	(86,546,641)
Other	N/A	(3,397,459)	(2,793,934)	(603,525)	(3,397,459)	(3,397,459)
Subtotal	N/A	(196,374,897)	**(163,096,354)**	**(33,278,543)**	(196,374,897)	(196,374,897)
Benefits	1,105,000,176	580,608,411	497,321,491	83,286,920	989,891,227	788,140,573
Costs	(207,992,070)	(225,008,341)	(954,414,035)	(143,057,855)	(433,000,411)	(225,008,341)
Net Benefit (Cost)	**897,008,106**	**355,600,070**	**(457,092,544)**	**(59,770,935)**	**556,890,815**	**563,132,232**
Benefit/Cost Ratio	**5.31**	**2.58**	**0.52**	**0.58**	**2.29**	**3.50**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	14.4 years
Lifetime (Weighted on Dth)	14.0 years
T & D Loss Factor (Energy)	7.71%
T & D Loss Factor (Demand)	9.41%
System Coincident kW Saved at Generator	**223,451 kW**
Annual kWh Saved at Customer	532,638,825 kWh
Annual kWh Saved at Generator	**614,507,259 kWh**
Annual Dth Saved	**1,145,031 Dth**
Electric Participants	**4,234,691**
Gas Participants	**1,107,836**
Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	17.0 years
Lifetime (Weighted on Dth)	17.2 years
T & D Loss Factor (Energy)	8.46%
T & D Loss Factor (Demand)	9.19%
System Coincident kW Saved at Generator	**-55.76 kW**
Annual kWh Saved at Customer	-4,085,387 kWh
Annual kWh Saved at Generator	**-4,463,147 kWh**
Annual Dth Saved	**39,226 Dth**
Electric Participants	**2,773**
Gas Participants	**1,551**
First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-782 tons CO2
Gas Electrification	2,861 tons CO2
Other Fuel Electification	194 tons CO2
TOTAL	247,953 tons CO2
Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,173,173 tons CO2
Electric Electrification	-9,816 tons CO2
Gas Electrification	49,297 tons CO2
Other Fuel Electification	2,437 tons CO2
TOTAL	2,507,104 tons CO2

PORTFOLIO TOTAL W ALTERNATIVE FILINGS	DSM TOTAL	2026	GOAL

2026 Net Present Cost Benefit Summary Analysis For All Participants Benefits (Positive Values) Costs (Negative Values)

	Participant Test ($Total)	Utility Test ($Total)	Electric Rate Impact Test ($Total)	Gas Rate Impact Test ($Total)	Societal Test ($Total)	Minnesota Test ($Total)
Electric System Impacts						
Generation Capacity	N/A	191,071,534	191,071,534	N/A	218,276,118	218,276,118
Transmission and Distribution Capacity	N/A	17,107,228	17,107,228	N/A	19,918,257	19,918,257
Energy Generation	N/A	299,802,376	299,802,376	N/A	348,860,046	348,860,046
Market Effects and Ancilary Services	N/A	9,869,545	9,869,545	N/A	11,411,206	11,411,206
Subtotal	N/A	517,850,683	517,850,683	N/A	598,465,628	598,465,628
Gas System Impacts						
Commodity Cost	N/A	75,373,996	N/A	75,373,996	87,428,537	87,428,537
Variable O&M	N/A	643,991	N/A	643,991	742,939	742,939
Demand	N/A	18,267,956	N/A	18,267,956	21,077,177	21,077,177
Environmental Compliance	N/A	1,048,906	N/A	1,048,906	1,210,767	1,210,767
Subtotal	N/A	95,334,849	N/A	95,334,849	110,459,420	110,459,420
Environmental Externalities and Non-Energy Impacts						
Electric Environmental Externalities	N/A	N/A	N/A	N/A	57,551,773	57,551,773
Gas Environmental Externalities	N/A	N/A	N/A	N/A	67,497,681	67,497,681
Other Fuels Environmental Externalities	N/A	N/A	N/A	N/A	119,681	119,681
Electric Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Gas Non-Energy Benefits	0	N/A	N/A	N/A	0	0
Other Fuels Benefits	787,100	N/A	N/A	N/A	787,100	787,100
Utility Performance Incentives	N/A	(30,389,841)	(25,456,050)	(4,933,791)	(30,389,841)	(30,389,841)
Utility Non-Energy Benefits	N/A	0	0	0	0	0
Subtotal	787,100	(30,389,841)	(25,456,050)	(4,933,791)	95,566,394	95,566,394
Participant Impacts						
Electric Bill	851,172,700	N/A	(811,866,423)	N/A	N/A	N/A
Gas Bill	130,075,055	N/A	N/A	(120,771,173)	N/A	N/A
Participant Rebates and Incentives	92,220,931	N/A	N/A	N/A	92,220,931	N/A
Incremental Capital	(219,605,634)	N/A	N/A	N/A	(219,605,634)	N/A
Incremental O&M	105,177,457	N/A	N/A	N/A	118,046,495	N/A
Subtotal	959,040,510	N/A	(811,866,423)	(120,771,173)	(9,338,208)	N/A
Utility Impacts						
Utility Project Costs						
Customer Services	N/A	(1,885,484)	(1,456,920)	(428,564)	(1,885,484)	(1,885,484)
Utility Administration	N/A	(89,805,307)	(76,711,093)	(13,094,215)	(89,805,307)	(89,805,307)
Advertising & Promotion	N/A	(16,743,065)	(13,201,815)	(3,541,251)	(16,743,065)	(16,743,065)
Measurement & Verification	N/A	(3,083,664)	(2,625,055)	(458,609)	(3,083,664)	(3,083,664)
Rebates	N/A	(92,220,931)	(73,309,765)	(18,911,165)	(92,220,931)	(92,220,931)
Other	N/A	(3,057,468)	(2,351,982)	(705,486)	(3,057,468)	(3,057,468)
Subtotal	N/A	(206,795,920)	**(169,656,630)**	**(37,139,290)**	(206,795,920)	(206,795,920)
Benefits	1,179,433,244	613,185,532	517,850,683	95,334,849	1,045,148,709	834,881,283
Costs	(219,605,634)	(237,185,761)	(1,006,979,102)	(162,844,255)	(456,791,395)	(237,185,761)
Net Benefit (Cost)	**959,827,610**	**375,999,771**	**(489,128,419)**	**(67,509,406)**	**588,357,314**	**597,695,522**
Benefit/Cost Ratio	**5.37**	**2.59**	**0.51**	**0.59**	**2.29**	**3.52**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Energy Efficiency Impacts	
Lifetime (Weighted on Generator kWh)	14.5 years
Lifetime (Weighted on Dth)	14.2 years
T & D Loss Factor (Energy)	7.72%
T & D Loss Factor (Demand)	9.36%
System Coincident kW Saved at Generator	**243,149 kW**
Annual kWh Saved at Customer	556,884,516 kWh
Annual kWh Saved at Generator	**640,650,635 kWh**
Annual Dth Saved	**1,224,928 Dth**
Electric Participants	**4,229,859**
Gas Participants	**1,087,207**

Beneficial Electrification Impacts	
Lifetime (Weighted on Generator kWh)	16.9 years
Lifetime (Weighted on Dth)	17.1 years
T & D Loss Factor (Energy)	8.52%
T & D Loss Factor (Demand)	9.17%
System Coincident kW Saved at Generator	**-115.96 kW**
Annual kWh Saved at Customer	-7,603,474 kWh
Annual kWh Saved at Generator	**-8,311,654 kWh**
Annual Dth Saved	**74,032 Dth**
Electric Participants	**4,340**
Gas Participants	**3,012**

First year Carbon Emissions Reductions	
Electric Energy Efficiency	166,901 tons CO2
Gas Energy Efficiency	78,779 tons CO2
Electric Electrification	-1,403 tons CO2
Gas Electrification	5,399 tons CO2
Other Fuel Electification	210 tons CO2
TOTAL	249,886 tons CO2

Lifetime Carbon Emissions Reductions	
Electric Energy Efficiency	1,292,013 tons CO2
Gas Energy Efficiency	1,267,556 tons CO2
Electric Electrification	-17,596 tons CO2
Gas Electrification	92,288 tons CO2
Other Fuel Electification	2,759 tons CO2
TOTAL	2,637,020 tons CO2

TECHNICAL ASSUMPTIONS

This section provides supporting documentation for the energy savings calculations, incremental costs, and measure lifetimes for the energy savings measures in the 2024-2026 ECO Triennial. Included in this section, we provide the following:

- **Forecast Technical Assumptions** which includes the expected number of units for each measure including in the plan by program;
- **Deemed Savings Technical Assumptions** which documents the assumptions and variables to determine the impacts of actual implementation similar to the state's *Technical Reference Manual*; and
- **Technical Reference Manual Comparison** of these savings with the *Technical Reference Manual Version 4.0* as approved by the Deputy Commissioner on February 16, 2023, in Docket No. E,G999/CIP-18-694.

Measure Description					Economic Assumptions							Customer Information						Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Affordable New Home Construction - MN	ENERGY STAR Clothes Dryer	ENERGY STAR Clothes Dryer	Energy Star Clothes Dryer >= 4.4 Cu.Ft.	Industry Standard	12	$40.00	$75.00	41	0.005	0.0	$0.00	MN-RES-SFLIT	Res	Electric Only	Combo	A018	1.6	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Front-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	244	0.036	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A023	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Combo	A024	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A090	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A091	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Top-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	52	0.008	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A025	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A092	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A093	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00		Res	Combo	Combo	A026	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Clothes Washer	Electric Clothes Washer - Advanced Tier	ENERGY STAR Most Efficient Clothes Dryer 2019	Industry Standard	11	$20.00	$50.00	0	0.000	0.0	$0.00	MN-RES-SFLIT	Res	Electric Only	Combo	A027	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$15.00	$20.00	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A028	1.9	100%	100%	100%	100%							22	22	22	-	-	-
Affordable New Home Construction - MN	A - New Homes	11 MSR - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$18,000.00	$13,819.71	1,274	0.200	29.7	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O033	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	A - New Homes	12 MSR - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$21,000.00	$14,541.50	1,323	0.216	40.1	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O034	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	A - New Homes	13 MSR - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$23,000.00	$14,400.69	1,329	0.217	41.8	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O035	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	B - New Homes	11 MSR - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$18,000.00	$11,055.77	0	0.000	29.7	$0.00		RES	Combo	Gas Only	O036	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	B - New Homes	12 MSR - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$21,000.00	$11,633.20	0	0.000	40.1	$0.00		RES	Combo	Gas Only	O037	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	B - New Homes	13 MSR - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$23,000.00	$11,520.55	0	0.000	41.8	$0.00		RES	Combo	Gas Only	O038	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	11 MSR + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$19,000.00	$14,129.71	7,878	0.452	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O039	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	12 MSR + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$22,000.00	$14,851.50	9,883	0.469	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O040	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	13 MSR + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$25,000.00	$14,910.69	10,210	0.469	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O041	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	A - New Homes	10% Overall UA - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$18,000.00	$12,286.45	1,003	0.182	26.8	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O042	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	A - New Homes	15% Overall UA - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$21,000.00	$13,078.24	1,323	0.216	40.1	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O043	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	A - New Homes	20% Overall UA - Combo Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$23,000.00	$16,698.98	1,329	0.217	41.8	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O044	15.1	100%	100%	100%	100%	12	12	12	11	11	11	12	12	12	11	11	11
Affordable New Home Construction - MN	B - New Homes	10% Overall UA - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$18,000.00	$11,055.77	0	0.000	29.7	$0.00		RES	Combo	Gas Only	O045	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	B - New Homes	15% Overall UA - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$21,000.00	$11,633.20	0	0.000	40.1	$0.00		RES	Combo	Gas Only	O046	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	B - New Homes	20% Overall UA - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$23,000.00	$11,520.55	0	0.000	41.8	$0.00		RES	Combo	Gas Only	O047	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	10% Overall UA + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$19,000.00	$12,617.45	7,878	0.452	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O048	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	15% Overall UA + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$22,000.00	$13,409.24	9,883	0.469	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O049	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	C - New Homes - 100% Electric Homes	20% Overall UA + Electrification - Electric Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$25,000.00	$17,029.98	6,464	0.452	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O050	15.1	100%	100%	100%	100%	13	13	13				13	13	13	-	-	-
Affordable New Home Construction - MN	Rater Incentive	Energy Efficient Home - Less than 30% BTC	Energy Efficient Home - 20-30% BTC	Reference Home Based upon Local Code	20	$125.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	Res	Combo	Combo	O052	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	Rater Incentive	Energy Efficient Home - 30% & Higher BTC	Energy Efficient Home - 30% & Higher BTC	Reference Home Based upon Local Code	20	$250.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	Res	Combo	Combo	O053	15.1	100%	100%	100%	100%							25	25	25	11	11	11
Affordable New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U080	17.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - GAS Only	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	0	0.000	0.0	$0.00		RES	Gas Only	Gas Only	U085	17.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	ES Radon Fans	Energy Star Radon Fans	Energy Star Radon Fan - Radonaway RP140	Radonaway RP145	10	$125.00	$0.00	273	0.031	5.5	$0.00	MN-RES-FLAT	RES	Electric Only	Combo	U096	17.9	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$20.00	$125.00	76	0.180	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U075	17.7	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	Water Heater DR	Demand response capability on grid enabled electric resistance water heater	Demand response from electric resistance water heater	No management of water heater time of use	1	$100.00	$200.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Electric Only	S268	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045)	Heat Pump Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$325.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Electric Only	S269	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	HP Water Heater	Heat Pump Water Heater - New Homes	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S275	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Affordable New Home Construction - MN	HP Water Heater	Heat Pump Water Heater + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S277	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Business Energy Assessments - MN	Behavioral Industrial	Behavioral Changes	Behavior changes that reduce energy use	No change in behavior	3	$0.00	$0.00	0	0.000		$0.00	MN-BUS-RECOM	Bus	Electric Only	Electric Only	C001		100%	100%	100%	100%	3	3	4	-	-	-	3	3	4	-	-	-
Business Energy Assessments - MN	Behavioral Commercial	Behavioral Changes	Behavior changes that reduce energy use	No change in behavior	3	$1,462.25	$0.00	189,195	38.119		$0.00	MN-BUS-RECOM	Bus	Electric Only	Electric Only	C002		100%	100%	100%	100%	2	2	4	-	-	-	2	2	4	-	-	-
Business Energy Assessments - MN	Peak Partner Rewards	New Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,618.00	$0.00	863	143.892	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T021	4.2	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Business Energy Assessments - MN	Peak Partner Rewards	Existing Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,618.00	$0.00	863	143.892	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T022	4.2	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Business Energy Assessments - MN	Custom BEA Industrial Project	Custom Industrial BEA Electric	High Efficiency Product/system	Less Efficient Product/Systems	18	$5,036.11	$60,089.96	115,245	13.872	0.0	$0.00	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	G021	7.1	100%	100%	100%	100%	18	30	32	-	-	-	22	42	40	-	-	-
Business Energy Assessments - MN	Custom BEA Industrial Project	Custom Industrial BEA Gas	High Efficiency Product/system	Less Efficient Product/Systems	19	$12,823.85	$74,630.00	0	0.000	2,564.8	$16,050.85		BUS	Gas Only	Gas Only	G022	7.1	100%	100%	100%	100%	-	-	-	5	7	6	-	-	-	5	7	6
Business Energy Assessments - MN	Custom BEA Commercial Project	Custom Commercial BEA Electric	New or Optimized System or Equipment	Old or less efficient systems or equipment	17	$7,752.07	$34,850.64	101,300	19.617	0.0	$0.00	MN-BUS-CUSTOM_	Bus	Electric Only	Electric Only	G023	7.1	100%	100%	100%	100%	20	26	30	-	-	-	24	36	35	-	-	-
Business Energy Assessments - MN	Custom BEA Commercial Project	Custom Commercial BEA Gas	New or Optimized System or Equipment	Old or less efficient systems or equipment	15	$3,688.67	$17,980.33	0	0.000	737.8	$42.67	MN-BUS-CUSTOM_	Bus	Gas Only	Gas Only	G024	7.1	100%	100%	100%	100%	-	-	-	5	4	5	-	-	-	5	4	5
Business Energy Assessments - MN	Efficiency Controls Gas Project	Business Energy Assessments Controls Gas Project	New Building Controls	Old Building Controls	15	$4,005.47	$47,311.88	0	0.000	801.1	$1,195.19		Bus	Gas Only	Gas Only	G032	7.1	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
Business Energy Assessments - MN	Efficiency Controls Electric Project	Business Energy Assessments Controls Electric Project	New Building Controls	Old Building Controls	15	$8,375.64	$52,277.85	170,777	2.244	0.0	$1,461.23	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	G033	7.1	100%	100%	100%	100%	7	12	12	-	-	-	7	12	12	-	-	-
Business Energy Assessments - MN	Load Shifting	Equipment Based Load Shift	Equipment-based load shift to off peak hours	Unshifted peak load	15	$22,500.00	$50,000.00	0	50.000	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	G046	7.1	100%	100%	100%	100%	1	3	6	-	-	-	1	3	6	-	-	-
Business Energy Assessments - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	98.6	$0.00	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	G050	7.1	100%	100%	100%	100%	19	48	60	19	48	60	19	48	60	19	48	60
Business Energy Assessments - MN	Industrial Prescriptive	Average Cooling Project	More efficient cooling equipment	Baseline System	20	$740.70	$1,532.95	13,379	1.284	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	J001	9.1	100%	100%	100%	100%	30	30	28	-	-	-	32	33	30	-	-	-
Business Energy Assessments - MN	Industrial Prescriptive	Average Compressed Air/FSO Project	Optimized System	Old System	11	$4,654.65	$7,994.12	68,687	6.876	0.0	$0.00	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	J002	9.1	100%	100%	100%	100%	8	12	15	-	-	-	12	20	20	-	-	-
Business Energy Assessments - MN	Industrial Prescriptive	Average EMS	New Direct Digital Controls System	Old System	15	$1,598.33	$41,031.09	66,293	0.000	0.0	$0.00	MN-BUS-EMS_OFFP	BUS	Electric Only	Electric Only	J003	9.1	100%	100%	100%	100%	4	12	12	-	-	-	4	12	12	-	-	-
Business Energy Assessments - MN	Industrial Prescriptive	Average Lighting Project	Optimized System	Old System	15	$5,474.70	$22,649.44	78,367	7.781	0.0	$0.00	MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	J004	9.1	100%	100%	100%	100%	24	20	18	-	-	-	35	32	24	-	-	-
Business Energy Assessments - MN	Industrial Prescriptive	Average Motor Project	Optimized System	Old System	15	$3,031.26	$10,652.08	33,890	6.214	0.0	$0.00	MN-BUS-MOTORASD	BUS	Electric Only	Electric Only	J005	9.1	100%	100%	100%	100%	20	26	28	-	-	-	28	50	40	-	-	-
Business Energy Assessments - MN	Industrial Prescriptive	Average Heating Project	New System	Old System	17	$715.18	$2,423.03	0	0.000	406.8	-$21.67		BUS	Gas Only	Gas Only	J006	9.1	100%	100%	100%	100%	-	-	-	8	7	11	-	-	-	8	7	11
Business Energy Assessments - MN	Commercial Prescriptive	Average Cooling Project	More efficient cooling equipment	Baseline System	20	$2,448.12	$4,794.04	13,800	2.319	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	J007	9.1	100%	100%	100%	100%	13	24	24	-	-	-	13	24	24	-	-	-
Business Energy Assessments - MN	Commercial Prescriptive	Average Compressed Air/FSO Project	Efficient Equipment	Old System	11	$4,844.57	$6,412.14	71,945	8.530	0.0	$39.54	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	J008	9.1	100%	100%	100%	100%	1	2	2	-	-	-	1	2	2	-	-	-
Business Energy Assessments - MN	Commercial Prescriptive	Average Lighting Project	Efficient Equipment	Old System	15	$7,657.21	$30,502.17	110,085	16.287	0.0	-$265.23	MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	J009	9.1	100%	100%	100%	100%	30	25	20	-	-	-	40	38	30	-	-	-
Business Energy Assessments - MN	Commercial Prescriptive	Average Motor Project	Efficient Equipment	Old System	15	$17,178.48	$48,503.65	294,454	42.935	0.0	$0.00	MN-BUS-MOTORASD	BUS	Electric Only	Electric Only	J010	9.1	100%	100%	100%	100%	18	24	23	-	-	-	24	36	34	-	-	-
Business Energy Assessments - MN	Commercial Prescriptive	Average Heating Project	Efficient Equipment	Old System	17	$1,848.50	$13,699.24	0	0.000	418.7	$0.00		BUS	Gas Only	Gas Only	J011	9.1	100%	100%	100%	100%	-	-	-	10	10	13	-	-	-	10	10	13
Business Energy Assessments - MN	Turn Key Services Prescriptive	Average Cooling Project	More efficient cooling equipment	Baseline System	20	$6,713.92	$6,582.19	8,123	8.955	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	J038	9.1	100%	100%	100%	100%	9	20	24	-	-	-	9	20	24	-	-	-
Business Energy Assessments - MN	Turn Key Services Prescriptive	Average Compressed Air/FSO Project	Efficient Equipment	Non-Optimized System	11	$6,018.75	$6,336.75	28,269	6.181	0.0	$32.38	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	J039	9.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
Business Energy Assessments - MN	Turn Key Services Prescriptive	Average Lighting Project	Optimized System	Old System	20	$14,042.44	$38,657.82	88,281	17.275	0.0	-$191.27	MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	J040	9.1	100%	100%	100%	100%	12	12	10	-	-	-	18	18	15	-	-	-
Business Energy Assessments - MN	Turn Key Services Prescriptive	Average Motor Project	Efficient Equipment	Old System	15	$1,893.93	$6,427.39	18,742	3.240	0.0	$0.00	MN-BUS-MOTORASD	BUS	Electric Only	Electric Only	J041	9.1	100%	100%	100%	100%	4	9	10	-	-	-	4	9	14	-	-	-
Business Energy Assessments - MN	Turn Key Services Prescriptive	Average Heating Project	New System	Old System	20	$4,972.04	$6,336.36	7,265	0.017	559.4	$217.01		BUS	Gas Only	Gas Only	J042	9.1	100%	100%	100%	100%	-	-	-	5	2	4	-	-	-	5	2	4
Business Energy Assessments - MN	Load Shifting	Average Load Shift Project	Load Shifted Operation	Existing Operation	1	$750.00	$0.00	0	25.000			MN-BUS-EIS Load Shift	BUS	Electric Only	Electric Only	J051	9.1	100%	100%	100%	100%	4	6	9	-	-	-	4	6	9	-	-	-
Business Energy Assessments - MN	BEA Building Assessment	Building Assessment	Assessment Performed and Energy Efficient Improvements Implemented	Existing Building Pre-Assessment		$3,500.00	$5,000.00						BUS	Combo	Combo	R001	Combo	100%	100%	100%	100%	36	32	33	12	11	11	36	32	33	12	11	11
Business Energy Assessments - MN	BEA Targeted Building Assessment	Targeted Building Assessment	Assessment Performed and Energy Efficient Improvements Implemented	Existing Building Pre-Assessment		$15,000.00	$20,000.00						BUS	Combo	Combo	R002	Combo	100%	100%	100%	100%	4	7	12	3	6	9	4	7	12	3	6	9
Business Energy Assessments - MN	BEA Industrial Streamlined Assessment	Industrial Streamlined Assessment	Assessment Performed and Energy Efficient Improvements Implemented	Existing Building Pre-Assessment		$6,172.07	$6,172.07						BUS	Combo	Combo	R003		100%	100%	100%	100%	36	40	42	12	12	10	36	40	42	12	12	10
Business Energy Assessments - MN	Building Operator Certification	BOC	Energy Use After Class	Energy Usage Before Class	5	$500.00	$640.72	27,951	1.627	0.0		MN-BUS-RECOM	BUS	Combo	Combo	R004	Combo	100%	100%	100%	100%	24	35	40	4	4	4	24	35	40	4	4	4
Business Energy Assessments - MN	Commercial Streamlined Assessment	Streamlined Assessment	Assessment Performed and Energy Efficient Improvements Implemented	Existing Building Pre-Assessment		$1,500.00	$1,750.00						BUS	Combo	Combo	R007		100%	100%	100%	100%	120	120	120	30	30	30	120	120	120	30	30	30
Business Energy Assessments - MN	In-Depth Study	Beneficial Electrification Studies				$8,680.00	$21,148.00						BUS	Beneficial Electrification	Electric Only	R025		100%	100%	100%	100%	3	4	6	3	4	6	3	4	6	3	4	6

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors											Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Business New Construction - MN	EDA	Energy Design Assistance for Gas	More Efficient than Code Building	Code-Compliant Building	20	$15,693.46	$258,931.57	0	0.000	3,138.7	$0.00	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D001		100%	100%	100%	100%				13	19	17				13	19	17
Business New Construction - MN	EDA	Energy Design Assistance for Electric	More Efficient than Code Building	Code-Compliant Building	20	$74,044.20	$232,412.19	513,074	106.876	0.0	$0.00	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D002		100%	100%	100%	100%	100	79	80				100	79	80			
Business New Construction - MN	EDA	Energy Design Assistance for Efficient Fuel Switching, Gas to Electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	20	$7,806.75	$49,664.76	-41,046	-8.550	376.6	$7,806.75	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	D004		100%	100%	100%	100%		3	5		3	5		3	5		3	5
Business New Construction - MN	EDA	Energy Design Assistance for Low Income gas projects	More Efficient than Code Building	Code-Compliant Building	20	$10,867.48	$113,475.78	0	0.000	1,358.4	$0.00	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D016		100%	100%	100%	100%					1	3					1	3
Business New Construction - MN	EDA	Energy Design Assistance for Low Income electric projects	More Efficient than Code Building	Code-Compliant Building	20	$101,462.50	$163,698.80	365,848	78.703	0.0	$0.00	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D017		100%	100%	100%	100%		3	5					3	5			
Business New Construction - MN	EDA	Energy Design Assistance for Low Income efficient fuel switching projects, gas to electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	20	$7,806.75	$49,664.76	-41,046	-8.550	376.6	$7,806.75	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	D108		100%	100%	100%	100%			3			3			3			3
Business New Construction - MN	EEB	Energy Efficient Buildings for Gas	More Efficient than Code Building	Code-Compliant Building	17	$3,748.77	$11,816.06	0	0.000	484.5	$235.56	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D019		100%	100%	100%	100%				19	16	20				19	16	20
Business New Construction - MN	EEB	Energy Efficient Buildings for Electric	More Efficient than Code Building	Code-Compliant Building	17	$3,378.93	$13,738.63	42,814	8.874	0.0	$207.65	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D020		100%	100%	100%	100%	220	175					220	175				
Business New Construction - MN	EEB	Energy Efficient Buildings for Efficient Fuel Switching, Gas to Electric	More Efficient than Code Building	Code-Compliant Building	17	$720.17	$2,517.02	-3,425	-0.710	58.1	$720.17	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	D021		100%	100%	100%	100%			1			1			1			1
Business New Construction - MN	LI EEB	Energy Efficient Buildings for Low Income gas projects	More Efficient than Code Building	Code-Compliant Building	17	$5,710.83	$7,978.18	0	0.000	284.1	$164.68	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D030		100%	100%	100%	100%						1						1
Business New Construction - MN	LI EEB	Energy Efficient Buildings for Low Income electric projects	More Efficient than Code Building	Code-Compliant Building	17	$4,639.36	$8,249.05	33,083	5.107	0.0	$176.84	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D031		100%	100%	100%	100%			1						1			
Business New Construction - MN	LI EEB	Energy Efficient Buildings for Low Income efficient fuel switching projects, gas to electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	17	$1,056.45	$33,083.00	-2,647	-0.409	34.1	$1,056.45	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	D032		100%	100%	100%	100%												
Business New Construction - MN	Code Compliance	2024 Savings attributed to Xcel Energy for code compliance	Code Compliant Building	Non-Compliant Building	20	$0.00	$0.00	0	0.000	0.0	$0.00	MN-BUS-CODES	BUS	Combo	Combo	D033		100%	100%	100%	100%												
Business New Construction - MN	Code Compliance	2025 Savings attributed to Xcel Energy for code compliance	Code Compliant Building	Non-Compliant Building	20	$0.00	$0.00	7,313,000	834.817	1,918.4	$0.00	MN-BUS-CODES	BUS	Combo	Combo	D034		100%	100%	100%	100%		1			1			1			1	
Business New Construction - MN	Code Compliance	2026 Savings attributed to Xcel Energy for code compliance	Code Compliant Building	Non-Compliant Building	20	$0.00	$0.00	24,297,000	2773.630	27,452.4	$0.00	MN-BUS-CODES	BUS	Combo	Combo	D035		100%	100%	100%	100%			1			1			1			1
Business New Construction - MN	EEB	Energy Efficient Buildings for Electric - Test	More Efficient than Code Building	Code-Compliant Building	17	$4,290.74	$13,738.63	42,814	8.874	0.0	$207.65	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D036		100%	100%	100%	100%			175						175			
Compressed Air Efficiency - MN	Peak Partner Rewards	New Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,458.00	$0.00	833	138.880	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T011	4.2	100%	100%	100%	100%	1	1	1				1	1	1			
Compressed Air Efficiency - MN	Peak Partner Rewards	Existing Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,458.00	$0.00	833	138.880	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T012	4.2	100%	100%	100%	100%	-	1	2	-	-	-	-	1	2	-	-	-
Compressed Air Efficiency - MN	ECO	Non-Custom Opportunity identified in a study	Optimized System	Non-Optimized System	5	$0.00	$390.00	29,167	3.558	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E001	5.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Compressed Air Efficiency - MN	Supply Side Study	Supply-side compressed air study with leak fixes	Leaks & Waste Found and Repaired	Existing System with Leaks & Waste that have not been repaired	5	$7,180.00	$7,950.00	62,682	7.893	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E002	5.2	100%	100%	100%	100%	42	43	45	-	-	-	42	43	45	-	-	-
Compressed Air Efficiency - MN	Cycling Dryers	Cycling or Variable Speed Refrigerated Dryer	New Cycling Refrigerated Dryer	New Non-Cycling Refrigerated Dryer	20	$1,606.00	$3,986.00	17,953	1.981	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E003	5.3	100%	100%	100%	100%	22	24	26	-	-	-	22	24	26	-	-	-
Compressed Air Efficiency - MN	Dryer Purge Demand Controls	Dryer Purge/Dewpoint Demand Controls on a Heatless Desiccant Dryer	Purge/Dewpoint Control for Heatless Dessicant Dryers	No Purge Control for Heatless Desiccant Dryers	20	$1,847.00	$4,982.00	97,768	10.962	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E004	5.4	100%	100%	100%	100%	3	3	4	-	-	-	3	3	4	-	-	-
Compressed Air Efficiency - MN	Mist Eliminators	Mist Eliminator Filter w/ rated pressure drop of 1 psig or less	New Mist Eliminator Filter	New General Purpose Filter	11	$1,802.00	$7,012.00	11,641	1.547	0.0	$578.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E005	5.5	100%	100%	100%	100%	4	5	5	-	-	-	4	5	5	-	-	-
Compressed Air Efficiency - MN	No Air Loss Drain	New No-Air Loss Drains	New No-Air Loss Drains	New Electronic Solenoid/Timed Drains	13	$200.00	$323.00	3,790	0.511	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E006	5.6	100%	100%	100%	100%	32	33	35	-	-	-	32	33	35	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	10HP VFD Air Compressor - New	New 10HP VFD Compressor	New 10HP Fixed Speed Compressor w/ modulation or load no-load control	20	$1,500.00	$3,368.00	17,911	2.060	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E007	5.7	100%	100%	100%	100%	3	3	4	-	-	-	3	3	4	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	15HP VFD Air Compressor - New	New 15HP VFD Compressor	New 15HP Fixed Speed Compressor w/ modulation or load no-load control	20	$2,250.00	$4,155.00	26,556	3.047	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E008	5.7	100%	100%	100%	100%	4	4	5	-	-	-	4	4	5	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	20HP VFD Air Compressor - New	New 20HP VFD Compressor	New 20HP Fixed Speed Compressor w/ modulation or load no-load control	20	$3,000.00	$4,943.00	35,494	4.063	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E009	5.7	100%	100%	100%	100%	3	3	4	-	-	-	3	3	4	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	25HP VFD Air Compressor - New	New 25HP VFD Compressor	New 25HP Fixed Speed Compressor w/ modulation or load no-load control	20	$3,750.00	$5,730.00	44,197	5.047	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E010	5.7	100%	100%	100%	100%	5	6	6	-	-	-	5	6	6	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	30HP VFD Air Compressor - New	New 30HP VFD Compressor	New 30HP Fixed Speed Compressor w/ modulation or load no-load control	20	$4,500.00	$6,517.00	52,883	6.024	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E011	5.7	100%	100%	100%	100%	3	3	4	-	-	-	3	3	4	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	40HP VFD Air Compressor - New	New 40HP VFD Compressor	New 40HP Fixed Speed Compressor w/ modulation or load no-load control	20	$6,000.00	$8,092.00	70,854	8.032	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E012	5.7	100%	100%	100%	100%	7	8	8	-	-	-	7	8	8	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	50HP VFD Air Compressor - New	New 50HP VFD Compressor	New 50HP Fixed Speed Compressor w/ modulation or load no-load control	20	$7,500.00	$9,667.00	88,606	9.997	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E013	5.7	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	75HP VFD Air Compressor - New	New 75HP VFD Compressor	New 75HP Fixed Speed Compressor w/ modulation or load no-load control	20	$11,250.00	$13,604.00	133,763	14.917	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E014	5.7	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	100HP VFD Air Compressor - New	New 100HP VFD Compressor	New 100HP Fixed Speed Compressor w/ modulation or load no-load control	20	$15,000.00	$17,541.00	179,616	19.805	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E015	5.7	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	New VFD Compressor	125HP VFD Air Compressor - New	New 125HP VFD Compressor	New 125HP Fixed Speed Compressor w/ modulation or load no-load control	20	$18,750.00	$21,478.00	226,974	24.757	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E016	5.7	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Demand Side Study	Demand-side compressed air and vacuum system studies	Study Completed	No Study Completed	5	$4,970.00	$6,627.00	0	0.000	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E017	5.8	100%	100%	100%	100%	5	6	6	-	-	-	5	6	6	-	-	-
Compressed Air Efficiency - MN	Pressure Flow Controller	Precision System Pressure Regulator or Flow Controller Installed in Compressed Air System	New Pressure/Flow Controller Installed w/ Optimized Pressures	Non-Optimized Compressed Air System	15	$2,000.00	$5,430.00	22,053	2.372	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E018	5.9	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Storage Tank	Compressed Air Storage Tank for Load/Unload Systems	New Additional Storage Tanks Installed	Fixed Speed Load/Unload Compressed Air System	20	$2,000.00	$8,000.00	45,845	4.931	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E019	5.1	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Dryer Purge Demand Controls	Heated Desiccant Dryer w/ Dewpoint/Purge Controls	New Heated Desiccant Dryer w/ Purge/Dewpoint Controls	Uncontrolled Heatless Desiccant Dryer	20	$2,888.00	$11,767.00	114,699	13.315	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E020	5.4	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Dryer Purge Demand Controls	Heated Blower Purge Desiccant Dryer w/ Purge/Dewpoint Controls	New Heated Blower Purge Desiccant Dryer w/ Purge/Dewpoint Control	Uncontrolled Heatless Desiccant Dryer	20	$2,888.00	$22,312.00	121,009	14.047	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E021	5.4	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Leak Fixes	Compressed Air Leak Fixes	Leaks & Waste Found and Repaired	Existing Compressed Air System with Leaks & Waste that have not been repaired	5	$1,500.00	$2,250.00	60,306	8.138	0.0	$0.00	MN-BUS-CUSTCAIR	Bus	Electric Only	Electric Only	E022	5.11	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Industrial Battery Chargers	High efficiency battery chargers for industrial equipment	High frequency industrial battery chargers	Low efficiency industrial battery chargers, ferroresonant or HCR	20	$250.00	$872.50	2,672	0.303	0.0	$0.00	MN-BUS-Forklift	Bus	Electric Only	Electric Only	E023	5.12	100%	100%	100%	100%	2	3	3	-	-	-	2	3	3	-	-	-
Compressed Air Efficiency - MN	Forklift Electrification	Lithium-Ion battery forklift	Electric forklift with lithium-ion battery	Propane forklift	15	$4,000.00	$10,200.00	-34,620	-4.083	4,158.0	$0.00	MN-BUS-Forklift	Bus	Electrification - Propane	Electric Only	E024	5.13	100%	100%	100%	100%	1	2	2				1	2	2	1	2	2
Compressed Air Efficiency - MN	Custom Compressed Air Project	Custom compressed air, blower, and vacuum opportunities. With Study	New Equipment	Old or less efficient systems or equipment	19	$10,342.45	$40,455.85	121,529	18.690	0.0	$76.92	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	G009	7.1	100%	100%	100%	100%	11	12	13	-	-	-	11	12	13	-	-	-
Compressed Air Efficiency - MN	Custom Compressed Air Project	Custom compressed air, blower, and vacuum opportunities. Without Study	New Equipment	Old or less efficient systems or equipment	20	$2,167.83	$13,013.50	60,140	7.244	0.0	$0.00	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	G031	7.1	100%	100%	100%	100%	6	7	8	-	-	-	6	7	8	-	-	-
CPP TOU Pilot - MN	Critical Peak Pricing	New Participating Customer	Reduction of building electrical load due to participation in this program and higher prices implemented when the electric grid experiences peak demand periods	No participation in program	1	$0.00	$0.00	2,786	696.470	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T025	4.5	100%	100%	100%	100%	-	20	20				-	20	20			
CPP TOU Pilot - MN	Critical Peak Pricing	Existing Participating Customer	Reduction of building electrical load due to participation in this program and higher prices implemented when the electric grid experiences peak demand periods	No participation in program	1	$0.00	$0.00	2,786	696.470	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T026	4.5	100%	100%	100%	100%	30	30	50				30	30	50			
CPP TOU Pilot - MN	Critical Peak Pricing	New Participating Customer	Reduction of building electrical load due to participation in this program and higher prices implemented when the electric grid experiences peak demand periods	No participation in program	1	$0.00	$0.00	2,786	696.470	0.0	$0.00	MN-BUS-PEAK_CNT	Bus	DR	Electric Only	T063	5.8	100%	100%	100%	100%												
CPP TOU Pilot - MN	Critical Peak Pricing	Existing Participating Customer	Reduction of building electrical load due to participation in this program and higher prices implemented when the electric grid experiences peak demand periods	No participation in program	1	$0.00	$0.00	2,786	696.470	0.0	$0.00	MN-BUS-PEAK_CNT	Bus	DR	Electric Only	T064	6.8	100%	100%	100%	100%												
Custom Efficiency - MN	Custom Custom Electric Project	Custom Efficiency Electric	High Efficiency Product/system	Less Efficient Product/Systems	18	$12,526.78	$286,390.23	161,794	22.371	0.0	$71,529.57	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	G002	7.1	100%	100%	100%	100%	35	35	35	-	-	-	35	36	37	-	-	-
Custom Efficiency - MN	Custom Gas Project	Custom Efficiency Gas	High Efficiency Product/system	Less Efficient Product/Systems	19	$12,823.85	$74,630.00	0	0.000	2,564.8	$16,050.85		BUS	Gas Only	Gas Only	G003	7.1	100%	100%	100%	100%	-	-	-	8	8	8	-	-	-	8	8	8
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	98.6	$0.00	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	G041	7.1	100%	100%	100%	100%	1	3	5	1	3	5	1	3	5	1	3	5
Custom Efficiency - MN	Load Shifting	Equipment Based Load Shift	Equipment-based load shift to off peak hours	Unshifted peak load	15	$22,500.00	$50,000.00	0	50.000	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	G042	7.1	100%	100%	100%	100%	-	1	2	-	-	-	-	1	2	-	-	-
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gasoline Equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	820.0	$0.00	MN-BUS-CUSTOM	BUS	Electrification - Gasoline	Combo	G052	7.1	100%	100%	100%	100%	1	3	5	1	3	5	1	3	5	1	3	5
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Propane Equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	1,077.6	$0.00	MN-BUS-CUSTOM	BUS	Electrification - Propane	Combo	G053	7.1	100%	100%	100%	100%	-	1	1	-	-	-	-	1	1	-	-	-
Custom Efficiency - MN	In-Depth Study	Custom Studies Electric				$14,679.49	$28,510.91						BUS	Electric Only	Electric Only	R008	Combo	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
Custom Efficiency - MN	In-Depth Study	Custom Studies Gas				$12,417.53	$36,884.88						BUS	Gas Only	Gas Only	R009		100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
Custom Efficiency - MN	In-Depth Study	Beneficial Electrification Studies				$8,680.00	$21,148.00						BUS	Beneficial Electrification	Electric Only	R024		100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Data Center Efficiency - MN	EDA	New Construction, addition or renovation for Data Centers	Highly efficient data center	Standard efficiency new data center	11	$23,191.92	$80,232.20	312,502	22.554	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	D007		100%	100%	100%	100%	6	4	2				6	4	2			
Data Center Efficiency - MN	Computer VDI	Zero & Thin Client Installations	Server & software at data center, along with thin-client or zero-client device, to replace desktop CPU (e.g. VM Ware w/ Wyse thin-client system, Pano-Logic zero-client system); meeting Energy Star 6.0 specification	Desktop computers meeting ENERGY STAR 3.0 specifications	10	$10.00	$117.00	711	0.097	0.0	$305.00	MN-BUS-LITE_CI_	BUS	Electric Only	Electric Only	F001	6.1	100%	100%	100%	100%	6	5	5				6	5	5			
Data Center Efficiency - MN	Data Center Efficiency Implementation	Data Center Measures - Study Identified	High Efficiency Product/system	Less Efficient Product/Systems	20	$5,708.54	$86,625.00	146,829	7.547	0.0	$2,000.00	MN-BUS-Data Center Blend	BUS	Electric Only	Electric Only	G004	7.1	100%	100%	100%	100%	25	25	22				25	25	22			
Data Center Efficiency - MN	Data Center Efficiency Implementation	Data Center Measures - Customer Identified	High Efficiency Product/system	Less Efficient Product/Systems	20	$5,708.54	$86,625.00	146,829	7.547	0.0	$0.00	MN-BUS-Data Center Blend	BUS	Electric Only	Electric Only	G005	7.1	100%	100%	100%	100%	2	2	1				2	2	1			
Data Center Efficiency - MN	Data Center Efficiency Implementation	Data Center Measures - On Site	High Efficiency Product/system	Less Efficient Product/Systems	20	$5,708.54	$86,625.00	146,829	7.547	0.0	$2,000.00	MN-BUS-Data Center Blend	BUS	Electric Only	Electric Only	G006	7.1	100%	100%	100%	100%	2	2	1				2	2	1			
Data Center Efficiency - MN	Load Shifting	Equipment Based Load Shift	Equipment-based load shift to off peak hours	Unshifted peak load	15	$22,500.00	$50,000.00	0	50.000	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	G048	7.1	100%	100%	100%	100%	-	1	1				-	1	1			
Data Center Efficiency - MN	Data Center Efficiency Prescriptive	Average Cooling Project	Efficient Equipment	Old System	20	$45,500.67	$391,571.53	664,079	-0.094	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	J017	9.1	100%	100%	100%	100%	4	4	3				4	4	3			
Data Center Efficiency - MN	Data Center Efficiency Prescriptive	Average Lighting Project	Efficient Equipment	Old System	20	$405.00	$1,976.40	16,177	3.057	0.0	-$86.30	MN-BUS-FLAT	BUS	Electric Only	Electric Only	J018	9.1	100%	100%	100%	100%	7	7	6				7	7	6			
Data Center Efficiency - MN	Data Center Efficiency Prescriptive	Average Motor Project	Efficient Equipment	Old System	15	$16,120.00	$52,114.31	365,330	32.568	0.0	$0.00	MN-BUS-MOTORASD	BUS	Electric Only	Electric Only	J019	9.1	100%	100%	100%	100%	10	10	7				10	10	7			

Measure Description					Economic Assumptions								Customer Information						Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Data Center Efficiency - MN	Data Center Efficiency Prescriptive	Average Computer Project	Efficient Equipment	Old System	10	$4,717.89	$9,199.89	10,031	1.372	0.0	$2,358.46	MN-BUS-FLAT	BUS	Electric Only	Electric Only	J020	9.1	100%	100%	100%	100%	2	2	1				2	2	1			
Data Center Efficiency - MN	CRAC Units	Downflow, Air-Cooled w/ Economizer, 65,000 ≤ Net Sensible Btuh < 240,000	More efficient CRAC unit	CRAC unit at Code efficiency	20	$1,457.88	$4,047.71	23,260	3.455	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L023	11.11	100%	100%	100%	100%	4	3	2				4	3	2			
Data Center Efficiency - MN	CRAC Units	Downflow, Air-Cooled w/ Economizer, 240,000 ≤ Net Sensible Btuh < 760,000	More efficient CRAC unit	CRAC unit at Code efficiency	20	$3,195.20	$15,417.12	91,298	12.455	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L024	11.11	100%	100%	100%	100%	4	3	2				4	3	2			
Data Center Efficiency - MN	CRAC Units	Upflow, Air-Cooled w/ Economizer, 240,000 ≤ Net Sensible Btuh < 760,000	More efficient CRAC unit	CRAC unit at Code efficiency	20	$3,301.40	$14,853.08	94,984	12.658	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L025	11.11	100%	100%	100%	100%	4	3	2				4	3	2			
Data Center Efficiency - MN	CRAC Units	Downflow, Glycol-Cooled, 65,000 ≤ Net Sensible Btuh < 240,000	More efficient CRAC unit	CRAC unit at Code efficiency	20	$893.00	$7,541.97	15,302	1.747	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L026	11.11	100%	100%	100%	100%	4	3	2				4	3	2			
Data Center Efficiency - MN	CRAC Units	Upflow, Glycol-Cooled w/ Economizer, 240,000 ≤ Net Sensible Btuh < 760,000	More efficient CRAC unit	CRAC unit at Code efficiency	20	$1,656.48	$13,186.20	28,681	3.899	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L027	11.11	100%	100%	100%	100%	4	3	2				4	3	2			
Data Center Efficiency - MN	Plate & Frame Heat Exchangers	Chilled Water Systems Waterside Economizer	Chilled water system with waterside economizer	Chilled water system without economizer	20	$21,200.00	$65,570.00	180,351	0.000	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L028	11.12	100%	100%	100%	100%	2	2	1				2	2	1			
Data Center Efficiency - MN	In-Depth Study	Data Center Efficiency Study	Study Performed			$7,350.00	$9,800.00						BUS	Electric Only	Electric Only	R010		100%	100%	100%	100%	5	5	4				5	5	4			
Efficiency Controls - MN	Peak Partner Rewards	New Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,171.00	$0.00	780	129.920	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T013	4.2	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Efficiency Controls - MN	Peak Partner Rewards	Existing Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$4,171.00	$0.00	780	129.920	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T014	4.2	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Efficiency Controls - MN	Efficiency Controls Gas Project	Efficiency Controls - Gas	New Building Controls	Old Building Controls	15	$4,005.47	$47,311.88	0	0.000	801.1	$1,195.19		BUS	Gas Only	Gas Only	G007	7.1	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
Efficiency Controls - MN	Efficiency Controls Electric Project	Efficiency Controls - Electric	New Building Controls	Old Building Controls	15	$8,375.64	$52,277.85	170,777	2.244	0.0	$1,461.23	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	G008	7.1	100%	100%	100%	100%	30	35	40	-	-	-	30	35	40	-	-	-
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Small Office	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	718	0.000	12.0	$0.00	MN-BUS-EMS	BUS	Combo	Combo	H001	20.1	100%	100%	100%	100%	5	7	8	5	7	8	28	39	44	28	39	44
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Medium Office	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	230	0.000	8.6	$0.00	MN-BUS-EMS	BUS	Combo	Combo	H002	20.1	100%	100%	100%	100%	8	9	10	8	9	10	424	477	530	424	477	530
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Large Office	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	290	0.000	8.3	$0.00	MN-BUS-EMS	BUS	Combo	Combo	H003	20.1	100%	100%	100%	100%	2	3	5	2	3	4						
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Small Office (Electric Heating)	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	5,102	0.000	0.0	$0.00	MN-BUS-EMS	BUS	Electric Only	Electric Only	H004	20.1	100%	100%	100%	100%	8	10	12	-	-	-	44	55	66	-	-	-
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Medium Office (Electric Heating)	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	3,394	0.000	0.0	$0.00	MN-BUS-EMS	BUS	Electric Only	Electric Only	H005	20.1	100%	100%			10	12	13	-	-	-	530	636	689	-	-	-
Efficiency Controls - MN	Pneumatic to DDC	Pneumatic to Wireless DDC Thermostat - Large Office (Electric Heating)	New wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.	An existing pneumatic thermostat	8	$100.00	$990.00	3,322	0.000	0.0	$0.00	MN-BUS-EMS	BUS	Electric Only	Electric Only	H006	20.1	100%	100%	100%	100%	1	1	1	-	-	-	450	450	450	-	-	-
Efficiency Controls - MN	Demand Control	RTU with Demand Control Ventilation	RTU With Demand Control	RTU Without Demand Control	15	$303.13	$1,600.54	897	0.000	76.6	$0.00	MN-BUS-Cool with Economizer	BUS	Combo	Combo	H007	20.3	100%	100%	100%	100%	4	5	6	4	5	6	16	20	24	15	20	25
Efficiency Controls - MN	GREM	GREM - PTAC/Electric Resistance	A thermostat (room HVAC controller) with guest room energy management control	An existing manual thermostat control	15	$50.00	$260.00	1,049	0.132	0.0	$0.00	MN-BUS-EMS	BUS	Electric Only	Electric Only	H008	20.2	100%	100%	100%	100%	6	7	8	-	-	-	280	780	800	-	-	-
Efficiency Controls - MN	GREM	GREM - PTAC/Hot Water or Fan Coil	A thermostat (room HVAC controller) with guest room energy management control	An existing manual thermostat control	15	$50.00	$260.00	110	0.132	4.0	$0.00	MN-BUS-EMS	BUS	Combo	Combo	H009	20.2	100%	100%	100%	100%	6	7	8	2	2	2	280	780	800	200	200	200
Efficiency Controls - MN	GREM	GREM - PTHP	A thermostat (room HVAC controller) with guest room energy management control	An existing manual thermostat control	15	$50.00	$260.00	401	0.132	0.0	$0.00	MN-BUS-EMS	BUS	Electric Only	Electric Only	H010	20.2	100%	100%	100%	100%	3	4	5	-	-	-	600	800	1,000	-	-	-
Efficiency Controls - MN	GREM	GREM - Chilled Water/Hot Water Fan Coil	A thermostat (room HVAC controller) with guest room energy management control	An existing manual thermostat control	15	$50.00	$260.00	100	0.119	4.0	$0.00	MN-BUS-EMS	BUS	Combo	Combo	H011	20.2	100%	100%	100%	100%	2	4	6	1	1	1	600	260	800	100	100	100
Efficient New Home Construction - MN	ENERGY STAR Clothes Dryer	ENERGY STAR Clothes Dryer	Energy Star Clothes Dryer >= 4.4 Cu.Ft.	Industry Standard	12	$40.00	$75.00	41	0.005	0.0	$0.00	MN-RES-SFLIT	Res	Electric Only	Combo	A016	1.6	100%	100%	100%	100%							150	150	150	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Front-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$40.00	$50.00	244	0.036	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A019	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$20.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Combo	A020	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$20.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A086	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$20.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A087	1.7	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Top-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$40.00	$50.00	52	0.008	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A021	1.7	100%	100%	100%	100%							70	70	70	-	-	-
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$20.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Combo	A022	1.7	100%	100%	100%	100%							100	100	100	100	100	100
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$20.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A088	1.7	100%	100%	100%	100%							35	35	35	35	35	35
Efficient New Home Construction - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$20.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A089	1.7	100%	100%	100%	100%							-	-	-	10	10	10
Efficient New Home Construction - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$15.00	$20.00	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A033	1.9	100%	100%	100%	100%							1,500	1,500	1,500	-	-	-
Efficient New Home Construction - MN	New Homes	Low Income Envelope Improvements - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$500.00	$3,624.95	1,143	0.385	24.1	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O001	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	New Homes	Low Income Envelope Improvements - Electric Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$446.38	1,180	0.396	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O002	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	New Homes	Low Income Envelope Improvements - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$500.00	$3,064.94	0	0.000	22.3	$0.00		RES	Gas Only	Gas Only	O003	15.1	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	New Homes	10% to 15% improvement over code - Combo Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$500.00	$2,209.16	1,143	0.231	12.1	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O004	15.1	100%	100%	100%	100%	406	445	489	406	445	489	406	445	489	406	445	489
Efficient New Home Construction - MN	New Homes	15% to 20% improvement over code - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,000.00	$3,206.62	1,413	0.280	22.0	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O005	15.1	100%	100%	100%	100%	528	578	636	528	578	636	528	578	636	528	578	636
Efficient New Home Construction - MN	New Homes	20% to 25% improvement over code - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,500.00	$4,238.52	1,609	0.301	34.3	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O006	15.1	100%	100%	100%	100%	339	371	408	339	371	408	339	371	408	339	371	408
Efficient New Home Construction - MN	New Homes	25% to 30% improvement over code - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$2,000.00	$5,278.03	1,869	0.329	48.9	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O007	15.1	100%	100%	100%	100%	54	59	65	54	59	65	54	59	65	54	59	65
Efficient New Home Construction - MN	New Homes	30% to 35% improvement over code - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$3,000.00	$6,205.41	1,893	0.366	73.6	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O008	15.1	100%	100%	100%	100%	12	13	15	12	13	15	12	13	15	12	13	15
Efficient New Home Construction - MN	New Homes	35% and greater improvement over code - Combo	Energy Efficient Home	Reference Home Based upon Local Code	20	$4,000.00	$7,841.39	3,612	0.452	68.3	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O009	15.1	100%	100%	100%	100%	1	1	2	1	1	2	1	1	2	1	1	2
Efficient New Home Construction - MN	New Homes	10% to 15% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$344.87	921	0.283	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O010	15.1	100%	100%	100%	100%	469	514	566				469	514	566	-	-	-
Efficient New Home Construction - MN	New Homes	15% to 20% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$408.67	1,062	0.365	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O011	15.1	100%	100%	100%	100%	626	686	754				626	686	754	-	-	-
Efficient New Home Construction - MN	New Homes	20% to 25% improvement over code - Electric Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$550.74	1,483	0.523	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O012	15.1	100%	100%	100%	100%	376	411	452				376	411	452	-	-	-
Efficient New Home Construction - MN	New Homes	25% to 30% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$724.16	1,910	0.735	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O013	15.1	100%	100%	100%	100%	78	86	94				78	86	94	-	-	-
Efficient New Home Construction - MN	New Homes	30% to 35% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$3,163.30	2,086	0.846	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O014	15.1	100%	100%	100%	100%	14	15	17				14	15	17	-	-	-
Efficient New Home Construction - MN	New Homes	35% and greater improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$100.00	$2,413.31	21,926	1.683	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O015	15.1	100%	100%	100%	100%	2	2	2				2	2	2	-	-	-
Efficient New Home Construction - MN	New Homes	10% to 15% improvement over code - Gas Only Customers	Energy Efficient Home	Reference Home Based upon Local Code	20	$500.00	$2,158.30	0	0.000	26.5	$0.00		RES	Gas Only	Gas Only	O016	15.1	100%	100%	100%	100%				72	79	87	-	-	-	72	79	87
Efficient New Home Construction - MN	New Homes	15% to 20% improvement over code - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,000.00	$3,077.33	0	0.000	26.5	$0.00		RES	Gas Only	Gas Only	O017	15.1	100%	100%	100%	100%				116	127	139	-	-	-	116	127	139
Efficient New Home Construction - MN	New Homes	20% to 25% improvement over code - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,500.00	$3,913.00	0	0.000	12.0	$0.00		RES	Gas Only	Gas Only	O018	15.1	100%	100%	100%	100%				87	95	104	-	-	-	87	95	104
Efficient New Home Construction - MN	New Homes	25% to 30% improvement over code - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$2,000.00	$4,700.30	0	0.000	22.3	$0.00		RES	Gas Only	Gas Only	O019	15.1	100%	100%	100%	100%				12	13	14	-	-	-	12	13	14
Efficient New Home Construction - MN	New Homes	30% to 35% improvement over code - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$3,000.00	$3,251.88	0	0.000	32.2	$0.00		RES	Gas Only	Gas Only	O020	15.1	100%	100%	100%	100%				3	3	3	-	-	-	3	3	3
Efficient New Home Construction - MN	New Homes	35% and greater improvement over code - Gas Only	Energy Efficient Home	Reference Home Based upon Local Code	20	$4,000.00	$7,794.54	0	0.000	88.9	$0.00		RES	Gas Only	Gas Only	O021	15.1	100%	100%	100%	100%				-	-	-	-	-	-	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	10% to 15% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$500.00	$3,515.79	3,809	0.285	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O022	15.1	100%	100%	100%	100%	2	4	6				2	4	6	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	15% to 20% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,000.00	$4,677.00	4,335	0.371	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O023	15.1	100%	100%	100%	100%	2	4	6				2	4	6	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	20% to 25% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$1,500.00	$6,961.35	1,508	0.327	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O024	15.1	100%	100%	100%	100%	5	6	9				5	6	9	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	25% to 30% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$2,000.00	$3,298.83	6,473	0.364	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O025	15.1	100%	100%	100%	100%	5	6	9				5	6	9	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	30% to 35% improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$3,000.00	$4,487.80	2,956	0.104	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O026	15.1	100%	100%	100%	100%	5	8	10				5	8	10	-	-	-
Efficient New Home Construction - MN	New Homes - 100% Electric Homes	35% and greater improvement over code - Electric Only Customer	Energy Efficient Home	Reference Home Based upon Local Code	20	$4,000.00	$22,681.45	3,428	0.265	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	O027	15.1	100%	100%	100%	100%	1	2	2				1	2	2	-	-	-
Efficient New Home Construction - MN	Builder Incentive	ENERGY STAR Home	Energy Efficient Home that is ENERGY STAR Homes v3.2 Certified	Reference Home Based upon Local Code	20	$250.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O028	15.1	100%	100%	100%	100%							32	350	770	32	350	770
Efficient New Home Construction - MN	Builder Incentive	ENERGY STAR Home	Energy Efficient Home that is ENERGY STAR Next Gen Certified	Reference Home Based upon Local Code	20	$500.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	RES	Combo	Combo	O029	15.1	100%	100%	100%	100%							10	15	21	-	-	-
Efficient New Home Construction - MN	Rater Incentive	Energy Efficient Home - Less than 30% BTC	Energy Efficient Home - 20-30% BTC	Reference Home Based upon Local Code	20	$125.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	Res	Combo	Combo	O031	15.1	100%	100%	100%	100%							2,001	2,035	2,070	1,987	2,015	2,040
Efficient New Home Construction - MN	Rater Incentive	Energy Efficient Home - 30% & Higher BTC	Energy Efficient Home - 30% & Higher BTC	Reference Home Based upon Local Code	20	$250.00	$0.00	0	0.000	0.0	$0.00	MN-RES-HMEFF	Res	Combo	Combo	O032	15.1	100%	100%	100%	100%							27	32	34	21	22	22
Efficient New Home Construction - MN	Codes & Standards	Residential Codes 2024	Influenced code level	Uninfluenced code level	20	$0.00	$0.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Combo	Combo	Q001	1.2	100%	100%	100%	100%							1	-	-	1	-	-
Efficient New Home Construction - MN	Codes & Standards	Residential Codes 2025	Influenced code level	Uninfluenced code level	20	$0.00	$0.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Combo	Combo	Q002	1.2	100%	100%	100%	100%							-	1	-	-	1	-
Efficient New Home Construction - MN	Codes & Standards	Residential Codes 2026	Influenced code level	Uninfluenced code level	20	$0.00	$0.00	6,554,500	748.231	5,819.6	$0.00	MN-RES-SFWHT	RES	Combo	Combo	Q003	1.2	100%	100%	100%	100%							-	-	1	-	-	1
Efficient New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U074	17.7	100%	100%	100%	100%							250	300	250	250	300	250
Efficient New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U079	17.7	100%	100%	100%	100%							150	175	200	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Efficient New Home Construction - MN	Smart Thermostat	Install Energy Star certified smart thermostat - GAS Only	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	0	0.000	5.5	$0.00		RES	Gas Only	Gas Only	U084	17.7	100%	100%	100%	100%							-	-	-	25	25	25
Efficient New Home Construction - MN	ES Radon Fans	Energy Star Radon Fans	Energy Star Radon Fan - Radonaway RP140	Radonaway RP145	10	$20.00	$0.00	273	0.031	0.0	$0.00	MN-RES-FLAT	RES	Electric Only	Combo	U095	17.9	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	Water Heater DR	Demand response capability on grid enabled electric resistance water heater	Demand response from electric resistance water heater	No management of water heater time of use	1	$100.00	$200.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	S181	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045)	Heat Pump Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$325.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Combo	S188	19.2	100%	100%	100%	100%							-	-	-	-	-	-
Efficient New Home Construction - MN	HP Water Heater	Heat Pump Water Heater - New Homes	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S274	19.2	100%	100%	100%	100%							20	35	50	-	-	-
Efficient New Home Construction - MN	HP Water Heater	Heat Pump Water Heater + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	0	0.000	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S276	19.2	100%	100%	100%	100%							15	30	45	-	-	-
Electric Rate Savings - MN	Electric Rate Savings	Participating Customer	Utility load control of at least 50 kW for control period	No control	5	$0.00	$0.00	288	143.892	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T001	4.1	100%	100%	100%	100%	60	50	40	-	-	-	60	50	40	-	-	-
Empower Intelligence - MN	Custom Electric Project	Custom Virtual Commissioning	Improved Building Operation	Standard Building Operation	7			71,368	0.000	60.6		MN-BUS-RECOM	Bus	Combo	Combo	G051	7.1	100%	100%	100%	100%	35	37	40	1	1	1	35	37	40	1	1	1
Empower Intelligence - MN	Virtual Commissioning Subscription	One-year's subscription to receive virtual commissioning					$1,032.00							Combo	Combo	R021		100%	100%	100%	100%	351	377	405	1	1	1	351	377	405	1	1	1
Energy Efficient Showerhead - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2024	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S009	19.1	100%	100%	30%	100%							2,300	-	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2025	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S010	19.1	100%	100%	30%	100%							-	2,475	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2026	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S011	19.1	100%	100%	30%	100%							-	-	2,700	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2024	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S012	19.1	100%	100%	40%	100%							2,300	-	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2025	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S013	19.1	100%	100%	40%	100%							-	2,500	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2026	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S014	19.1	100%	100%	40%	100%							-	-	2,700	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2024	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S015	19.1	100%	100%	30%	100%							1,600	-	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2025	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S016	19.1	100%	100%	30%	100%							-	1,700	-	-	-	-
Energy Efficient Showerhead - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater - 2026	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	64	0.009	0.0	$5.73	MN-RES-SFWHT	Res	Electric Only	Combo	S017	19.1	100%	100%	30%	100%							-	-	1,900	-	-	-
Energy Efficient Showerhead - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2024	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S036	19.1	100%	100%	30%	100%							-	-	-	5,300	-	-
Energy Efficient Showerhead - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2025	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S037	19.1	100%	100%	30%	100%							-	-	-	-	5,800	-
Energy Efficient Showerhead - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2026	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.99	$1.99	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S038	19.1	100%	100%	30%	100%							-	-	-	-	-	6,400
Energy Efficient Showerhead - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2024	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S039	19.1	100%	100%	40%	100%							-	-	-	5,300	-	-
Energy Efficient Showerhead - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2025	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S040	19.1	100%	100%	40%	100%							-	-	-	-	5,800	-
Energy Efficient Showerhead - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2026	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S041	19.1	100%	100%	40%	100%							-	-	-	-	-	6,400
Energy Efficient Showerhead - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2024	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S042	19.1	100%	100%	30%	100%							-	-	-	3,700	-	-
Energy Efficient Showerhead - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2025	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S043	19.1	100%	100%	30%	100%							-	-	-	-	4,100	-
Energy Efficient Showerhead - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater - 2026	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.65	$0.65	0	0.000	0.3	$5.73		Res	Gas Only	Combo	S044	19.1	100%	100%	30%	100%							-	-	-	-	-	4,400
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S093	19.1	100%	100%	75%	100%							2,000	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S094	19.1	100%	100%	75%	100%							-	2,200	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S095	19.1	100%	100%	75%	100%							-	-	2,400	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S096	19.1	100%	100%	50%	100%							1,500	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S097	19.1	100%	100%	50%	100%							-	1,600	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S098	19.1	100%	100%	50%	100%							-	-	1,750	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S099	19.1	100%	100%	75%	100%							200	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S100	19.1	100%	100%	75%	100%							-	210	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S101	19.1	100%	100%	75%	100%							-	-	220	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S102	19.1	100%	100%	50%	100%							60	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S103	19.1	100%	100%	50%	100%							-	65	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S104	19.1	100%	100%	50%	100%							-	-	70	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S105	19.1	100%	100%	75%	100%							130	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S106	19.1	100%	100%	75%	100%							-	145	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S107	19.1	100%	100%	75%	100%							-	-	160	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2024	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S108	19.1	100%	100%	50%	100%							80	-	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2025	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S109	19.1	100%	100%	50%	100%							-	90	-	-	-	-
Energy Efficient Showerhead - MN	Showerheads - EWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater - 2026	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S110	19.1	100%	100%	50%	100%							-	-	100	-	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S131	19.1	100%	100%	75%	100%							-	-	-	4,700	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S132	19.1	100%	100%	75%	100%							-	-	-	-	5,200	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2026	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S133	19.1	100%	100%	75%	100%							-	-	-	-	-	5,700
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S134	19.1	100%	100%	50%	100%							-	-	-	3,400	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S135	19.1	100%	100%	50%	100%							-	-	-	-	3,700	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2026	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.75	$3.75	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S136	19.1	100%	100%	50%	100%							-	-	-	-	-	4,100
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S137	19.1	100%	100%	75%	100%							-	-	-	450	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S138	19.1	100%	100%	75%	100%							-	-	-	-	480	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2026	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S139	19.1	100%	100%	75%	100%							-	-	-	-	-	520
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S140	19.1	100%	100%	50%	100%							-	-	-	130	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S141	19.1	100%	100%	50%	100%							-	-	-	-	135	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater -2026	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$2.84	$9.25	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S142	19.1	100%	100%	50%	100%							-	-	-	-	-	145
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S143	19.1	100%	100%	75%	100%							-	-	-	300	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S144	19.1	100%	100%	75%	100%							-	-	-	-	330	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Primary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2026	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S145	19.1	100%	100%	75%	100%							-	-	-	-	-	370
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2024	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S146	19.1	100%	100%	50%	100%							-	-	-	170	-	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2025	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S147	19.1	100%	100%	50%	100%							-	-	-	-	180	-
Energy Efficient Showerhead - MN	Showerheads - GWH	Secondary Styled Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater - 2026	1.5 GPM Styled Showerhead	2.5 GPM Showerhead	10	$1.48	$5.00	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S148	19.1	100%	100%	50%	100%							-	-	-	-	-	200
Foodservice Equipment - MN	Dishwasher Combo	Dishwashers - Primary Fuel: Elec; Secondary Fuel: Gas	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	12	$170.64	$339.55	2,556	0.333	16.8	$81.50	MN-BUS-FLAT	Bus	Combo	Combo	A010	1.1	100%	100%	100%	100%	6	6	6	4	4	4	6	6	6	4	4	4
Foodservice Equipment - MN	Dishwasher Combo	Dishwashers - Primary Fuel: Gas; Secondary Fuel: Elec	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	14	$212.43	$597.74	4,842	0.631	26.3	$598.52	MN-BUS-FLAT	Bus	Combo	Combo	A011	1.1	100%	100%	100%	100%	6	6	6	4	4	4	6	6	6	4	4	4
Foodservice Equipment - MN	Dishwasher Electric	Dishwashers - Primary Fuel: Elec; Secondary Fuel: Elec	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	14	$125.00	$577.41	9,290	1.210	0.0	$138.78	MN-BUS-FLAT	Bus	Electric Only	Electric Only	A012	1.1	100%	100%	100%	100%	12	12	9	-	-	-	12	12	9	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Foodservice Equipment - MN	Dishwasher Electric	Dishwashers - Primary Fuel: Elec; Secondary Fuel: None	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	15	$250.00	$25.00	1,998	0.260	0.0	$246.46	MN-BUS-FLAT	Bus	Electric Only	Electric Only	A013	1.1	100%	100%	100%	100%	12	10	10	-	-	-	12	10	10	-	-	-
Foodservice Equipment - MN	Dishwasher Gas	Dishwashers - Primary Fuel: Gas; Secondary Fuel: Gas	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	10	$250.00	$120.00	5	2.083	7.1	$28.52	MN-BUS-FLAT	Bus	Gas Only	Gas Only	A014	1.1	100%	100%	100%	100%	-	-	-	3	3	2	-	-	-	3	3	2
Foodservice Equipment - MN	Dishwasher Gas	Dishwashers - Primary Fuel: Gas; Secondary Fuel: None	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	10	$250.00	$50.00	5	5.000	10.6	$66.97	MN-BUS-FLAT	Bus	Gas Only	Gas Only	A015	1.1	100%	100%	100%	100%	-	-	-	4	2	2	-	-	-	4	2	2
Foodservice Equipment - MN	Food Service	Combi-Oven	Combination Oven	Steamer	12	$1,000.00	$5,053.81	5	0.198	167.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A039	1.2	100%	100%	100%	100%	-	-	-	6	6	5	-	-	-	6	6	5
Foodservice Equipment - MN	Food Service	Commercial Gas Fryer	High Efficiency Unit	Standard Efficiency Unit	12	$250.00	$1,991.29	5	0.126	41.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A040	1.2	100%	100%	100%	100%	-	-	-	5	3	2	-	-	-	5	3	2
Foodservice Equipment - MN	Food Service	Convection Oven	Convection Oven	Deck Oven	12	$500.00	$2,042.80	5	0.245	103.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A041	1.2	100%	100%	100%	100%	-	-	-	7	5	4	-	-	-	7	5	4
Foodservice Equipment - MN	Food Service	Conveyor Oven	Conveyor Oven	Pizza Deck Oven	12	$750.00	$9,733.03	5	0.077	254.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A042	1.2	100%	100%	100%	100%	-	-	-	3	2	2	-	-	-	3	2	2
Foodservice Equipment - MN	Food Service	High Efficiency Charbroiler	High Efficiency Charbroiler	Standard Charbroiler	12	$300.00	$1,860.00	5	0.161	64.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A043	1.2	100%	100%	100%	100%	-	-	-	3	2	2	-	-	-	3	2	2
Foodservice Equipment - MN	Food Service	High Efficiency Salamander Broiler	High Efficiency Salamander Broiler	Standard Salamander Broiler	12	$150.00	$1,357.20	5	0.111	31.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A044	1.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
Foodservice Equipment - MN	Food Service	Pasta Cooker	Pasta Cooker	Gas Range	12	$200.00	$1,972.81	5	0.101	113.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A045	1.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
Foodservice Equipment - MN	Food Service	Rotating Rack Oven	Rotating Rack Oven	Deck Oven	12	$500.00	$4,809.75	5	0.104	276.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A046	1.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
Foodservice Equipment - MN	Food Service	Rotisserie Oven	Rotisserie Oven - Infrared	Open Flame Rotisserie Oven	12	$500.00	$2,189.40	5	0.228	45.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A047	1.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
Foodservice Equipment - MN	Food Service	Upright Broiler	Upright Broiler	Standard Radiant Broiler	12	$600.00	$1,272.00	5	0.472	31.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	A048	1.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
Foodservice Equipment - MN	Food Service Electric	Hot Food Holding Cabinet	ENERGY STAR qualified unit	Conventional unit as defined by ENERGY STAR	12	$400.00	$1,713.00	2,073	0.324	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Combo	A049	1.2	100%	100%	100%	100%	7	6	5	-	-	-	7	6	5	-	-	-
Foodservice Equipment - MN	Steam Cooker	3 Pan Steam Cooker	Energy Star 3 Pan Steam Cooker	Non- Energy Star 3 Pan Steam Cooker	12	$349.72	$2,270.00	0	0.000	87.4	$219.40	MN-BUS-FLAT	Bus	Gas Only	Combo	A058	1.4	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
Foodservice Equipment - MN	Steam Cooker	4 Pan Steam Cooker	Energy Star 4 Pan Steam Cooker	Non- Energy Star 4 Pan Steam Cooker	12	$402.64	$2,270.00	0	0.000	100.7	$292.49	MN-BUS-FLAT	Bus	Gas Only	Combo	A059	1.4	100%	100%	100%	100%	-	-	-	4	4	4	-	-	-	4	4	4
Foodservice Equipment - MN	Steam Cooker	5 Pan Steam Cooker	Energy Star 5 Pan Steam Cooker	Non- Energy Star 5 Pan Steam Cooker	12	$456.38	$2,270.00	0	0.000	113.9	$365.61	MN-BUS-FLAT	Bus	Gas Only	Combo	A060	1.4	100%	100%	100%	100%	-	-	-	4	4	3	-	-	-	4	4	3
Foodservice Equipment - MN	Steam Cooker	6+ Pan Steam Cooker	Energy Star 6+ Pan Steam Cooker	Non- Energy Star 6+ Pan Steam Cooker	12	$509.32	$2,270.00	0	0.000	127.3	$438.73	MN-BUS-FLAT	Bus	Gas Only	Combo	A061	1.4	100%	100%	100%	100%	-	-	-	4	4	6	-	-	-	4	4	6
Foodservice Equipment - MN	Demand Control Ventilation	Demand Controlled Ventilation - Electric Only or Gas Only or Combo Customer	Commercial kitchen ventilation hoods with Demand Controlled Ventilation with 8.65 HP Motor	Commercial kitchen ventilation hoods with Demand Controlled Ventilation with 8.65 HP Motor	20	$751.03	$3,737.70	9,218	1.379	50.2	$0.00	MN-BUS-FLAT	Bus	Combo	Combo	M076	12.8	100%	100%	100%	100%	11	9	9	6	4	4	11	9	9	6	4	4
Home Energy Insights - MN	Behavioral Residential	Online Energy Feedback & Tools	Treatment	Control	1	$0.00	$0.00	59	0.000	1.6	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C005		100%	100%	100%	100%							30,000	30,000	30,000	30,000	30,000	30,000
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: Existing Participant - 2024	Treatment	Control	1	$0.00	$0.00	160	0.040	1.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C006		100%	100%	100%	100%							378,000	-	-	136,000	-	-
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: New Participant - 2024	Treatment	Control	1	$0.00	$0.00	82	0.014	0.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C007		100%	100%	100%	100%							-	-	-	-	-	-
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: Existing Participant - 2025	Treatment	Control	1	$0.00	$0.00	162	0.040	1.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C008		100%	100%	100%	100%							-	378,000	-	-	136,000	-
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: New Participant - 2025	Treatment	Control	1	$0.00	$0.00	67	0.019	0.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C009		100%	100%	100%	100%							-	50,000	-	-	17,500	-
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: Existing Participant - 2026	Treatment	Control	1	$0.00	$0.00	164	0.041	1.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C010		100%	100%	100%	100%							-	-	378,000	-	-	136,000
Home Energy Insights - MN	Behavioral Residential	ROLL-UP: New Participant - 2026	Treatment	Control	1	$0.00	$0.00	67	0.019	0.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C011		100%	100%	100%	100%							-	-	50,000	-	-	17,500
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustment-Online Group Savings	Treatment	Control	0	$0.00	$0.00	-39	0.000	-1.1	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C012		100%	100%	100%	100%							30,000	30,000	30,000	30,000	30,000	30,000
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: Existing Participants 2024 Savings	Treatment	Control	0	$0.00	$0.00	-106	-0.027	-0.6	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C013		100%	100%	100%	100%							378,000	-	-	136,000	-	-
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: New Participant 2024 Savings	Treatment	Control	0	$0.00	$0.00	-54	-0.010	-0.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C014		100%	100%	100%	100%							-	-	-	-	-	-
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: Existing Participants 2025 Savings	Treatment	Control	0	$0.00	$0.00	-108	-0.027	-0.7	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C015		100%	100%	100%	100%							-	378,000	-	-	136,000	-
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: New Participant 2025 Savings	Treatment	Control	0	$0.00	$0.00	-45	-0.013	-0.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C016		100%	100%	100%	100%							-	50,000	-	-	17,500	-
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: Existing Participants 2026 Savings	Treatment	Control	0	$0.00	$0.00	-109	-0.027	-0.7	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C017		100%	100%	100%	100%							-	-	378,000	-	-	136,000
Home Energy Insights - MN	Behavioral Residential	Behavioral Adjustments Rollup: New Participant 2026 Savings	Treatment	Control	0	$0.00	$0.00	-45	-0.013	-0.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	C018		100%	100%	100%	100%							-	-	50,000	-	-	17,500
Home Energy Insights - MN	High Bill Alerts	High Bill Alert	Customer enrolled in High Bill Alerts	Customer not enrolled in High Bill Alerts	1	$0.00	$0.00	28	0.000	0.4	$0.00	MN-RES-FLAT	Res	Combo	Combo	C020		100%	100%	100%	100%							548,000	537,000	527,000	33,000	16,000	-
Home Energy Insights - MN	High Bill Alerts	Behavioral Adjustments High Bill Alert Savings	Customer enrolled in High Bill Alerts	Customer not enrolled in High Bill Alerts	0	$0.00	$0.00	-19	0.000	-0.2	$0.00	MN-RES-FLAT	Res	Combo	Combo	C022		100%	100%	100%	100%							548,000	537,000	527,000	33,000	16,000	-
Home Energy Savings Program - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$20.00	$20.00	68	0.009	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A001	1.5	100%	100%	75%	100%	500	600	650				1,100	1,200	1,300			
Home Energy Savings Program - MN	Dehumidifier Recycling	Dehumidifier Removal and Recycling	Removal of dehumidifier	Existing dehumidifier	5	$15.00	$15.00	824	0.426	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	A008	1.1	100%	100%	100%	100%	15	18	20				15	18	20			
Home Energy Savings Program - MN	ENERGY STAR Refrigerator	Freezer Replacement	ENERGY STAR ® Freezers	Industry Standard	11	$407.50	$407.50	43	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A034	1.9	100%	100%	100%	100%	349	373	400				349	373	400			
Home Energy Savings Program - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$865.00	$865.00	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A035	1.9	100%	100%	100%	100%	550	625	689				550	625	689			
Home Energy Savings Program - MN	Refrigerator Recycling	Freezer Removal and Recycling	Removal of freezer	Existing primary unit - age mostly >10 years	7	$82.00	$82.00	943	0.108	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A051	1.11	100%	100%	100%	100%	550	625	689				550	625	689			
Home Energy Savings Program - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Secondary Refrigerator	Existing Secondary Unit - age mostly > 15 years	8	$82.00	$82.00	1,095	0.125	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A052	1.11	100%	100%	100%	100%	17	19	20				17	19	20			
Home Energy Savings Program - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Primary Refrigerator	Existing Primary Unit - age mostly > 15 years	8	$87.50	$87.50	851	0.097	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A100	1.11	100%	100%	100%	100%	2	2	2				2	2	2			
Home Energy Savings Program - MN	ENERGY STAR Dehumidifier	Installation of ENERGY STAR Dehumidifier	ENERGY STAR Dehumidifier (Current ENERGY STAR Criteria)	Standard Efficiency Dehumidifier (Current Federal Standard)	12	$289.00	$289.00	106	0.025	0.0	$0.00	MN-RES-ESTARREF	Res	Electric Only	Combo	A069	1.8	100%	100%	100%	100%	15	18	20				15	18	20			
Home Energy Savings Program - MN	Attic Insulation - Electric Heating and Cooling	Attic insulation in homes with electric heating / electric cooling	Home with R49 or more attic insulation	Existing home with 985 sqft avg attic area and R19 avg baseline insulation	20	$1,521.97	$1,521.97	876	0.039	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I001	8.1	100%	100%	100%	100%	14	15	17				14	15	17			
Home Energy Savings Program - MN	Attic Insulation - Electric Heating Only	Attic insulation in homes with electric heating / no cooling	Home with R49 or more attic insulation	Existing home with 985 sqft avg attic area and R19 avg baseline insulation	20	$2,513.60	$2,513.60	1,480	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I002	8.1	100%	100%	100%	100%	1	2	3				1	2	3			
Home Energy Savings Program - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for combo customers	Home with R49 or more attic insulation	Existing home with 985 sqft avg attic area and R19 avg baseline insulation	20	$2,428.86	$2,428.86	40	0.077	8.1	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I003	8.1	100%	100%	100%	100%	98	106	117	98	106	117	98	106	117	98	106	117
Home Energy Savings Program - MN	Attic Insulation - Gas Heating Only	Attic insulation in homes with gas heating / no cooling	Home with R49 or more attic insulation	Existing home with 985 sqft avg attic area and R19 avg baseline insulation	20	$2,347.94	$2,347.94	0	0.000	9.3	$0.00		Res	Gas Only	Combo	I004	8.1	100%	100%	100%	100%	-	-	-	40	44	48	-	-	-	40	44	48
Home Energy Savings Program - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for gas-only customers	Home with R49 or more attic insulation	Existing home with 985 sqft avg attic area and R19 avg baseline insulation	20	$3,118.41	$3,118.41	47	0.090	9.5	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I005	8.1	100%	100%	100%	100%				32	35	39				32	35	39
Home Energy Savings Program - MN	Wall Insulation - Electric Heating and Cooling	Wall insulation in homes with electric heating / electric cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$2,919.49	$2,919.49	5,792	0.379	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I006	8.2	100%	100%	100%	100%	4	4	4				4	4	4			
Home Energy Savings Program - MN	Wall Insulation - Electric Heating Only	Wall insulation in homes with electric heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$2,919.49	$2,919.49	4,819	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I007	8.2	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for combo customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$2,794.95	$2,794.95	152	0.292	30.7	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I008	8.2	100%	100%	100%	100%	33	36	40	33	36	40	33	36	40	33	36	40
Home Energy Savings Program - MN	Wall Insulation - Gas Heating Only	Wall insulation in homes with gas heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$3,066.58	$3,066.58	0	0.000	33.7	$0.00		Res	Gas Only	Combo	I009	8.2	100%	100%	100%	100%				15	17	19				15	17	19
Home Energy Savings Program - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for gas-only customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$4,329.60	$4,329.60	235	0.452	47.6	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I010	8.2	100%	100%	100%	100%				11	12	13				11	12	13
Home Energy Savings Program - MN	Crawl Space Insulation - Electric Heating and Cooling	Crawl Space insulation in homes with electric heating / electric cooling	Home with R13 crawl space insulation added	Home with modist existing crawl space insulation (R1.9 above grade, R2.9 below grade)	20	$1,856.67	$1,856.67	1,308	0.024	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I011	8.6	100%	100%	100%	100%	1	1	1				0	0	1			
Home Energy Savings Program - MN	Crawl Space Insulation - Electric Heating Only	Crawl Space insulation in homes with electric heating / no cooling	Home with R13 crawl space insulation added	Home with modist existing crawl space insulation (R1.9 above grade, R2.9 below grade)	20	$1,856.67	$1,856.67	1,296	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I012	8.6	100%	100%	100%	100%	1	1	1				0	0	1			
Home Energy Savings Program - MN	Crawl Space Insulation - Gas Heating / Electric Cooling	Crawl Space insulation in homes with gas heating / electric cooling for combo customers	Home with R13 crawl space insulation added	Home with modist existing crawl space insulation (R1.9 above grade, R2.9 below grade)	20	$1,856.67	$1,856.67	13	0.024	7.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I013	8.6	100%	100%	100%	100%	5	6	8	5	6	8	5	6	8	5	6	8
Home Energy Savings Program - MN	Crawl Space Insulation - Gas Heating Only	Crawl Space insulation in homes with gas heating / no cooling	Home with R13 crawl space insulation added	Home with modist existing crawl space insulation (R1.9 above grade, R2.9 below grade)	20	$1,856.67	$1,856.67	0	0.000	7.2	$0.00		Res	Gas Only	Combo	I014	8.6	100%	100%	100%	100%				2	2	3				2	2	3
Home Energy Savings Program - MN	Crawl Space Insulation - Gas Heating / Electric Cooling	Crawl Space insulation in homes with gas heating / electric cooling for gas-only customers	Home with R13 crawl space insulation added	Home with modist existing crawl space insulation (R1.9 above grade, R2.9 below grade)	20	$1,856.67	$1,856.67	13	0.024	7.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I015	8.7	100%	100%	100%	100%				1	2	1				1	2	1
Home Energy Savings Program - MN	Rim Joist Insulation - Electric Heating and Cooling	Rim Joist insulation in homes with electric heating / electric cooling	Home with R13 rim joist insulation added	Home with no rim joist insulation	20	$429.25	$429.25	361	0.019	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I016	8.7	100%	100%	100%	100%	2	3	3				2	3	3			
Home Energy Savings Program - MN	Rim Joist Insulation - Electric Heating Only	Rim Joist insulation in homes with electric heating / no cooling	Home with R13 rim joist insulation added	Home with no rim joist insulation	20	$429.25	$429.25	351	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I017	8.7	100%	100%	100%	100%	1	1	2				1	1	2			
Home Energy Savings Program - MN	Rim Joist Insulation - Gas Heating / Electric Cooling	Rim Joist insulation in homes with gas heating / electric cooling for combo customers	Home with R13 rim joist insulation added	Home with no rim joist insulation	20	$429.25	$429.25	10	0.019	2.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I018	8.7	100%	100%	100%	100%	9	11	16	9	11	16	9	11	16	9	11	16
Home Energy Savings Program - MN	Rim Joist Insulation - Gas Heating Only	Rim Joist insulation in homes with gas heating / no cooling	Home with R13 rim joist insulation added	Home with no rim joist insulation	20	$429.25	$429.25	0	0.000	2.0	$0.00		Res	Gas Only	Combo	I019	8.7	100%	100%	100%	100%				3	3	5				3	3	5
Home Energy Savings Program - MN	Rim Joist Insulation - Gas Heating / Electric Cooling	Rim Joist insulation in homes with gas heating / electric cooling for gas-only customers	Home with R13 rim joist insulation added	Home with no rim joist insulation	20	$429.25	$429.25	10	0.000	2.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I020	8.7	100%	100%	100%	100%				2	3	2				2	3	2
Home Energy Savings Program - MN	Air Sealing - Electric Heating and Cooling	Air sealing in homes with electric heating / electric cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$405.76	$405.76	610	0.019	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I021	8.3	100%	100%	100%	100%	1	1	1				1	1	1			
Home Energy Savings Program - MN	Air Sealing - Electric Heating Only	Air sealing in homes with electric heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$405.76	$405.76	223	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I022	8.3	100%	100%	100%	100%	1	1	1				1	1	1			
Home Energy Savings Program - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for combo customers	Home with bypass air sealing performed	Existing home without air sealing	10	$405.76	$405.76	47	0.091	13.4	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I023	8.3	100%	100%	100%	100%	99	109	120	99	109	120	99	109	120	99	109	120
Home Energy Savings Program - MN	Air Sealing - Gas Heating Only	Air sealing in homes with gas heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$405.76	$405.76	0	0.000	18.7	$0.00		Res	Gas Only	Combo	I024	8.3	100%	100%	100%	100%				39	43	47				39	43	47
Home Energy Savings Program - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for gas-only customers	Home with bypass air sealing performed	Existing home without air sealing	10	$405.76	$405.76	27	0.051	7.5	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I025	8.3	100%	100%	100%	100%				33	36	40				33	36	40

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Home Energy Savings Program - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$32.00	$32.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I026	8.4	100%	100%	100%	100%	1	1	1				0	0	0			
Home Energy Savings Program - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$32.00	$32.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I027	8.4	100%	100%	100%	100%	1	1	1				0	1	1			
Home Energy Savings Program - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$32.00	$32.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I028	8.4	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Home Energy Savings Program - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$32.00	$32.00	0	0.000	1.8	$0.00		Res	Gas Only	Combo	I029	8.4	100%	100%	100%	100%				1	1	1				1	1	1
Home Energy Savings Program - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for gas-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$32.00	$32.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I030	8.4	100%	100%	100%	100%				1	1	1				1	1	1
Home Energy Savings Program - MN	Manufacutred Home Floor Insulation - Electric Heating and Cooling	Manufactured Home floor insulation in homes with electric heating / electric cooling	Home with R-30 belly insulation or more	Existing home with 1,254 sqft avg belly area and R-9 avg baseline insulation	20	$9,050.00	$9,050.00	3,667	0.107	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I099	8.8	100%	100%	100%	100%	1	2	6				1	2	6			
Home Energy Savings Program - MN	Manufacutred Home Floor Insulation - Electric Heating Only	Manufactured Home floor insulation in homes with electric heating / no cooling	Home with R-30 belly insulation or more	Existing home with 1,254 sqft avg belly area and R-9 avg baseline insulation	20	$9,050.00	$9,050.00	3,591	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I100	8.8	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Manufacutred Home Floor Insulation - Gas Heating / Electric Cooling	Manufactured Home floor insulation in homes with gas heating / electric cooling for combo customers	Home with R-30 belly insulation or more	Existing home with 1,254 sqft avg belly area and R-9 avg baseline insulation	20	$9,050.00	$9,050.00	76	0.146	15.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I101	8.8	100%	100%	100%	100%	24	48	144	24	48	144	24	48	144	24	48	144
Home Energy Savings Program - MN	Manufacutred Home Floor Insulation - Gas Heating Only	Manufactured Home floor insulation in homes with gas heating / no cooling	Home with R-30 belly insulation or more	Existing home with 1,254 sqft avg belly area and R-9 avg baseline insulation	20	$9,050.00	$9,050.00	0	0.000	15.3	$0.00		Res	Gas Only	Combo	I102	8.8	100%	100%	100%	100%				1	2	6				1	2	6
Home Energy Savings Program - MN	Manufacutred Home Floor Insulation - Gas Heating / Electric Cooling	Manufactured Home floor insulation in homes with gas heating / electric cooling for gas-only customers	Home with R-30 belly insulation or more	Existing home with 1,254 sqft avg belly area and R-9 avg baseline insulation	20	$9,050.00	$9,050.00	76	0.146	15.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I103	8.8	100%	100%	100%	100%				1	2	6				1	2	6
Home Energy Savings Program - MN	Home Lighting DI	LED A19 10W	LED A19 10W	Existing Incandecent Bulb	18	$3.35	$3.35	54	0.006	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K003	13.1	100%	100%	100%	100%	988	1,087	1,196				988	1,087	1,196			
Home Energy Savings Program - MN	Home Lighting DI	LED A19 10W CFL Replacement	LED A19 10W	Existing CFL Bulb	18	$3.35	$3.35	6	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K004	13.1	100%	100%	100%	100%	174	191	210				174	191	210			
Home Energy Savings Program - MN	Home Lighting DI	LED A19 11W	11W LED	Existing Incandecent Bulb	18	$3.35	$3.35	53	0.006	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K005	13.1	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Home Lighting DI	LED A19 9W	9W LED	Existing Incandecent Bulb	18	$3.35	$3.35	56	0.007	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K006	13.1	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Home Lighting DI	LED Candelabra 6W	LED Candelabra 6W	Existing Incandecent Bulb	20	$4.40	$4.40	26	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K007	13.1	100%	100%	100%	100%	262	288	317				262	288	317			
Home Energy Savings Program - MN	Home Lighting DI	LED Globe 6W	LED Globe 6W	Existing Incandecent Bulb	20	$4.95	$4.95	25	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K008	13.1	100%	100%	100%	100%	325	358	394				325	358	394			
Home Energy Savings Program - MN	Boiler	95% Efficient Boiler	95% Efficient Boiler	84% Efficient Boiler	20	$9,172.50	$9,172.50	0	0.000	13.4	$0.00		RES	Gas Only	Combo	U034	17.5	100%	100%	100%	100%				50	60	70				50	60	70
Home Energy Savings Program - MN	Furnace	Replace Furnace AFUE 80 to 95 (SF)	95% Efficient Furnace	80% Efficient Furnace	18	$4,432.50	$4,432.50	0	0.000	10.9	$0.00		RES	Gas Only	Combo	U044	17.5	100%	100%	100%	100%				80	90	100				80	90	100
Home Energy Savings Program - MN	Saver's Switch	Residential AC Switch	Utility Load Control for control period with smart switch	No Control, No Switch	15	$10.00	$10.00	1	0.984		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U060	17.8	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Home Energy Savings Program - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U088	17.7	100%	100%	100%	100%	25	30	39	25	30	39	25	30	39	25	30	39
Home Energy Savings Program - MN	Residential Furnace Tune Up	Furnace Tune Up	Existing Furnace with Tune Up - 5% improvement in efficiency	Existing Furnace	2	$330.00	$330.00	0	0.000	3.0	$0.00		RES	Gas Only	Combo	U089	17.5	100%	100%	100%	100%				12	14	19				12	14	19
Home Energy Savings Program - MN	Residential Boiler Tune Up	Boiler Tune Up	Existing Boiler with Tune Up - 5% improvement in efficiency	Existing Boiler	2	$430.00	$430.00	0	0.000	4.9	$0.00		RES	Gas Only	Combo	U090	17.5	100%	100%	100%	100%				-	-	-				-	-	-
Home Energy Savings Program - MN	ECM Furnace Fan	EC Fan Motor on Retrofit Residential Furnace with AC	Furnace Fan with AC retrofited with ECM	Existing furnace with AC and non-EC Motor	7	$845.00	$845.00	539	0.134	0.0	-$9.50	MN-RES-FLAT	RES	Electric Only	Combo	U091	17.5	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	ECM Furnace Fan	EC Fan Motor on Retrofit Residential Furnace no AC	Furnace Fan without AC retrofited with ECM	Existing furnace without AC with non-EC Motor	7	$845.00	$845.00	433	0.055	0.0	-$9.50	MN-RES-FLAT	RES	Electric Only	Combo	U092	17.5	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Wall AC	Wall Air Conditioner Replacement	Average Energy Star Wall AC w/o Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$540.00	$540.00	49	0.071		$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U097	17.11	100%	100%	100%	100%	200	220	242				200	220	242			
Home Energy Savings Program - MN	Room Air Conditioner Recycling	Wall Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr Window AC Unit	Existing Window AC Unit	5	$82.00	$82.00	542	0.781		$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U099	17.11	100%	100%	100%	100%	100	110	121				100	110	121			
Home Energy Savings Program - MN	Window AC	Window Air Conditioner Replacement	Average Energy Star Window AC with Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$492.50	$492.50	45	0.066	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U102	17.11	100%	100%	100%	100%	220	242	266				440	484	532			
Home Energy Savings Program - MN	Room Air Conditioner Recycling	Window Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr Window AC Unit	Existing Window AC Unit	5	$82.00	$82.00	499	0.720		$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U104	17.11	100%	100%	100%	100%	100	110	121				100	110	121			
Home Energy Savings Program - MN	Res MSHP	Non-ducted Multi-Split Heat Pump w/ Electric Resistance baseline	Residential Multi-Split Heat Pump w/ 2 heads (Nominal 1.8 Tons with 18.9 SEER2, 12.9 EER2, 10.2 HSPF2) with electric resistance heat backup	Spot Cooling Solution needed with Existing Electric Resistance Heating	15	$4,232.25	$4,232.25	5,959	0.196	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U109	17.4	100%	100%	100%	100%	25	30	35				25	30	35			
Home Energy Savings Program - MN	Res ASHP	Centrally ducted ASHP Cooling size basis w/ER baseline	Quality Installation of Qualifying ASHP sized for Cooling Load - 2 Ton 16 SEER2 & 12 EER2 & 9 HSPF2 with existing ER heat backup	Non-Quality Installation of 13.4 SEER2 AC Sized at 2 tons in home with existing electric resistance heat	18	$9,942.00	$9,942.00	6,761	0.532	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U129	17.3	100%	100%	100%	100%	6	7	9				6	7	9			
Home Energy Savings Program - MN	Res ccASHP	Centerally ducted cold climate ASHP w/ electric resistance baseline	Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 8.1 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$11,011.81	$11,011.81	10,520	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Electric Only	Combo	U151	17.12	100%	100%	100%	100%	11.0	14.0	16.0				11	14	16			
Home Energy Savings Program - MN	Res ccMSHP	Non-ducted cold climate Multi-Split Heat Pump w/ Electric Resistance Heat backup	Installation of Cold Climate Mini-Split Heat Pump (2.75 Tons 20.5 SEER2, 13.3 EER2, 11.5 HSPF2) with 3 indoor heads and Electric Resistance heat backup	Installation of comparable size code minimum AC with Exsisting Electric Resistance Heating	15	$9,255.48	$9,255.48	14,658	0.656	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U159	17.13	100%	100%	100%	100%	12	14	16				12	14	16			
Home Energy Savings Program - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) - Gas Only Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U163	17.6	100%	100%	100%	100%	28	32	36				28	32	36			
Home Energy Savings Program - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) combo customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U164	17.6	100%	100%	100%	100%	28	32	36	28	32	36	28	32	36	28	32	36
Home Energy Savings Program - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) electric only customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U165	17.6	100%	100%	100%	100%	10	12	14	10	12	14	37	42	48	37	42	48
Home Energy Savings Program - MN	EFS - Res ASHP Cooling	Centerally ducted dual fuel ASHP	Cooling Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$5,373.17	$5,373.17	314	0.122	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U193	17.3	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$5,373.17	$5,373.17	-6,171	0.000	51.9	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U194	17.3	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	EFS - Res ccASHP Cooling	Centerally ducted dual fuel cold climate ASHP	Cooling Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$9,741.82	$9,741.82	165	0.413	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U201	17.12	100%	100%	100%	100%	0.0	0.0	0.0				0	0	0			
Home Energy Savings Program - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$9,741.82	$9,741.82	-7,201	0.000	57.5	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U202	17.12	100%	100%	100%	100%	2.0	3.0	5.0				2	3	5			
Home Energy Savings Program - MN	EFS - Res ccMSHP Cooling	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Cooling Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$5,393.09	$5,393.09	269	0.013	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U209	17.13	100%	100%	100%	100%	2	3	4				2	3	4			
Home Energy Savings Program - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$5,393.09	$5,393.09	-4,402	0.000	39.6	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U210	17.13	100%	100%	100%	100%	2	3	4	2	3	4	2	3	4	2	3	4
Home Energy Savings Program - MN	EFS - Res MSHP Cooling	Non-ducted dual fuel MSHP w/ gas furnace backup	Cooling Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$4,500.00	$4,500.00	305	0.381	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U217	17.4	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$4,500.00	$4,500.00	-2,591	0.000	30.0	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U218	17.4	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$5.20	$5.20	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S018	19.1	100%	100%	100%	100%	2	3	4				2	3	4			
Home Energy Savings Program - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$5.20	$5.20	91	0.013	0.0	$8.12	MN-RES-SFWHT	Res	Electric Only	Combo	S019	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$5.20	$5.20	91	0.013	0.0	$8.12	MN-RES-SFWHT	Res	Electric Only	Combo	S020	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Home Energy Savings Program - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$5.20	$5.20	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S045	19.1	100%	100%	100%	100%				27	33	40				27	33	40
Home Energy Savings Program - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$5.20	$5.20	0	0.000	0.4	$8.12		Res	Gas Only	Combo	S046	19.1	100%	100%	100%	100%				6	8	9				6	8	9
Home Energy Savings Program - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$5.20	$5.20	0	0.000	0.4	$8.12		Res	Gas Only	Combo	S047	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	1,743	0.269	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S061	19.2	100%	100%	100%	100%	1	2	2	-	-	-	1	2	2	-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	2,035	0.269	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S062	19.2	100%	100%	100%	100%	1	2	2	-	-	-	1	2	2	-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	2,352	0.269	0.0	-$15.73	MN-RES-SFWHT	RES	Electric Only	Combo	S063	19.2	100%	100%	100%	100%	1	19	20	-	-	-	1	19	20	-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	1,727	0.267	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S064	19.2	100%	100%	100%	100%	1	2	2	-	-	-	1	2	2	-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	2,018	0.267	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S065	19.2	100%	100%	100%	100%	1	2	2	-	-	-	1	2	2	-	-	-
Home Energy Savings Program - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Existing Electric Water Heater	13	$4,850.00	$4,850.00	2,336	0.267	0.0	-$15.73	MN-RES-SFWHT	RES	Electric Only	Combo	S066	19.2	100%	100%	100%	100%	34	45	54	-	-	-	34	45	54	-	-	-

Measure Description					Economic Assumptions							
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape
Home Energy Savings Program - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$15.00	$15.00	511	0.037	0.0	$45.67	MN-RES-SFWHT
Home Energy Savings Program - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$15.00	$15.00	344	0.025	0.0	$30.71	MN-RES-SFWHT
Home Energy Savings Program - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$47.00	$47.00	511	0.037	0.0	$45.67	MN-RES-SFWHT
Home Energy Savings Program - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$47.00	$47.00	344	0.025	0.0	$30.71	MN-RES-SFWHT
Home Energy Savings Program - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$15.00	$15.00	0	0.000	2.2	$45.67	
Home Energy Savings Program - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$15.00	$15.00	0	0.000	1.5	$30.71	
Home Energy Savings Program - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$47.00	$47.00	0	0.000	2.2	$45.67	
Home Energy Savings Program - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$47.00	$47.00	0	0.000	1.5	$30.71	
Home Energy Savings Program - MN	Water Heater	High Efficiency Storage Water Heater	68% UEF High Efficiency Storage Water Heater - Medium Draw	Minimum Efficiency Storage Water Heater	13	$3,325.00	$3,325.00	0	0.000	3.5	$0.00	
Home Energy Savings Program - MN	Water Heater	High Efficiency Storage Water Heater	68% UEF High Efficiency Storage Water Heater - High Draw	Minimum Efficiency Storage Water Heater	13	$3,325.00	$3,325.00	0	0.000	1.8	$0.00	
Home Energy Savings Program - MN	Aerators - EWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.22	$1.22	74	0.010	0.0	$5.71	MN-RES-SFWHT
Home Energy Savings Program - MN	Aerators - EWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.48	$0.48	64	0.009	0.0	$5.73	MN-RES-SFWHT
Home Energy Savings Program - MN	Showerheads - EWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.22	$3.22	511	0.037	0.0	$45.67	MN-RES-SFWHT
Home Energy Savings Program - MN	Aerators - GWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.22	$1.22	0	0.000	0.3	$5.71	
Home Energy Savings Program - MN	Aerators - GWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.48	$0.48	0	0.000	0.3	$5.73	
Home Energy Savings Program - MN	Showerheads - GWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.22	$3.22	0	0.000	2.2	$45.67	
Home Energy Squad - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$25.00	$25.00	68	0.009	0.0	$0.00	MN-RES-FLAT
Home Energy Squad - MN	ENERGY STAR Dehumidifier	Installation of ENERGY STAR Dehumidifier	ENERGY STAR Dehumidifier (Current ENERGY STAR Criteria)	Standard Efficiency Dehumidifier (Current Federal Standard)	12	$35.00	$50.00	111	0.034	0.0	$0.00	MN-RES-ESTARREF
Home Energy Squad - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec
Home Energy Squad - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	0	0.000	1.8	$0.00	
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for gas-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Weatherstripping - Electric Heating and Cooling	A la carte weatherstripping in homes with electric heating / electric cooling	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec
Home Energy Squad - MN	Weatherstripping - Electric Heating Only	A la carte weatherstripping in homes with electric heating / no cooling	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	A la carte weatherstripping in homes with gas heating / electric cooling for combo customers	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Weatherstripping - Gas Heating Only	A la carte weatherstripping in homes with gas heating / no cooling	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	0	0.000	1.8	$0.00	
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	A la carte weatherstripping in homes with gas heating / electric cooling for gas-only customers	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	A la carte weatherstripping in homes with gas heating / electric cooling for electric-only customers	Additional weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Additional existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$0.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Home Energy Squad Service	Home Energy Squad Service	Tier One Energy Squad Service				$70.00					
Home Energy Squad - MN	Home Lighting DI	3-WAY 5W-9W-16W	3-WAY 5W-9W-16W	Existing Incandescent Bulb	18	$5.00	$5.00	34	0.004	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	LED - A-lamp (15W)	15w Standard LED (100w Equivalent)	Existing Incandescent Bulb	18	$5.00	$5.00	93	0.011	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	LED - A-lamp (9W)	9w Standard LED (60w Equivalent)	Existing Incandescent Bulb	18	$5.00	$5.00	56	0.007	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	LED - Candelabra (5W)	LED - Candelabra (5W)	Existing Incandescent Bulb	20	$5.00	$5.00	15	0.002	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	LED - Flood (10W)	10W VALUE led (60W Equivalent)	Existing Incandescent Bulb	20	$5.00	$5.00	36	0.005	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	LED - Globe (6W)	6w Globe LED Dim	Existing Incandescent Bulb	20	$5.00	$5.00	40	0.006	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	Replace Compact Flourescent Lamps (CFLs) with LEDs	A-Line LED	Existing CFL	18	$5.00	$5.00	11	0.001	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	Replace Compact Flourescent Lamps (CFLs) with LEDs	Specialty LED	Existing CFL	20	$5.00	$5.00	3	0.000	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	A19 Smart LED Bulb	A19 Smart LED Bulb	Existing Incandescent Bulb	18	$12.99	$12.99	13	0.001	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Home Lighting DI	BR30 Smart LED Bulb	BR30 Smart LED Bulb	Existing Incandescent Bulb	18	$17.99	$17.99	14	0.001	0.0	$0.00	MN-RES-SFLIT
Home Energy Squad - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat)	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Programmable Thermostat	Install Second Programmable Thermostat	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	39	0.086	6.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Programmable Thermostat	Programming of Existing T-stat (Elec Cooling & Gas Heat)	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Base modeled home w/ 10 SEER AC and no setup temp	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Saver's Switch	Residential AC Switch	Utility Load Control for control period with smart switch	No Control, No Switch	15	$90.00	$90.00	1	0.984		$0.00	MN-RES-PEAK_CNT
Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	76	0.180	0.0	$0.00	MN-RES-HMEFF
Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	76	0.180	0.0	$0.00	MN-RES-Cooling_DX
Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - GAS Only	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	0	0.000	5.5	$0.00	
Home Energy Squad - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.25	$1.25	74	0.010	0.0	$5.71	MN-RES-SFWHT
Home Energy Squad - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	91	0.013	0.0	$8.12	MN-RES-SFWHT
Home Energy Squad - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.25	$1.25	0	0.000	0.3	$5.71	
Home Energy Squad - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	0	0.000	0.4	$8.12	
Home Energy Squad - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	511	0.037	0.0	$45.67	MN-RES-SFWHT
Home Energy Squad - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	344	0.025	0.0	$30.71	MN-RES-SFWHT
Home Energy Squad - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	511	0.037	0.0	$45.67	MN-RES-SFWHT
Home Energy Squad - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	344	0.025	0.0	$30.71	MN-RES-SFWHT
Home Energy Squad - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	0	0.000	2.2	$45.67	
Home Energy Squad - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	0	0.000	1.5	$30.71	
Home Energy Squad - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	0	0.000	2.2	$45.67	
Home Energy Squad - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	0	0.000	1.5	$30.71	

	Customer Information					Stipulated Factors										Forecast Units					
Measure Description	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S111	19.1	100%	100%	100%	100%	5	7	8				25	27	29			
Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S112	19.1	100%	100%	100%	100%	5	7	8				25	27	29			
Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S113	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S114	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S149	19.1	100%	100%	100%	100%				5	7	8				25	27	29
Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S150	19.1	100%	100%	100%	100%				5	7	8				25	27	29
Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S151	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S152	19.1	100%	100%	100%	100%				-	-	-				-	-	-
High Efficiency Storage Water Heater	RES	Gas Only	Combo	S167	19.2	100%	100%	100%	100%				5	6	7				18	22	26
High Efficiency Storage Water Heater	RES	Gas Only	Combo	S168	19.2	100%	100%	100%	100%				50	55	66				187	220	264
Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	Res	Electric Only	Combo	S207	19.1	100%	100%	60%	100%							-	-	-			
Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	Res	Electric Only	Combo	S208	19.1	100%	100%	60%	100%							-	-	-			
Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S209	19.1	100%	100%	65%	100%							-	-	-			
Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	Res	Gas Only	Combo	S210	19.1	100%	100%	60%	100%										-	-	-
Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	Res	Gas Only	Combo	S211	19.1	100%	100%	60%	100%										-	-	-
Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S212	19.1	100%	100%	65%	100%										-	-	-
Advanced Power Strip	Res	Electric Only	Combo	A002	1.5	100%	100%	100%	100%							10	20	30	-	-	-
Installation of ENERGY STAR Dehumidifier	Res	Electric Only	Combo	A072	1.8	100%	100%	100%	100%							39	43	47	-	-	-
Weatherstripping in homes with electric heating / electric cooling	Res	Electric Only	Combo	I064	8.4	100%	100%	100%	100%							190	209	230	-	-	-
Weatherstripping in homes with electric heating / no cooling	Res	Electric Only	Combo	I065	8.4	100%	100%	100%	100%							36	40	44	-	-	-
Weatherstripping in homes with gas heating / electric cooling for combo customers	Res	Combo	Combo	I066	8.4	100%	100%	100%	100%							8,320	9,152	10,068	8,320	9,152	10,068
Weatherstripping in homes with gas heating / no cooling	Res	Gas Only	Combo	I067	8.4	100%	100%	100%	100%							-	-	-	779	857	943
Weatherstripping in homes with gas heating / electric cooling for gas-only customers	Res	Combo	Gas Only	I068	8.4	100%	100%	100%	100%							-	-	-	-	-	-
Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Res	Combo	Electric Only	I069	8.4	100%	100%	100%	100%							-	-	-	-	-	-
A la carte weatherstripping in homes with electric heating / electric cooling	Res	Electric Only	Combo	I070	8.4	100%	100%	100%	100%							19	20	23	-	-	-
A la carte weatherstripping in homes with electric heating / no cooling	Res	Electric Only	Combo	I071	8.4	100%	100%	100%	100%							3	4	4	-	-	-
A la carte weatherstripping in homes with gas heating / electric cooling for combo customers	Res	Combo	Combo	I072	8.4	100%	100%	100%	100%							83	91	100	83	91	100
A la carte weatherstripping in homes with gas heating / no cooling	Res	Gas Only	Combo	I073	8.4	100%	100%	100%	100%							-	-	-	77	85	94
A la carte weatherstripping in homes with gas heating / electric cooling for gas-only customers	Res	Combo	Gas Only	I074	8.4	100%	100%	100%	100%							-	-	-	-	-	-
A la carte weatherstripping in homes with gas heating / electric cooling for electric-only customers	Res	Combo	Electric Only	I075	8.4	100%	100%	100%	100%							-	-	-	-	-	-
Home Energy Squad Service		Combo	Combo	J021	9.1	100%	100%	100%	100%	11,322	12,455	13,700	4,160	4,576	5,034	11,322	12,455	13,700	4,160	4,576	5,034
3-WAY 5W-9W-16W	RES	Electric Only	Combo	K009	13.1	100%	100%	100%	100%							-	-	-			
LED - A-lamp (15W)	RES	Electric Only	Combo	K010	13.1	100%	100%	100%	100%							10,657	9,591	8,632			
LED - A-lamp (9W)	RES	Electric Only	Combo	K011	13.1	100%	100%	100%	100%							67,382	60,643	54,579			
LED - Candelabra (5W)	RES	Electric Only	Combo	K012	13.1	100%	100%	100%	100%							27,654	24,888	22,399			
LED - Flood (10W)	RES	Electric Only	Combo	K013	13.1	100%	100%	100%	100%							30,238	27,215	24,493			
LED - Globe (6W)	RES	Electric Only	Combo	K014	13.1	100%	100%	100%	100%							14,001	12,601	11,341			
Replace Compact Flourescent Lamps (CFLs) with LEDs	RES	Electric Only	Combo	K015	13.1	100%	100%	100%	100%							2,707	2,436	2,193			
Replace Compact Flourescent Lamps (CFLs) with LEDs	RES	Electric Only	Combo	K016	13.1	100%	100%	100%	100%							1,041	937	844			
A19 Smart LED Bulb	RES	Electric Only	Combo	K070	13.1	100%	100%	100%	100%							-	-	-			
BR30 Smart LED Bulb	RES	Electric Only	Combo	K071	13.1	100%	100%	100%	100%							-	-	-			
Install Programmable T-stat (Elec Cooling & Gas Heat)	RES	Combo	Combo	U045	17.6	100%	100%	100%	100%							480	396	387	480	396	387
Install Second Programmable Thermostat	RES	Combo	Combo	U049	17.6	100%	100%	100%	100%							33	22	12	33	22	12
Programming of Existing T-stat (Elec Cooling & Gas Heat)	RES	Combo	Combo	U053	17.6	100%	100%	100%	100%							174	143	123	174	143	123
Residential AC Switch	RES	DR	Combo	U058	17.8	100%	100%	100%	100%							-	-	-	-	-	-
Install Energy Star certified smart thermostat - AC & ELEC HEAT	RES	Electric Only	Electric Only	U070	17.7	100%	100%	100%	100%							80	88	96			
Install Energy Star certified smart thermostat - AC & GAS	RES	Combo	Combo	U072	17.7	100%	100%	100%	100%							920	1,012	1,113	920	1,012	1,113
Install Energy Star certified smart thermostat - AC ONLY	RES	Electric Only	Electric Only	U077	17.7	100%	100%	100%	100%							21	23	25			
Install Energy Star certified smart thermostat - GAS Only	RES	Gas Only	Gas Only	U082	17.7	100%	100%	100%	100%										21	23	25
Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	Res	Electric Only	Combo	S021	19.1	100%	100%	100%	100%							94	104	114			
Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	Res	Electric Only	Combo	S022	19.1	100%	100%	100%	100%							732	805	885			
Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	Res	Gas Only	Combo	S048	19.1	100%	100%	100%	100%										498	548	503
Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	Res	Gas Only	Combo	S049	19.1	100%	100%	100%	100%										2,766	3,024	3,347
Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S115	19.1	100%	100%	100%	100%							416	443	487			
Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S116	19.1	100%	100%	100%	100%							141	153	169			
Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S117	19.1	100%	100%	100%	100%							142	171	188			
Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	Res	Electric Only	Combo	S118	19.1	100%	100%	100%	100%							11	14	15			
Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S153	19.1	100%	100%	100%	100%										1,589	1,701	1,872
Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S154	19.1	100%	100%	100%	100%										572	625	687
Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S155	19.1	100%	100%	100%	100%										471	565	621
Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	Res	Gas Only	Combo	S156	19.1	100%	100%	100%	100%										74	89	98

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Home Energy Squad - MN	Water Heater DR	Demand response capability on grid enabled electric resistance water heater	Demand response from electric resistance water heater	No management of water heater time of use	1	$100.00	$200.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	S182	19.2	100%	100%	100%	100%							10	20	40			
Home Energy Squad - MN	Gas Water Heater Setback	Gas Water Heater Setback	setback WH setpoint to 120 F	Existing WH at setpoint of 130 F	8	$0.00	$0.00			0.4	$0.00		RES	Gas Only	Combo	S191	19.2	100%	100%	100%	100%							-	-	-	817	899	989
Home Energy Squad - MN	Electric Water Heater Setback	Electric Water Heater Setback	setback WH setpoint to 120 F	Existing WH at setpoint of 130 F	8	$0.00	$0.00	94	0.011	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S192	19.2	100%	100%	100%	100%							10	20	30	-	-	-
Home Energy Squad - MN	Water Heater Pipe Insulation	Water Heater Pipe Insulation - ER water heater	R-2 Pipe insulation added to 6ft after water heater	Bare pipe	13	$21.78	$21.78	277	0.032	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	S270	19.5	100%	100%	100%	100%							100	120	130	-	-	-
Home Energy Squad - MN	Water Heater Pipe Insulation	Water Heater Pipe Insulation - Gas water heater	R-2 Pipe insulation added to 6ft after water heater	Bare pipe	13	$21.78	$21.78	0	0.000	14.7	$0.00	MN-RES-FLAT	Res	Gas Only	Combo	S271	19.5	100%	100%	100%	100%							-	-	-	41	45	50
Home Energy Squad - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	91	0.013	0.0	$8.12	MN-RES-SFWHT	Res	Electric Only	Combo	S279	19.1	100%	100%	100%	100%							25	28	31	-	-	-
Home Energy Squad - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	0	0.000	0.4	$8.12		Res	Gas Only	Combo	S280	19.1	100%	100%	100%	100%							-	-	-	87	96	106
Home Lighting - MN	Residential Home Lighting - Residential Customers	Connected Lighting	Smart Bulb	45 lm/W EISA Equivalent	18	$2.00	$9.74	14	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K051	13.1	100%		99%	100%	769	769	769				10,000	10,000	10,000			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Bulb - GSL	LED Bulb GSL	45 lm/W EISA Equivalent	19	$1.37	$1.47	10	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K060	13.1	100%		99%	100%	216,264	202,210	188,156				2,811,437	2,628,731	2,446,025			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Bulb - GSL Specialty	LED Bulb Specialty GSL	Incandescent Equivalent	20	$1.50	$1.66	29	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K061	13.1	100%		99%	100%	1,085	1,085	1,085				14,100	14,100	14,100			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Bulb - Fixtures	LED Fixture	Incandescent Equivalent	20	$2.07	$13.00	58	0.007	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K062	13.1	100%		99%	100%	13,406	15,555	17,705				174,278	202,221	230,163			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Tubes (Linear Lamps)	LED Linear Tube	Fluorescent Equivalent	20	$2.50	$13.73	12	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K063	13.1	100%		99%	100%	10,472	12,676	14,880				20,944	25,352	29,760			
Home Lighting - MN	Residential Home Lighting - Business Customers	LED Bulb - GSL	LED Bulb GSL	45 lm/W EISA Equivalent	4	$1.37	$7.61	49	0.008	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Combo	K064	13.1	100%		100%	100%	6,902	6,454	6,005				179,453	167,791	156,129			
Home Lighting - MN	Residential Home Lighting - Business Customers	LED Bulb - GSL Specialty	LED Bulb Specialty GSL	Incandescent Equivalent	5	$1.50	$7.27	222	0.034	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Combo	K065	13.1	100%		100%	100%	35	35	35				900	900	900			
Home Lighting - MN	Residential Home Lighting - Business Customers	LED Bulb - Fixtures	LED Fixture	Incandescent Equivalent	9	$2.07	$21.60	322	0.049	0.0	$0.00	MN-BUS-Light Troffer	BUS	Electric Only	Combo	K066	13.1	100%		100%	100%	428	496	565				11,124	12,908	14,691			
Home Lighting - MN	Residential Home Lighting - Business Customers	LED Tubes (Linear Lamps)	LED Linear Tube	Fluorescent Equivalent	10	$2.50	$13.73	88	0.013	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Combo	K067	13.1	100%		100%	100%	2,551	3,088	3,625				66,323	80,282	94,241			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Holiday Lights	LED Holiday Lights	Incandescent Holiday Lights	8	$2.00	$10.00	16	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K068	13.1	100%		99%	100%	1,538	1,538	1,538				20,000	20,000	20,000			
Home Lighting - MN	Residential Home Lighting - Residential Customers	LED Nightlight	LED Nightlight	Incandescent Nightlight	8	$2.00	$3.35	30	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K069	13.1	100%		99%	100%	84,000	37,500	75,000				168,000	75,000	150,000			
HVAC+R - MN	Ozone Laundry	Ozone Washer Extractor	New ozone laundry system(Venturi Injection or Bubble Diffusion) is added-on to new or existing commercial washing machine using hot water heated with natural gas	new or existing commercial washing machine using hot water heated with natural gas	10	$3,028.26	$10,804.35	9	0.274	82.0	$1,272.23	MN-BUS-FLAT	Bus	Gas Only	Combo	A050	1.3	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Custom Cooling Project	Custom Cooling Projects	New Efficient Equipment	Existing or New Inefficient Equipment	18	$8,843.85	$58,558.67	93,404	19.134	0.0	$1.67	MN-BUS-COOLING	BUS	Electric Only	Electric Only	G001	7.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Custom Motors Project	Custom Motors Project	New Equipment	Existing or New Inefficient	17	$6,751.12	$28,584.28	74,886	13.571	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	G011	7.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Custom Heating Project	Custom Heating Project	New Efficient Equipment	Less Efficient Product/Systems	18	$663.88	$6,612.75	0	0.000	132.8	$0.00		BUS	Gas Only	Gas Only	G019	7.1	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Custom Refrigeration Project	Custom Refrigeration Project	New Efficient Equipment	Less Efficient Product/Systems	16	$12,257.79	$71,019.11	154,882	24.504	0.0	$7,781.69	MN-BUS-CUSTOM_	Bus	Electric Only	Electric Only	G028	7.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	DX	DX Units < 5.4 tons	DX unit size 3.71 tons, 12.88 EER, 15.15 SEER	DX unit size 3.71 tons, 11.05 EER, 13.00 SEER	15	$347.36	$612.90	332	0.515	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L001	11.1	100%	100%	100%	100%	22	22	22	-	-	-	22	22	22	-	-	-
HVAC+R - MN	DX	DX Units 5.4 - 11.3 tons	DX unit size 8.06 tons, 12.13 EER, 14.78 SEER	DX unit size 8.06 tons, 11.00 EER, 12.60 SEER	15	$1,101.41	$1,208.73	1,502	0.739	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L002	11.1	100%	100%	100%	100%	45	45	45	-	-	-	45	45	45	-	-	-
HVAC+R - MN	DX	DX Units 11.4 - 19.9 tons	DX unit size 14.69 tons, 12.04 EER, 14.67 SEER	DX unit size 14.69 tons, 10.80 EER, 12.20 SEER	15	$2,284.71	$2,056.30	2,890	1.513	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L003	11.1	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	DX	DX Units 20 - 63.3 tons	DX unit size 26.64 tons, 11.45 EER, 13.94 SEER	DX unit size 26.64 tons, 9.80 EER, 11.40 SEER	15	$3,471.13	$3,330.29	9,333	4.228	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L004	11.1	100%	100%	100%	100%	22	22	22	-	-	-	22	22	22	-	-	-
HVAC+R - MN	DX	DX Units ≥ 63.3 tons	DX unit size 95.68 tons, 11.28 EER, 13.73 SEER	DX unit size 95.68 tons, 9.50 EER, 11.00 SEER	15	$11,194.90	$10,524.70	27,409	17.124	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L005	11.1	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	WSHP	Water Source Heat Pumps	WSHP unit size 2.81 tons, 14.20 EER, 15.78 SEER	WSHP unit size 2.81 tons, 13.00 EER, 14.44 SEER	15	$242.15	$421.56	191	0.198	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L006	11.2	100%	100%	100%	100%	23	23	23	-	-	-	23	23	23	-	-	-
HVAC+R - MN	DX	PTAC Units	PTAC unit size 0.60 tons, 13.00 EER, 15.29 SEER	PTAC unit size 0.60 tons, 11.83 EER, 13.92 SEER	15	$21.12	$150.85	30	0.050	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L007	11.3	100%	100%	100%	100%	100	100	100	-	-	-	135	135	135	-	-	-
HVAC+R - MN	Chiller	Scroll/Screw Chiller < 75 tons	Chiller size 67 tons, 0.73 FLV kW/ton, 0.57 IPLV kW/ton	Chiller size 67 tons, 0.75 FLV kW/ton, 0.60 IPLV kW/ton	20	$965.47	$8,710.00	1,493	1.230	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L008	11.4	100%	100%	100%	100%	6	6	6	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Chiller	Scroll/Screw chiller 75 to 150 tons	Chiller size 111.1 tons, 0.70 FLV kW/ton, 0.53 IPLV kW/ton	Chiller size 111.1 tons, 0.72 FLV kW/ton, 0.56 IPLV kW/ton	20	$1,600.37	$9,995.40	7,699	2.039	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L009	11.4	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Chiller	Scroll/Screw chiller 150 to 300 tons	Chiller size 225 tons, 0.64 FLV kW/ton, 0.51 IPLV kW/ton	Chiller size 225 tons, 0.66 FLV kW/ton, 0.54 IPLV kW/ton	20	$3,242.25	$20,250.00	15,598	4.131	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L010	11.4	100%	100%	100%	100%	6	6	6	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Chiller	Scroll/Screw chiller ≥ 300 tons	Chiller size 500 tons, 0.59 FLV kW/ton, 0.49 IPLV kW/ton	Chiller size 500 tons, 0.61 FLV kW/ton, 0.52 IPLV kW/ton	20	$7,205.00	$20,000.00	34,661	9.180	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L011	11.4	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Chiller	Centrifugal Chillers < 150 tons	Chiller size 75.00 tons, 0.60 FLV kW/ton, 0.55 IPLV kW/ton	Chiller size 75.00 tons, 0.61 FLV kW/ton, 0.55 IPLV kW/ton	20	$791.13	$9,750.00	624	1.253	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L012	11.5	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Chiller	Centrifugal Chillers 150 - 300 tons	Chiller size 206.00 tons, 0.57 FLV kW/ton, 0.35 IPLV kW/ton	Chiller size 206.00 tons, 0.61 FLV kW/ton, 0.55 IPLV kW/ton	20	$5,775.82	$17,510.00	94,865	8.317	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L013	11.5	100%	100%	100%	100%	5	5	5	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Chiller	Centrifugal Chillers 300 - 600 tons	Chiller size 435.33 tons, 0.54 FLV kW/ton, 0.32 IPLV kW/ton	Chiller size 435.33 tons, 0.58 FLV kW/ton, 0.55 IPLV kW/ton	20	$14,510.70	$37,003.33	221,203	16.523	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L014	11.5	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Chiller	Centrifugal Chillers ≥ 600 tons	Chiller size 918.18 tons, 0.53 FLV kW/ton, 0.34 IPLV kW/ton	Chiller size 918.18 tons, 0.56 FLV kW/ton, 0.50 IPLV kW/ton	20	$28,194.63	$36,727.27	355,064	36.478	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L015	11.5	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Chiller	Air-Cooled Chillers < 150 tons	Chiller size 69.77 tons, 11.60 EER, 15.98 SEER	Chiller size 69.77 tons, 10.10 EER, 13.70 SEER	20	$2,532.49	$7,674.98	12,426	9.652	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L016	11.6	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Chiller	Air-Cooled Chillers ≥ 150 tons	Chiller size 273.16 tons, 11.04 EER, 19.40 SEER	Chiller size 273.16 tons, 10.10 EER, 14.00 SEER	20	$14,516.72	$30,047.51	77,632	24.982	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L017	11.6	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Chiller VFD	Chiller VFD Retrofit	VFD Chiller size 583 tons, 0.55 FLV kW/ton, 0.34 IPLV	Const Speed Chiller size 583 tons, 0.54 FLV kW/ton, 0.44 IPLV	15	$8,483.88	$41,886.57	364,136	-8.417	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L018	11.7	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	MN ERV	ERV Install on RTU/AHU for reduced cooling & heating load	130% Sensible Effectiveness Heat Recovery on 3755 CFM OA (Cooling Mode)	No heat recovery on 3755 CFM OA	15	$3,754.93	$1,351.40	7,809	16.597	1,257.4	$0.00	MN-BUS-COOLING	BUS	Combo	Combo	L019	11.8	100%	100%	100%	100%	2	2	2	2	2	2	3	3	3	2	2	2
HVAC+R - MN	Mini Split	Mini-Split Heat Pump	MSHP size 1.2 tons, 21.27 SEER, 10.50 HSPF	MSHP size 1.2 tons, 14 SEER, 8.2 HSPF	18	$227.30	$512.36	0	0.000	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L020	11.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Mini Split	Mini-Split AC - Data Centers	MSAC size 2.2 tons, 17.79 SEER	MSAC size 2.2 tons, 14 SEER	15	$107.84	$542.29	2,926	0.559	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L021	11.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Mini Split	Mini-Split AC	MSAC size 2.2 tons, 17.79 SEER	MSAC size 2.2 tons, 14 SEER	15	$107.84	$542.29	2,926	0.559	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	L022	11.1	100%	100%	100%	100%	25	25	25	-	-	-	25	25	25	-	-	-
HVAC+R - MN	DX ACCU	DX ACCU > 11.3 tons	efficient ACCU full refrigerant circuit replacement, no HVAC fans	MN TRM baseline ACCU full refrigerant circuit replacement, no HVAC fans	20	$3,846.84	$2,167.52	4,164	2.629	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	L031	11.1A	100%	100%	100%	100%	5	5	5	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 0 - 0.299 MMBTUH	85% Efficient Boiler	80% Efficient Boiler	20	$248.00	$500.00	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M001	12.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 0.3 - 0.499 MMBTUH	85% Efficient Boiler	80% Efficient Boiler	20	$248.00	$500.00	0	0.000	21.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M002	12.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 0.5 - 0.999 MMBTUH	85% Efficient Boiler	80% Efficient Boiler	20	$496.00	$4,000.00	0	0.000	104.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M003	12.2	100%	100%	100%	100%	-	-	-	3	3	2	-	-	-	3	3	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 1 - 1.999 MMBTUH	85% Efficient Boiler	80% Efficient Boiler	20	$864.00	$4,400.00	0	0.000	207.8	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M004	12.2	100%	100%	100%	100%	-	-	-	3	3	2	-	-	-	3	3	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 2 - 2.499 MMBTUH	85% Efficient Boiler	80% Efficient Boiler	20	$1,600.00	$5,000.00	0	0.000	240.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M005	12.2	100%	100%	100%	100%	-	-	-	3	3	2	-	-	-	3	3	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 2.5 - 3.999 MMBTUH	85% Efficient Boiler	82% Efficient Boiler	20	$2,400.00	$5,000.00	0	0.000	352.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M006	12.2	100%	100%	100%	100%	-	-	-	3	3	2	-	-	-	3	3	2
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 4 - 5.999 MMBTUH	85% Efficient Boiler	82% Efficient Boiler	20	$3,200.00	$10,000.00	0	0.000	281.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M007	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 6 - 7.999 MMBTUH	85% Efficient Boiler	82% Efficient Boiler	20	$4,800.00	$15,000.00	0	0.000	422.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M008	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Non-condensing 8 -9.999 MMBTUH	85% Efficient Boiler	82% Efficient Boiler	20	$6,400.00	$20,000.00	0	0.000	563.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M009	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 0 - 0.299 MMBTUH	88% Efficient Boiler	80% Efficient Boiler	20	$980.00	$1,600.00	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M010	12.2	100%	100%	100%	100%	-	-	-	3	2	1	-	-	-	3	2	1
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 0.3 - 0.499 MMBTUH	88% Efficient Boiler	80% Efficient Boiler	20	$980.00	$1,600.00	0	0.000	52.5	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M011	12.2	100%	100%	100%	100%	-	-	-	3	2	1	-	-	-	3	2	1
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 0.5 - 0.999 MMBTUH	88% Efficient Boiler	80% Efficient Boiler	20	$2,170.00	$6,200.00	0	0.000	149.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M012	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 1 - 1.999 MMBTUH	88% Efficient Boiler	80% Efficient Boiler	20	$4,690.00	$7,700.00	0	0.000	322.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M013	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 2 - 2.499 MMBTUH	88% Efficient Boiler	80% Efficient Boiler	20	$7,000.00	$14,500.00	0	0.000	481.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M014	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 2.5 - 3.999 MMBTUH	88% Efficient Boiler	82% Efficient Boiler	20	$10,255.00	$14,500.00	0	0.000	550.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M015	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 4 - 5.999 MMBTUH	88% Efficient Boiler	82% Efficient Boiler	20	$17,640.00	$34,800.00	0	0.000	946.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M016	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 6 - 7.999 MMBTUH	88% Efficient Boiler	82% Efficient Boiler	20	$21,000.00	$43,500.00	0	0.000	1,126.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M017	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Hot Water Boiler - Condensing 8 - 9.999 MMBTUH	88% Efficient Boiler	82% Efficient Boiler	20	$28,000.00	$58,000.00	0	0.000	1,501.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M018	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 0 - 0.499 MMBTUH; for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$2,030.00	$4,600.00	0	0.000	85.8	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M019	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 0.500 - 0.999 MMBTUH; for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$4,900.00	$11,200.00	0	0.000	207.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M020	12.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 1 - 1.999 MMBTUH; for for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$7,000.00	$15,000.00	0	0.000	296.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M021	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 2 - 3.999 MMBTUH; for for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$17,920.00	$26,500.00	0	0.000	757.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M022	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 4 - 5.999 MMBTUH; for for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$28,000.00	$53,000.00	0	0.000	1,184.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M023	12.2	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 6 - 7.999 MMBTUH; for for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$42,000.00	$79,500.00	0	0.000	1,776.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M024	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Condensing Boiler Upgrade; 8 - 9.999 MMBTUH; for for space heating	88% Efficient Boiler	78% Efficient Boiler	20	$56,000.00	$106,000.00	0	0.000	2,368.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M025	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	Low Pressure Steam Boiler; 0 - 0.499 MMBTUH	84% Efficient Boiler	79% Efficient Boiler	20	$230.00	$1,320.00	0	0.000	56.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M026	12.2	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
HVAC+R - MN	Boiler	Low Pressure Steam Boiler; 0.5 - 4.999 MMBTUH	84% Efficient Boiler	79% Efficient Boiler	20	$1,755.00	$3,168.00	0	0.000	427.5	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M027	12.2	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
HVAC+R - MN	Boiler	Low Pressure Steam Boiler; 5 - 9.999 MMBTUH	84% Efficient Boiler	79% Efficient Boiler	20	$4,385.00	$16,500.00	0	0.000	1,281.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M028	12.2	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Boiler	High Pressure Steam Boiler; 0 - 0.499 MMBTUH	83% Efficient Boiler	79% Efficient Boiler	20	$150.00	$1,320.00	0	0.000	29.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M029	12.2	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
HVAC+R - MN	Boiler	High Pressure Steam Boiler; 0.5 - 4.99 MMBTUH	83% Efficient Boiler	79% Efficient Boiler	20	$2,205.00	$3,168.00	0	0.000	429.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M030	12.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler	High Pressure Steam Boiler; 5 - 9.999 MMBTUH	83% Efficient Boiler	79% Efficient Boiler	20	$4,155.00	$16,500.00	0	0.000	1,012.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M031	12.2	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
HVAC+R - MN	Furnace	90% Efficient Furnaces	90% Efficient Furnaces	78% Eff Furnace	20	$100.00	$1,254.30	0	0.000	12.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M032	12.3	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Furnace	92% Efficient Furnaces	92% Efficient Furnaces	78% Eff Furnace	20	$200.00	$1,341.89	0	0.000	13.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M033	12.3	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Furnace	94% Efficient Furnaces	94% Efficient Furnaces	78% Eff Furnace	20	$250.00	$1,429.48	0	0.000	16.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M034	12.3	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	3	3	3
HVAC+R - MN	Furnace	96% Efficient Furnaces	96% Efficient Furnaces	78% Eff Furnace	20	$300.00	$1,517.07	0	0.000	17.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M035	12.3	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	3	3	3
HVAC+R - MN	Unit Heater	Non-Condensing Power Vent (83% efficiency)	Non-condensing power vent unit heater	Non-condensing standard forced-air unit heater	20	$152.87	$125.66	0	0.000	16.8	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M036	12.4	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Unit Heater	Condensing (>90% efficiency)	Condensing power vent unit heater	Non-condensing standard forced-air unit heater	20	$102.77	$1,406.88	0	0.000	23.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M037	12.4	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Unit Heater Infrared	Infrared	Infrared Heater	Non-condensing standard forced-air unit heater	15	$185.94	$226.54	1,798	0.000	85.3	$0.00	MN-BUS-ECM	Bus	Combo	Combo	M038	12.4	100%	100%	100%	100%	1	1	1	2	2	2	1	1	1	2	2	2
HVAC+R - MN	Boiler Tune Up	Non-Condensing Boiler Tune-Up <= 300 MBTUH	Boiler Tune-up - 2.2% energy savings; Boiler now at 80% efficiency	Existing boiler Poorly functioning at 78.24% efficiency	2	$108.75	$435.00	0	0.000	10.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M039	12.5	100%	100%	100%	100%	-	-	-	65	65	65	-	-	-	65	65	65
HVAC+R - MN	Boiler Tune Up	Non-Condensing Boiler Tune-Up 301 - 1 MMBTUH	Boiler Tune-up - 2.2% energy savings; Boiler now at 80% efficiency	Existing boiler Poorly functioning at 78.24% efficiency	2	$108.25	$433.00	0	0.000	22.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M040	12.5	100%	100%	100%	100%	-	-	-	65	65	65	-	-	-	65	65	65
HVAC+R - MN	Boiler Tune Up	Non-Condensing Boiler Tune-Up 1 - 10 MMBTUH	Boiler Tune-up - 2.2% energy savings; Boiler now at 80% efficiency	Existing boiler Poorly functioning at 78.24% efficiency	2	$174.25	$697.00	0	0.000	93.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M041	12.5	100%	100%	100%	100%	-	-	-	65	60	55	-	-	-	65	60	55
HVAC+R - MN	Boiler Tune Up	Non-Condensing Boiler Tune-Up >= 10 MMBTUH	Boiler Tune-up - 2.2% energy savings; Boiler now at 80% efficiency	Existing boiler Poorly functioning at 78.24% efficiency	2	$182.50	$730.00	0	0.000	846.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M042	12.5	100%	100%	100%	100%	-	-	-	30	25	25	-	-	-	30	25	25
HVAC+R - MN	Boiler Tune Up	Condensing Boiler Tune-Up	Condensing Boiler Tune-up - 0.8% additive improvement in efficiency; Boiler now at 88% average annual operating efficiency	Existing condensing boiler Poorly functioning at 87.2% efficiency	2	$108.25	$433.00	0	0.000	7.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M043	12.5	100%	100%	100%	100%	-	-	-	60	60	60	-	-	-	60	60	60
HVAC+R - MN	Water Heater	Commercial Water Heaters - Tankless	95% Efficient Tankless Water Heater	80% Efficient Storage Water Heater	20	$1,050.00	$1,443.59	0	0.000	132.4	-$800.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M044	12.1	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Water Heater	Commercial Water Heaters - Storage	96% Efficient Storage Water Heater	80% Efficient Storage Water Heater	15	$874.86	$6,510.60	0	0.000	100.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M045	12.1	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Outdoor Air Reset on Non Condensing Boiler <= 300MBTUH	83.16% Efficient Boiler. 3.8% energy savings	80% Efficient existing boiler	5	$200.00	$823.00	0	0.000	18.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M046	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Outdoor Air Reset on Non-Condensing Boiler 301 - 1 MMBTUH	83.16% Efficient Boiler. 3.8% energy savings	80% Efficient existing boiler	5	$200.00	$1,271.00	0	0.000	39.5	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M047	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Outdoor Air Reset on Non-Condensing Boiler 1 - 10 MMBTUH	83.16% Efficient Boiler. 3.8% energy savings	80% Efficient existing boiler	5	$200.00	$1,504.00	0	0.000	160.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M048	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Outdoor Air Reset on Non-Condensing Boiler >= 10 MMBTUH	83.16% Efficient Boiler. 3.8% energy savings	80% Efficient existing boiler	5	$200.00	$1,500.00	0	0.000	1,462.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M049	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Stack Dampers on Non Condensing Boiler <= 300MBTUH	84.2% Efficient Boiler. 5% energy savings	80% Efficient existing boiler	5	$121.50	$486.00	0	0.000	24.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M050	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Stack Dampers on Non-Condensing Boiler 301 - 1 MMBTUH	84.2% Efficient Boiler. 5% energy savings	80% Efficient existing boiler	5	$127.00	$508.00	0	0.000	51.8	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M051	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	Stack Dampers on Non-Condensing Boiler 1 - 10 MMBTUH	84.2% Efficient Boiler. 5% energy savings	80% Efficient existing boiler	5	$200.00	$800.00	0	0.000	211.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M052	12.10	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler Controls	Stack Dampers on Non-Condensing Boiler >= 10 MMBTUH	84.2% Efficient Boiler. 5% energy savings	80% Efficient existing boiler	5	$250.00	$2,000.00	0	0.000	1,919.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M053	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Modulating Burners on Non Condensing Boiler <= 300MBTUH	83% Efficient Boiler	80% Efficient existing boiler	15	$375.00	$30,000.00	0	0.000	17.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M054	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Modulating Burners on Non-Condensing Boiler 301 - 1 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	15	$810.00	$34,667.00	0	0.000	37.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M055	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Modulating Burners on Non-Condensing Boiler 1 - 10 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	15	$3,300.00	$30,004.00	0	0.000	153.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M056	12.10	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	1	1	1
HVAC+R - MN	Boiler Controls	Modulating Burners on Non-Condensing Boiler >= 10 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	15	$7,000.00	$58,530.00	0	0.000	1,391.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M057	12.10	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler Controls	Turbulators on Non Condensing Boiler <= 300MBTUH	82.47% Efficient Boiler	80% Efficient existing boiler	20	$400.00	$1,375.00	0	0.000	14.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M058	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	Turbulators on Non-Condensing Boiler 301 - 1 MMBTUH	82.47% Efficient Boiler	80% Efficient existing boiler	20	$400.00	$1,375.00	0	0.000	31.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M059	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	Turbulators on Non-Condensing Boiler 1 - 10 MMBTUH	82.47% Efficient Boiler	80% Efficient existing boiler	20	$400.00	$1,375.00	0	0.000	126.8	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M060	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	Turbulators on Non-Condensing Boiler >= 10 MMBTUH	82.47% Efficient Boiler	80% Efficient existing boiler	20	$400.00	$1,375.00	0	0.000	1,152.7	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M061	12.10	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler Controls	O2 Trim Control on Non Condensing Boiler <= 300MBTUH	81.1% Efficient Boiler	80% Efficient existing boiler	5	$1,827.75	$7,311.00	0	0.000	6.5	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M062	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	O2 Trim Control on Non-Condensing Boiler 301 - 1 MMBTUH	81.1% Efficient Boiler	80% Efficient existing boiler	5	$1,827.75	$7,311.00	0	0.000	14.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M063	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	O2 Trim Control on Non-Condensing Boiler 1 - 10 MMBTUH	81.1% Efficient Boiler	80% Efficient existing boiler	5	$1,827.75	$7,311.00	0	0.000	57.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M064	12.10	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Controls	O2 Trim Control on Non-Condensing Boiler >= 10 MMBTUH	81.1% Efficient Boiler	80% Efficient existing boiler	5	$1,827.75	$7,311.00	0	0.000	522.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M065	12.10	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Boiler Controls	Linkageless Controls on Non Condensing Boiler <= 300MBTUH	83% Efficient Boiler	80% Efficient existing boiler	16	$75.00	$564.23	0	0.000	17.4	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M066	12.10	100%	100%	100%	100%	-	-	-	7	7	7	-	-	-	7	7	7
HVAC+R - MN	Boiler Controls	Linkageless Controls on Non-Condensing Boiler 301 - 1 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	16	$162.00	$1,218.73	0	0.000	37.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M067	12.10	100%	100%	100%	100%	-	-	-	7	7	7	-	-	-	7	7	7
HVAC+R - MN	Boiler Controls	Linkageless Controls on Non-Condensing Boiler 1 - 10 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	16	$660.00	$4,965.20	0	0.000	153.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M068	12.10	100%	100%	100%	100%	-	-	-	7	7	7	-	-	-	7	7	7
HVAC+R - MN	Boiler Controls	Linkageless Controls on Non-Condensing Boiler >= 10 MMBTUH	83% Efficient Boiler	80% Efficient existing boiler	16	$6,000.00	$45,138.16	0	0.000	1,391.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M069	12.10	100%	100%	100%	100%	-	-	-	5	4	3	-	-	-	5	4	3
HVAC+R - MN	Steam Traps	Steam Traps - Low Pressure	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$50.00	$258.03	0	0.000	39.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M070	12.6	100%	100%	100%	100%	-	-	-	60	60	60	-	-	-	62	62	62
HVAC+R - MN	Steam Traps	Steam Traps - High Pressure	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$50.00	$316.96	0	0.000	89.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M071	12.6	100%	100%	100%	100%	-	-	-	30	30	30	-	-	-	30	30	30
HVAC+R - MN	Pipe Insulation	Pipe Insulation 105-200 Degree	100 ft of pipe with new insulation	100 ft of pipe with no or old insulation	13	$1,067.50	$2,268.70	0	0.000	78.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M072	12.7	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
HVAC+R - MN	Pipe Insulation	Pipe Insulation 201-250 Degree	101 ft of pipe with new insulation	101 ft of pipe with no or old insulation	13	$1,428.75	$3,160.75	0	0.000	86.3	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M073	12.7	100%	100%	100%	100%	-	-	-	1	1	1	-	-	-	2	2	2
HVAC+R - MN	Pipe Insulation	Pipe Insulation 251-350 Degree	102 ft of pipe with new insulation	102 ft of pipe with no or old insulation	13	$1,686.25	$996.71	0	0.000	130.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M074	12.7	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Destratification Fans	Destratification Fans	HVLS Destratification Fan, 14 ft to <26 ft	No destratification fan	15	$2,000.00	$7,320.00	0	0.000	87.8	$0.00	MN-BUS-FLAT	Bus	Cross Fuel	Gas Only	M075	12.9	100%	100%	100%	100%	-	-	-	8	8	8	-	-	-	10	10	10
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs < 5.4 tons	Dual Fuel Packaged Rooftop Unit With ASHP Cooling	Packaged Rooftop Unit With DX Cooling	20	$310.35	$6,450.38	393	0.438	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Electric Only	M078	12.11	100%	100%	100%	100%	70	70	70	-	-	-	70	70	70	-	-	-
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs < 5.4 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20	$79.64	$3,225.19	-2,072	0.000	12.1	$0.00	MN-BUS-DFRTX	Bus	Beneficial Electrification	Combo	M121	12.11	100%	100%	100%	100%	15	15	15	15	15	15	15	15	15	15	15	15
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 5.4 - 11.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP Cooling	Packaged Rooftop Unit With DX Cooling	20	$587.38	$6,886.40	3,461	0.661	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Electric Only	M079	12.11	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 5.4 - 11.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20	$139.76	$3,443.20	-4,109	0.000	22.2	$0.00	MN-BUS-DFRTX	Bus	Beneficial Electrification	Combo	M122	12.11	100%	100%	100%	100%	10	10	10	10	10	10	10	10	10	10	10	10
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 11.4 - 19.9 tons	Dual Fuel Packaged Rooftop Unit With ASHP Cooling	Packaged Rooftop Unit With DX Cooling	20	$972.53	$20,591.85	9,997	0.939	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Electric Only	M080	12.11	100%	100%	100%	100%	40	40	40	-	-	-	40	40	40	-	-	-
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 11.4 - 19.9 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20	$196.14	$10,295.93	-6,185	0.000	32.0	$0.00	MN-BUS-DFRTX	Bus	Beneficial Electrification	Combo	M123	12.11	100%	100%	100%	100%	5	5	5	5	5	5	5	5	5	5	5	5
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 20 - 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP Cooling	Packaged Rooftop Unit With DX Cooling	20	$1,728.39	$34,110.21	17,667	2.486	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Electric Only	M081	12.11	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 20 - 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20	$351.97	$17,055.10	-11,421	0.000	58.0	$0.00	MN-BUS-DFRTX	Bus	Beneficial Electrification	Combo	M124	12.11	100%	100%	100%	100%	2	2	2	2	2	2	2	2	2	2	2	2
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs >= 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP Cooling	Packaged Rooftop Unit With DX Cooling	20	$4,646.08	$83,223.44	81,428	9.479	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Electric Only	M082	12.11	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs >= 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20	$956.51	$41,611.72	-29,945	0.000	155.5	$0.00	MN-BUS-DFRTX	Bus	Beneficial Electrification	Combo	M125	12.11	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
HVAC+R - MN	Steam Traps	Process Steam Traps - Low pressure: psig < 15	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$77.00	0	0.000	149.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M083	12.13	100%	100%	100%	100%	-	-	-	5	10	15	-	-	-	5	10	15
HVAC+R - MN	Steam Traps	Process Steam Traps - Medium Pressure: 15 ≤ psig < 30	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$180.00	0	0.000	70.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M084	12.13	100%	100%	100%	100%	-	-	-	5	10	15	-	-	-	5	10	15
HVAC+R - MN	Steam Traps	Process Steam Traps - Medium Pressure: 30 ≤ psig < 75	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$223.00	0	0.000	251.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M085	12.13	100%	100%	100%	100%	-	-	-	3	6	9	-	-	-	3	6	9
HVAC+R - MN	Steam Traps	Process Steam Traps - High pressure: 75 ≤ psig < 125	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$276.00	0	0.000	464.1	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M086	12.13	100%	100%	100%	100%	-	-	-	3	6	9	-	-	-	3	6	9
HVAC+R - MN	Steam Traps	Process Steam Traps - High pressure: 125 ≤ psig < 175	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$322.00	0	0.000	640.6	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M087	12.13	100%	100%	100%	100%	-	-	-	3	6	9	-	-	-	3	6	9
HVAC+R - MN	Steam Traps	Process Steam Traps - High Pressure: 175 ≤ psig < 250	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$370.00	0	0.000	855.9	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M088	12.13	100%	100%	100%	100%	-	-	-	3	6	9	-	-	-	3	6	9
HVAC+R - MN	Steam Traps	Process Steam Traps - High Pressure: 250 ≤ psig < 300	New Steam Traps	Existing Boiler, malfunctioning steam traps	6	$100.00	$418.00	0	0.000	1,088.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M089	12.13	100%	100%	100%	100%	-	-	-	7	7	7	-	-	-	7	7	7
HVAC+R - MN	Heat Pump Water Heater	Commercial Size Heat Pump Water Heater	50 MBH Capacity Heat Pump Water Heater	Baseline Electric Water Heater	10	$600.00	$2,613.50	5,393	0.616	0.0	-$16.83	MN-BUS-HPWH	Bus	Electric Only	Electric Only	M092	12.12	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Heat Pump Water Heater	Commercial Size Heat Pump Water Heater EFS	50 MBH Capacity Heat Pump Water Heater	Baseline Gas Water Heater	10	$600.00	$2,613.50	-10,209	-1.165	102.9	$0.00	MN-BUS-HPWH	Bus	Beneficial Electrification	Combo	M094	12.14	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Heat Pump Water Heater	Residential Style Heat Pump Water Heater	15 MBH Capacity Heat Pump Water Heater	Baseline Electric Water Heater	10	$400.00	$784.05	1,618	0.185	0.0	-$16.83	MN-BUS-HPWH	Bus	Electric Only	Electric Only	M090	12.12	100%	100%	100%	100%	1	3	5	-	-	-	1	3	5	-	-	-
HVAC+R - MN	Heat Pump Water Heater	Residential Style Heat Pump Water Heater EFS	15 MBH Capacity Heat Pump Water Heater	Baseline Gas Water Heater	10	$400.00	$784.05	-3,063	-0.350	30.9	$0.00	MN-BUS-HPWH	Bus	Beneficial Electrification	Combo	M091	12.14	100%	100%	100%	100%	1	3	5	1	3	5	1	3	5	1	3	5
HVAC+R - MN	Boiler	Steam Process Boiler	83% Eff Steam Boiler,	79% Efficient existing boiler	20	$8,270.00	$16,870.80	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M096	12.15	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler	Hot Water Non-Condensing Process Boiler	85% Eff Hot Water Boiler	82% Efficient existing boiler	20	$8,270.00	$41,350.00	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M097	12.15	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler	Hot Water Condensing Process Boiler	88% Efficient Hot Water Boiler	82% Efficient existing boiler	20	$16,540.00	$119,915.00	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M098	12.15	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Boiler Tune Up	Process Boiler Tune Up	Process Boiler Tune Up - 2.2% savings	Existing Boiler - no efficiency required	20	$3,432.05	$13,728.20	0	0.000	0.0	$0.00	MN-BUS-FLAT	Bus	Gas Only	Gas Only	M099	12.16	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Retrofit Refrigerated	LED Refrigerated Case Lighting	LED Strip lighting	T8 or T12 Fluorescent	20	$45.00	$163.75	333	0.059	0.0	$0.00	MN-BUS-Light Refrigerated	BUS	Electric Only	Electric Only	B200	13.2	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Direct Install Refrigerated	LED Ref and Frz Screw In Fixture Retrofit	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$3.15	$3.15	741	0.137	0.0	$0.00	MN-BUS-Light Refrigerated	BUS	Electric Only	Electric Only	B201	13.5	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Motors	1 HP Enhanced Efficiency Motor	1 hp motor 1% more efficient than NEMA Premium	1 hp NEMA Premium motor	20	$15.00	$134.12	24	0.004	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N001	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	1.5 HP Enhanced Efficiency Motor	1.5 hp motor 1% more efficient than NEMA Premium	1.5 hp NEMA Premium motor	20	$15.00	$148.55	26	0.006	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N002	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	2 HP Enhanced Efficiency Motor	2 hp motor 1% more efficient than NEMA Premium	2 hp NEMA Premium motor	20	$15.00	$152.09	40	0.008	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N003	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
HVAC+R - MN	Motors	3 HP Enhanced Efficiency Motor	3 hp motor 1% more efficient than NEMA Premium	3 hp NEMA Premium motor	20	$20.00	$165.78	63	0.012	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N004	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	5 HP Enhanced Efficiency Motor	5 hp motor 1% more efficient than NEMA Premium	5 hp NEMA Premium motor	20	$20.00	$183.25	101	0.021	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N005	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	7.5 HP Enhanced Efficiency Motor	7.5 hp motor 1% more efficient than NEMA Premium	7.5 hp NEMA Premium motor	20	$30.00	$263.65	169	0.030	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N006	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	10 HP Enhanced Efficiency Motor	10 hp motor 1% more efficient than NEMA Premium	10 hp NEMA Premium motor	20	$35.00	$313.83	224	0.041	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N007	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	15 HP Enhanced Efficiency Motor	15 hp motor 1% more efficient than NEMA Premium	15 hp NEMA Premium motor	20	$45.00	$441.22	373	0.060	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N008	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	20 HP Enhanced Efficiency Motor	20 hp motor 1% more efficient than NEMA Premium	20 hp NEMA Premium motor	20	$60.00	$534.64	474	0.079	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N009	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	25 HP Enhanced Efficiency Motor	25 hp motor 1% more efficient than NEMA Premium	25 hp NEMA Premium motor	20	$75.00	$661.36	577	0.103	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N010	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	30 HP Enhanced Efficiency Motor	30 hp motor 1% more efficient than NEMA Premium	30 hp NEMA Premium motor	20	$90.00	$763.56	832	0.116	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N011	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	40 HP Enhanced Efficiency Motor	40 hp motor 1% more efficient than NEMA Premium	40 hp NEMA Premium motor	20	$110.00	$963.09	1,040	0.161	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N012	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	50 HP Enhanced Efficiency Motor	50 hp motor 1% more efficient than NEMA Premium	50 hp NEMA Premium motor	20	$137.50	$1,097.83	1,223	0.204	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N013	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	60 HP Enhanced Efficiency Motor	60 hp motor 1% more efficient than NEMA Premium	60 hp NEMA Premium motor	20	$160.00	$1,513.84	1,548	0.241	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N014	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	75 HP Enhanced Efficiency Motor	75 hp motor 1% more efficient than NEMA Premium	75 hp NEMA Premium motor	20	$187.50	$1,835.34	2,297	0.311	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N015	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	100 HP Enhanced Efficiency Motor	100 hp motor 1% more efficient than NEMA Premium	100 hp NEMA Premium motor	20	$250.00	$2,219.55	2,706	0.414	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N016	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	125 HP Enhanced Efficiency Motor	125 hp motor 1% more efficient than NEMA Premium	125 hp NEMA Premium motor	20	$312.50	$2,783.49	2,749	0.538	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N017	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	150 HP Enhanced Efficiency Motor	150 hp motor 1% more efficient than NEMA Premium	150 hp NEMA Premium motor	20	$375.00	$3,287.22	3,777	0.641	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N018	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	200 HP Enhanced Efficiency Motor	200 hp motor 1% more efficient than NEMA Premium	200 hp NEMA Premium motor	20	$450.00	$4,084.77	5,537	0.821	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N019	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	250 HP Enhanced Efficiency Motor	250 hp motor 1% more efficient than NEMA Premium	250 hp NEMA Premium motor	20	$562.50	$5,030.61	8,528	1.062	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N020	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	300 HP Enhanced Efficiency Motor	300 hp motor 1% more efficient than NEMA Premium	300 hp NEMA Premium motor	20	$675.00	$6,186.20	10,017	1.309	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N021	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	350 HP Enhanced Efficiency Motor	350 hp motor 1% more efficient than NEMA Premium	350 hp NEMA Premium motor	20	$787.50	$10,114.74	11,922	1.460	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N022	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	400 HP Enhanced Efficiency Motor	400 hp motor 1% more efficient than NEMA Premium	400 hp NEMA Premium motor	20	$900.00	$11,547.96	13,663	1.513	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N023	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	450 HP Enhanced Efficiency Motor	450 hp motor 1% more efficient than NEMA Premium	450 hp NEMA Premium motor	20	$1,012.50	$13,102.94	15,328	1.877	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N024	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	500 HP Enhanced Efficiency Motor	500 hp motor 1% more efficient than NEMA Premium	500 hp NEMA Premium motor	20	$1,125.00	$13,566.69	17,070	2.182	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N025	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	VFDs	1 HP Variable Frequency Drive	1 hp centrifugal fan or pump coupled with a VFD	1 hp centrifugal fan or pump without a VFD	15	$400.00	$2,182.10	937	0.190	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N026	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	1.5 HP Variable Frequency Drive	1.5 hp centrifugal fan or pump coupled with a VFD	1.5 hp centrifugal fan or pump without a VFD	15	$400.00	$2,493.50	1,391	0.274	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N027	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	2 HP Variable Frequency Drive	2 hp centrifugal fan or pump coupled with a VFD	2 hp centrifugal fan or pump without a VFD	15	$400.00	$2,741.03	2,248	0.363	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N028	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	3 HP Variable Frequency Drive	3 hp centrifugal fan or pump coupled with a VFD	3 hp centrifugal fan or pump without a VFD	15	$400.00	$3,132.19	3,009	0.533	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N029	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	5 HP Variable Frequency Drive	5 hp centrifugal fan or pump coupled with a VFD	5 hp centrifugal fan or pump without a VFD	15	$600.00	$3,705.41	4,886	0.892	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N030	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	7.5 HP Variable Frequency Drive	7.5 hp centrifugal fan or pump coupled with a VFD	7.5 hp centrifugal fan or pump without a VFD	15	$750.00	$4,234.18	7,306	1.315	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N031	14.2	100%	100%	100%	100%	30	30	30	-	-	-	30	30	30	-	-	-
HVAC+R - MN	VFDs	10 HP Variable Frequency Drive	10 hp centrifugal fan or pump coupled with a VFD	10 hp centrifugal fan or pump without a VFD	15	$1,000.00	$4,654.52	10,129	1.738	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N032	14.2	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	VFDs	15 HP Variable Frequency Drive	15 hp centrifugal fan or pump coupled with a VFD	15 hp centrifugal fan or pump without a VFD	15	$1,250.00	$5,318.74	14,526	2.569	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N033	14.2	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	VFDs	20 HP Variable Frequency Drive	20 hp centrifugal fan or pump coupled with a VFD	20 hp centrifugal fan or pump without a VFD	15	$1,600.00	$5,846.74	19,479	3.413	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N034	14.2	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	VFDs	25 HP Variable Frequency Drive	25 hp centrifugal fan or pump coupled with a VFD	25 hp centrifugal fan or pump without a VFD	15	$2,000.00	$6,292.12	23,657	4.272	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N035	14.2	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	VFDs	30 HP Variable Frequency Drive	30 hp centrifugal fan or pump coupled with a VFD	30 hp centrifugal fan or pump without a VFD	15	$2,400.00	$6,681.09	31,457	5.157	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N036	14.2	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	VFDs	40 HP Variable Frequency Drive	40 hp centrifugal fan or pump coupled with a VFD	40 hp centrifugal fan or pump without a VFD	15	$3,000.00	$7,344.33	42,244	6.849	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N037	14.2	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	VFDs	50 HP Variable Frequency Drive	50 hp centrifugal fan or pump coupled with a VFD	50 hp centrifugal fan or pump without a VFD	15	$3,500.00	$7,903.80	49,610	8.409	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N038	14.2	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-
HVAC+R - MN	VFDs	60 HP Variable Frequency Drive	60 hp centrifugal fan or pump coupled with a VFD	60 hp centrifugal fan or pump without a VFD	15	$4,000.00	$8,392.40	67,468	10.226	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N039	14.2	100%	100%	100%	100%	5	5	5	-	-	-	5	5	5	-	-	-
HVAC+R - MN	VFDs	75 HP Variable Frequency Drive	75 hp centrifugal fan or pump coupled with a VFD	75 hp centrifugal fan or pump without a VFD	15	$5,000.00	$9,031.71	79,414	12.954	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N040	14.2	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	VFDs	100 HP Variable Frequency Drive	100 hp centrifugal fan or pump coupled with a VFD	100 hp centrifugal fan or pump without a VFD	15	$6,000.00	$9,928.29	105,712	16.610	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N041	14.2	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	VFDs	125 HP Variable Frequency Drive	125 hp centrifugal fan or pump coupled with a VFD	125 hp centrifugal fan or pump without a VFD	15	$7,000.00	$10,684.59	124,376	21.389	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N042	14.2	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	VFDs	150 HP Variable Frequency Drive	150 hp centrifugal fan or pump coupled with a VFD	150 hp centrifugal fan or pump without a VFD	15	$7,000.00	$11,345.11	165,481	25.409	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N043	14.2	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	VFDs	200 HP Variable Frequency Drive	200 hp centrifugal fan or pump coupled with a VFD	200 hp centrifugal fan or pump without a VFD	15	$8,000.00	$12,471.35	220,617	33.697	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N044	14.2	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	1 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$100.00	$683.54	68	0.011	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N045	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	1.5 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$100.00	$718.34	54	0.013	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N046	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	2 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$100.00	$726.88	95	0.020	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N047	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	3 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$112.50	$759.91	135	0.026	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N048	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	5 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$150.00	$802.06	172	0.035	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N049	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	7.5 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$225.00	$996.00	346	0.062	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N050	14.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Motors	10 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$250.00	$1,117.02	436	0.079	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N051	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	15 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$375.00	$2,144.34	558	0.090	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N052	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	20 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$425.00	$2,369.70	922	0.154	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N053	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	25 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$500.00	$2,675.38	866	0.155	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N054	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	30 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$500.00	$2,921.91	1,113	0.155	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N055	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	40 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$600.00	$3,403.22	1,126	0.174	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N056	14.1	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	50 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$750.00	$3,728.24	1,622	0.271	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N057	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	60 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$900.00	$4,731.77	2,002	0.312	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N058	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	75 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$1,125.00	$5,507.32	2,297	0.311	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N059	14.1	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Motors	100 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$1,500.00	$7,154.13	2,790	0.427	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N060	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	125 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$1,875.00	$8,514.50	2,365	0.463	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N061	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	150 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$2,250.00	$9,729.63	2,760	0.469	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N062	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	200 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$2,500.00	$11,653.55	4,491	0.666	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N063	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	250 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$3,125.00	$13,935.15	6,140	0.765	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N064	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	300 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$3,125.00	$16,722.72	4,007	0.524	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N065	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	350 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$3,125.00	$26,199.40	7,153	0.876	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N066	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	400 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$5,000.00	$29,656.70	10,930	1.210	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N067	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	450 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$5,000.00	$33,407.70	9,197	1.126	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N068	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Motors	500 HP Upgrade Motor	NEMA Premium Efficient Motor	EPACT Efficient Motor	15	$5,000.00	$34,526.40	6,828	0.873	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N069	14.1	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	1 HP Well Water Pump Variable Frequency Drive	1 hp well water pump coupled with a VFD	1 hp well water pump without a VFD	15	$100.00	$2,182.10	184	0.046	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N070	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	1.5 HP Well Water Pump Variable Frequency Drive	1.5 hp well water pump coupled with a VFD	1.5 hp well water pump without a VFD	15	$100.00	$2,493.50	276	0.069	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N071	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	2 HP Well Water Pump Variable Frequency Drive	2 hp well water pump coupled with a VFD	2 hp well water pump without a VFD	15	$100.00	$2,741.03	369	0.092	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N072	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	3 HP Well Water Pump Variable Frequency Drive	3 hp well water pump coupled with a VFD	3 hp well water pump without a VFD	15	$100.00	$3,132.19	553	0.139	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N073	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	5 HP Well Water Pump Variable Frequency Drive	5 hp well water pump coupled with a VFD	5 hp well water pump without a VFD	15	$150.00	$3,705.41	921	0.231	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N074	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	7.5 HP Well Water Pump Variable Frequency Drive	7.5 hp well water pump coupled with a VFD	7.5 hp well water pump without a VFD	15	$150.00	$4,234.18	1,382	0.346	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N075	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Well Pump VFD	10 HP Well Water Pump Variable Frequency Drive	10 hp well water pump coupled with a VFD	10 hp well water pump without a VFD	15	$225.00	$4,654.52	7,892	0.826	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N076	14.5	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Well Pump VFD	15 HP Well Water Pump Variable Frequency Drive	15 hp well water pump coupled with a VFD	15 hp well water pump without a VFD	15	$350.00	$5,318.74	11,688	1.419	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N077	14.5	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Well Pump VFD	20 HP Well Water Pump Variable Frequency Drive	20 hp well water pump coupled with a VFD	20 hp well water pump without a VFD	15	$450.00	$5,846.74	17,562	2.238	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N078	14.5	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Well Pump VFD	25 HP Well Water Pump Variable Frequency Drive	25 hp well water pump coupled with a VFD	25 hp well water pump without a VFD	15	$550.00	$6,292.12	19,233	3.740	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N079	14.5	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Well Pump VFD	30 HP Well Water Pump Variable Frequency Drive	30 hp well water pump coupled with a VFD	30 hp well water pump without a VFD	15	$662.50	$6,681.09	22,944	2.402	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N080	14.5	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Well Pump VFD	40 HP Well Water Pump Variable Frequency Drive	40 hp well water pump coupled with a VFD	40 hp well water pump without a VFD	15	$825.00	$7,344.33	20,032	2.651	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N081	14.5	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Well Pump VFD	50 HP Well Water Pump Variable Frequency Drive	50 hp well water pump coupled with a VFD	50 hp well water pump without a VFD	15	$1,000.00	$7,903.80	47,456	6.348	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N082	14.5	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
HVAC+R - MN	Well Pump VFD	60 HP Well Water Pump Variable Frequency Drive	60 hp well water pump coupled with a VFD	60 hp well water pump without a VFD	15	$1,225.00	$8,392.40	45,877	6.048	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N083	14.5	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Well Pump VFD	75 HP Well Water Pump Variable Frequency Drive	75 hp well water pump coupled with a VFD	75 hp well water pump without a VFD	15	$1,475.00	$9,031.71	49,089	6.895	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N084	14.5	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Well Pump VFD	100 HP Well Water Pump Variable Frequency Drive	100 hp well water pump coupled with a VFD	100 hp well water pump without a VFD	15	$1,700.00	$9,928.29	31,831	5.131	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N085	14.5	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Well Pump VFD	125 HP Well Water Pump Variable Frequency Drive	125 hp well water pump coupled with a VFD	125 hp well water pump without a VFD	15	$1,925.00	$10,684.59	51,132	6.115	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N086	14.5	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Well Pump VFD	150 HP Well Water Pump Variable Frequency Drive	150 hp well water pump coupled with a VFD	150 hp well water pump without a VFD	15	$2,125.00	$11,345.11	116,674	15.595	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N087	14.5	100%	100%	100%	100%	1	1	1	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Well Pump VFD	200 HP Well Water Pump Variable Frequency Drive	200 hp well water pump coupled with a VFD	200 hp well water pump without a VFD	15	$2,375.00	$12,471.35	140,818	17.821	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N088	14.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	1 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	19	$180.00	$310.59	137	0.024	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N089	14.4	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	1.5 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$200.00	$435.42	206	0.035	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N090	14.4	100%	100%	100%	100%	2	2	2	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	2 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$240.00	$476.58	316	0.046	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N091	14.4	100%	100%	100%	100%	2	2	2	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	3 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$280.00	$538.75	432	0.067	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N092	14.4	100%	100%	100%	100%	2	2	2	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	5 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$300.00	$539.00	685	0.104	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N093	14.4	100%	100%	100%	100%	2	2	2	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	7.5 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$340.00	$675.38	985	0.153	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N094	14.4	100%	100%	100%	100%	2	2	2	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	10 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$380.00	$734.44	1,327	0.198	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N095	14.4	100%	100%	100%	100%	3	3	3	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	15 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$400.00	$781.05	1,964	0.298	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N096	14.4	100%	100%	100%	100%	3	3	3	-	-	-	11	11	11	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	20 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$440.00	$753.90	2,481	0.384	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N097	14.4	100%	100%	100%	100%	3	3	3	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	25 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$480.00	$886.62	3,016	0.473	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N098	14.4	100%	100%	100%	100%	3	3	3	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	30 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$540.00	$952.70	4,136	0.578	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N099	14.4	100%	100%	100%	100%	3	3	3	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	40 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$580.00	$1,104.85	5,551	0.755	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N100	14.4	100%	100%	100%	100%	2	2	2	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	50 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$640.00	$1,148.91	6,756	0.978	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N101	14.4	100%	100%	100%	100%	2	2	2	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	60 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$680.00	$1,150.97	9,110	1.124	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N102	14.4	100%	100%	100%	100%	2	2	2	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	75 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$740.00	$1,507.63	11,557	1.478	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N103	14.4	100%	100%	100%	100%	2	2	2	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	100 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$800.00	$1,682.78	14,630	2.007	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N104	14.4	100%	100%	100%	100%	1	1	1	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	125 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$860.00	$1,437.07	18,422	2.459	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N105	14.4	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	150 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$1,080.00	$1,816.89	22,473	2.987	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N106	14.4	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	200 HP Efficient Fan	Efficient Fan with Qualifying FEI	Fan with Baseline FEI	20	$1,420.00	$2,386.15	25,587	3.448	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N107	14.4	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	1 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$580.00	$2,309.87	1,015	0.179	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N108	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	1.5 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$600.00	$2,650.28	1,533	0.263	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N109	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	2 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$640.00	$2,935.10	2,407	0.349	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N110	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	3 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$680.00	$3,315.53	3,284	0.509	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N111	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	5 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$900.00	$3,907.69	5,545	0.846	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N112	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	7.5 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$1,090.00	$4,479.35	7,994	1.245	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N113	14.4	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	10 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$1,380.00	$4,964.12	11,040	1.651	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N114	14.4	100%	100%	100%	100%	8	8	8	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	15 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$1,650.00	$5,605.61	16,165	2.449	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N115	14.4	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	20 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$2,040.00	$6,129.81	21,008	3.251	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N116	14.4	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	25 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$2,480.00	$6,701.23	25,782	4.042	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N117	14.4	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	30 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$2,940.00	$7,036.89	34,613	4.841	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N118	14.4	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	40 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$3,580.00	$7,763.25	47,324	6.433	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N119	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	50 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$4,140.00	$8,372.03	55,246	7.999	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N120	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	60 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$4,680.00	$8,822.79	77,539	9.568	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N121	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	75 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$5,740.00	$9,668.25	93,151	11.910	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N122	14.4	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	100 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$6,800.00	$10,612.58	115,517	15.847	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N123	14.4	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	125 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$7,860.00	$11,285.57	148,231	19.788	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N124	14.4	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	150 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$8,080.00	$12,109.68	178,104	23.671	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N125	14.4	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Fan Efficiency (FEI)	200 HP Efficient Fan and integrated VFD	Variable Speed Efficient Fan with Qualifying FEI and Integrated VFD	Constant Speed Fan with Baseline FEI	15	$9,420.00	$13,635.12	233,735	31.495	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N126	14.4	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Refigeration Fans	PMSM - Medium Temp Display Case	PMSM Motor	Shaded Pole Motor	15	$40.00	$93.30	430	0.049	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N127	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	PMSM - Low Temp Display Case	PMSM Motor	Shaded Pole Motor	15	$40.00	$93.30	508	0.058	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N128	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Medium Temp Display Case	ECM Motor	Shaded Pole Motor	15	$40.00	$140.71	414	0.047	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N129	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Low Temp Display Case	ECM Motor	Shaded Pole Motor	15	$40.00	$140.71	489	0.056	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N130	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Medium Temp Walk-in, Evap fan <= 15" Diameter	ECM Motor	Shaded Pole Motor	15	$70.00	$269.01	793	0.091	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N131	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Low Temp Walk-in, Evap fan <= 15" Diameter	ECM Motor	Shaded Pole Motor	15	$70.00	$269.01	937	0.107	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N132	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Medium Temp Walk-in, Evap fan > 15" Diameter	ECM Motor	PSC	15	$70.00	$269.01	605	0.069	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N133	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	ECM Motors - Low Temp Walk-in, Evap fan > 15" Diameter	ECM Motor	PSC	15	$70.00	$269.01	715	0.082	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N134	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	PMSM Motors - Medium Temp Walk-in	PMSM Motor	Shaded Pole Motor	15	$70.00	$110.00	715	0.082	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N135	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Refigeration Fans	PMSM Motors - Low Temp Walk-in	PMSM Motor	Shaded Pole Motor	15	$70.00	$110.00	844	0.096	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	N136	14.3	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/20 HP Circulator Pump	1/20 HP Circulator Pump with an ECM	1/20 HP Circulator Pump with a PSC	15	$50.00	$142.24	412	0.074	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N137	14.7	100%	100%	100%	100%	3	3	3	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/15 HP Circulator Pump	1/15 HP Circulator Pump with an ECM	1/15 HP Circulator Pump with a PSC	15	$50.00	$144.55	549	0.098	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N138	14.7	100%	100%	100%	100%	3	3	3	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/6 HP Circulator Pump	1/6 HP Circulator Pump with an ECM	1/6 HP Circulator Pump with a PSC	15	$50.00	$158.35	1,373	0.245	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N139	14.7	100%	100%	100%	100%	3	3	3	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/4 HP Circulator Pump	1/4 HP Circulator Pump with an ECM	1/4 HP Circulator Pump with a PSC	15	$50.00	$169.86	2,059	0.368	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N140	14.7	100%	100%	100%	100%	6	6	6	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/3 HP Circulator Pump	1/3 HP Circulator Pump with an ECM	1/3 HP Circulator Pump with a PSC	15	$100.00	$181.37	2,746	0.491	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N141	14.7	100%	100%	100%	100%	6	6	6	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	1/2 HP Circulator Pump	1/2 HP Circulator Pump with an ECM	1/2 HP Circulator Pump with a PSC	15	$100.00	$204.38	4,119	0.736	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N142	14.7	100%	100%	100%	100%	5	5	5	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	3/4 HP Circulator Pump	3/4 HP Circulator Pump with an ECM	3/4 HP Circulator Pump with a PSC	15	$100.00	$238.90	6,178	1.104	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N143	14.7	100%	100%	100%	100%	5	5	5	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Fractional HP Circ. Pumps	7/8 HP Circulator Pump	7/8 HP Circulator Pump with an ECM	7/8 HP Circulator Pump with a PSC	15	$100.00	$256.16	7,208	1.288	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N144	14.7	100%	100%	100%	100%	7	7	7	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/20 HP Fan Motor	1/20 HP Fan with an ECM	1/20 HP Fan with a PSC	15	$50.00	$142.24	163	0.056	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N145	14.8	100%	100%	100%	100%	3	3	3	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/15 HP Fan Motor	1/15 HP Fan with an ECM	1/15 HP Fan with a PSC	15	$50.00	$144.54	230	0.079	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N146	14.8	100%	100%	100%	100%	3	3	3	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/6 HP Fan Motor	1/6 HP Fan with an ECM	1/6 HP Fan with a PSC	15	$50.00	$158.35	582	0.199	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N147	14.8	100%	100%	100%	100%	3	3	3	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/4 HP Fan Motor	1/4 HP Fan with an ECM	1/4 HP Fan with a PSC	15	$50.00	$169.86	555	0.190	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N148	14.8	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/3 HP Fan Motor	1/3 HP Fan with an ECM	1/3 HP Fan with a PSC	15	$100.00	$181.36	686	0.235	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N149	14.8	100%	100%	100%	100%	3	3	3	-	-	-	4	4	4	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	1/2 HP Fan Motor	1/2 HP Fan with an ECM	1/2 HP Fan with a PSC	15	$100.00	$204.38	872	0.299	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N150	14.8	100%	100%	100%	100%	3	3	3	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	3/4 HP Fan Motor	3/4 HP Fan with an ECM	3/4 HP Fan with a PSC	15	$100.00	$238.89	1,014	0.348	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N151	14.8	100%	100%	100%	100%	3	3	3	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Fractional HP Fan Motors	7/8 HP Fan Motor	7/8 HP Fan with an ECM	7/8 HP Fan with a PSC	15	$100.00	$256.15	1,050	0.360	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N152	14.8	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	1 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$200.00	$20.43	748	0.157	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N153	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	1.5 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$240.00	$30.65	1,096	0.231	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N154	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	2 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$260.00	$40.86	1,456	0.306	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N155	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	3 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$320.00	$61.29	2,122	0.446	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N156	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	5 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$360.00	$102.15	3,525	0.742	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N157	14.6	100%	100%	100%	100%	8	8	8	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	7.5 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$420.00	$75.15	5,189	1.092	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N158	14.6	100%	100%	100%	100%	12	12	12	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	10 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$460.00	$100.20	6,881	1.448	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N159	14.6	100%	100%	100%	100%	12	12	12	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	15 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$540.00	$78.60	10,210	2.148	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N160	14.6	100%	100%	100%	100%	12	12	12	-	-	-	12	12	12	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	20 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$580.00	$104.80	13,554	2.851	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N161	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	25 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$640.00	$131.00	16,852	3.545	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N162	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	30 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$680.00	$89.40	20,179	4.245	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N163	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	40 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$740.00	$119.20	26,819	5.642	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N164	14.6	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	50 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$800.00	$149.00	33,346	7.015	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N165	14.6	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
HVAC+R - MN	Pump Efficiency (PEI)	60 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$860.00	$105.60	39,888	8.392	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N166	14.6	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	75 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$920.00	$132.00	49,651	10.445	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N167	14.6	100%	100%	100%	100%	6	6	6	-	-	-	6	6	6	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	100 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$1,020.00	$176.00	66,062	13.898	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N168	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	125 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$1,100.00	$131.25	82,491	17.354	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N169	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	150 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$1,180.00	$157.50	98,678	20.760	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N170	14.6	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	200 HP Efficient Pump	Pump at least 0.02 PEI better than minimum effiecncy	Pump at minimum efficency	20	$1,280.00	$210.00	131,296	27.622	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N171	14.6	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	1 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$600.00	$2,215.85	2,373	0.499	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N172	14.6	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	1.5 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$640.00	$2,544.13	3,476	0.731	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N173	14.6	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	2 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$660.00	$2,808.53	4,619	0.972	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N174	14.6	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	3 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$720.00	$3,202.06	6,733	1.417	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N175	14.6	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	5 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$960.00	$3,788.51	11,184	2.353	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N176	14.6	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	7.5 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$1,170.00	$4,309.33	15,242	3.207	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N177	14.6	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	10 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$1,460.00	$4,754.72	20,211	4.252	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N178	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	15 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$1,790.00	$5,397.34	29,989	6.309	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N179	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	20 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$2,180.00	$5,951.54	39,813	8.376	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N180	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	25 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$2,640.00	$6,423.12	49,499	10.414	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N181	14.6	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	30 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$3,080.00	$6,770.49	59,272	12.470	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N182	14.6	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	40 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$3,740.00	$7,463.53	78,777	16.573	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N183	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	50 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$4,300.00	$8,052.80	97,949	20.606	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N184	14.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	60 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$4,860.00	$8,498.00	117,166	24.649	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N185	14.6	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	75 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$5,920.00	$9,163.71	145,841	30.682	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N186	14.6	100%	100%	100%	100%	7	7	7	-	-	-	7	7	7	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	100 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$7,020.00	$10,104.29	194,046	40.823	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N187	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	125 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$8,100.00	$10,815.84	242,303	50.975	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N188	14.6	100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	150 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$8,180.00	$11,502.61	289,851	60.978	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N189	14.6	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Pump Efficiency (PEI)	200 HP Efficient Pump With Integrated VFD	Pump at least 0.02 PEI better than minimum effiecncy with a VFD	Pump at minimum efficency	15	$9,280.00	$12,681.35	385,661	81.135	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N190	14.6	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	Integrated Drives	1 HP Switched Reluctance Motor with controller	1 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	1 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$1,034.00	845	0.186	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N191	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	1.5 HP Switched Reluctance Motor with controller	1.5 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	1.5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$1,073.00	1,601	0.263	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N192	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	2 HP Switched Reluctance Motor with controller	2 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	2 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$1,132.00	1,789	0.362	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N193	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	3 HP Switched Reluctance Motor with controller	3 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	3 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$420.00	$1,282.00	2,678	0.525	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N194	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	5 HP Switched Reluctance Motor with controller	5 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$620.00	$2,271.00	5,565	0.908	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N195	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	7.5 HP Switched Reluctance Motor with controller	7.5 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	7.5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$780.00	$3,030.00	8,264	1.340	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N196	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Integrated Drives	10 HP Switched Reluctance Motor with controller	10 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	10 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$1,035.00	$3,500.00	9,125	1.683	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N197	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Integrated Drives	15 HP Switched Reluctance Motor with controller	15 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	15 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$1,295.00	$4,619.00	13,480	2.484	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N198	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Integrated Drives	20 HP Switched Reluctance Motor with controller	20 HP centrifugal fan or pump coupled with a Switched Reluctance Motor with controller	20 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$1,660.00	$5,409.00	18,035	3.196	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N199	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Integrated Drives	1 HP ECM	1 HP centrifugal fan or pump coupled with an ECM	1 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$2,588.78	908	0.200	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N200	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	1.5 HP ECM	1.5 HP centrifugal fan or pump coupled with an ECM	1.5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$2,752.19	1,711	0.281	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N201	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	2 HP ECM	2 HP centrifugal fan or pump coupled with an ECM	2 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$415.00	$2,915.60	1,843	0.373	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N202	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	3 HP ECM	3 HP centrifugal fan or pump coupled with an ECM	3 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$420.00	$3,388.43	2,739	0.537	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N203	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	5 HP ECM	5 HP centrifugal fan or pump coupled with an ECM	5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$620.00	$3,594.60	5,723	0.934	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N204	14.9	100%	100%	100%	100%	9	9	9	-	-	-	9	9	9	-	-	-
HVAC+R - MN	Integrated Drives	7.5 HP ECM	7.5 HP centrifugal fan or pump coupled with an ECM	7.5 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$780.00	$4,592.88	8,365	1.357	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N205	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Integrated Drives	10 HP ECM	10 HP centrifugal fan or pump coupled with an ECM	10 HP centrifugal fan or pump coupled with a Premium efficency motor	15	$1,035.00	$5,648.33	9,420	1.737	0.0	$0.00	MN-BUS-MOTORS	BUS	Electric Only	Electric Only	N206	14.9	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls, Medium Temperature Case	Anti-Sweat Heater Controls	Anti-Sweat Heaters running constantly	12	$60.00	$180.00	955	0.098	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P001	16.1	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	10	10	10
HVAC+R - MN	Anti-Sweat Heater Controls	Anti-Sweat Heater Controls, Low Temperature Case	Anti-Sweat Heater Controls	Anti-Sweat Heaters running constantly	12	$60.00	$180.00	1,874	0.193	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P002	16.1	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	No Heat Case Doors	No Heat Case Doors - Medium Temp	No Heat Case Doors	Anti-Sweat Heaters running constantly	12	$100.00	$275.00	1,061	0.121	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P003	16.2	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	No Heat Case Doors	No Heat Case Doors - Low Temp	No Heat Case Doors	Anti-Sweat Heaters running constantly	12	$150.00	$800.00	2,083	0.238	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P004	16.2	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	Evaporator Fan Motor Controller	Evaporator Fan Motor Controller (EFMC) (Cooler)	Evaporator fan motor control on medium temp walk-in	No fan motor controls on medium temp walk-in	15	$35.00	$351.49	450	0.051	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P005	16.3	100%	100%	100%	100%	45	45	45	-	-	-	45	45	45	-	-	-
HVAC+R - MN	Evaporator Fan Motor Controller	Evaporator Fan Motor Controller (EFMC) (Freezer)	Evaporator fan motor control on low temp walk-in	No fan motor controls on low temp walk-in	15	$35.00	$351.49	274	0.032	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P006	16.3	100%	100%	100%	100%	45	45	45	-	-	-	45	45	45	-	-	-
HVAC+R - MN	Medium-temp Enclosed Reach-In Case	Medium-temp Enclosed Reach-In Case (per linear foot)	Medium-temp Reach-In Cases with Doors	Medium-temp Open Reach-In Cases	15	$70.00	$686.29	970	0.111	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P007	16.4	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	Medium-temp Enclosed Reach-In Case	New Medium-temp Enclosed Reach-In Case (per linear foot)	New Medium-temp Reach-In Cases with Doors	New Medium-temp Open Reach-In Cases	15	$70.00	$337.58	970	0.111	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P008	16.4	100%	100%	100%	100%	35	35	35	-	-	-	35	35	35	-	-	-
HVAC+R - MN	Retrofit of open multi-deck cases with solid glass doors	Retrofit of open multi-deck cooler cases with solid glass doors (per linear foot of case)	Closed Case with Doors	Open Case with No Doors	12	$100.00	$497.82	514	0.059	6.7	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P009	16.5	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Retrofit of open multi-deck cases with solid glass doors	Retrofit of open multi-deck freezer cases with solid glass doors (per linear foot of case)	Closed Case with Doors	Open Case with No Doors	12	$150.00	$497.82	1,563	0.178	8.3	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P010	16.5	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
HVAC+R - MN	Walk-in Freezer Defrost Controls	Controls that only operate defrost when needed in a Walk-in Freezer	Demand Defrost Controls installed in Walk-in Freezer	Walk-in Freezer with Electric Defrost on Timer Controls	15	$598.00	$1,695.00	6,324	0.722	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P011	16.6	100%	100%	100%	100%	10	10	10	-	-	-	10	10	10	-	-	-
HVAC+R - MN	Floating Head Pressure Controls	Floating head pressure controls added onto a commercial refrigeration system	Electronic solenoids connected to floating head pressure controls to reduce minimum head pressure	Mechanical solenoids set at fixed head pressure	15	$2,200.00	$4,185.00	63,336	0.000	0.0	$0.00	MN-BUS-FLHP_CONTROLS	BUS	Electric Only	Electric Only	P012	16.7	100%	100%	100%	100%	5	5	5	-	-	-	5	5	5	-	-	-
HVAC+R - MN	Strip Curtains - Direct Install	Strip Curtains - Doorway to Freezer Space	Installation of new strip curtain at least 0.06 inches thick added to a walk-in freezer covering entire doorway when open	Walk-in freezer than previously had either no strip curtain installed or an old, ineffective strip curtain installed	4	$270.83	$270.83	4,620	0.527	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P013	16.8	100%	100%	100%	100%	75	75	75	-	-	-	75	75	75	-	-	-
HVAC+R - MN	Auto Closers - Direct Install	Auto-Close Doors - Walk-in Cooler	Installation of new automatic, hydraulic-type door closer on main walk-in cooler door	Walk-in cooler without an automatic closure	8	$156.82	$156.82	943	0.137	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P014	16.9	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Auto Closers - Direct Install	Auto-Close Doors - Walk-in Freezer	Installation of new automatic, hydraulic-type door closer on main walk-in freezer door	Walk-in freezer without an automatic closure	8	$156.82	$156.82	2,307	0.309	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P015	16.9	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Refrigeration Recommissioning - Custom	Refrigeration Recommissioning Implementation	Commercial refrigeration system after recommissioning implemented	Commercial refrigeration system prior to recommissioning	7	$0.00	$4,401.00	39,244	1.680	0.0	$0.00	MN-BUS-FLAT	BUS	Electric Only	Electric Only	P016	16.1	100%	100%	100%	100%	1	2	4	-	-	-	1	2	4	-	-	-
HVAC+R - MN	In-Depth Study	Cooling Studies				$38,945.63	$51,927.50						BUS	Electric Only	Electric Only	R011		100%	100%	100%	100%	3	3	3	-	-	-	3	3	3	-	-	-
HVAC+R - MN	In-Depth Study	Motors Studies				$28,933.33	$70,493.33						BUS	Electric Only	Electric Only	R012		100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	In-Depth Study	Heating Studies				$43,400.00	$105,740.00						BUS	Gas Only	Gas Only	R013		100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
HVAC+R - MN	Assessment	Refrigeration Assessment				$3,000.00	$3,000.00						BUS	Electric Only	Electric Only	R014		100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
HVAC+R - MN	In-Depth Study	Refrigeration Study				$11,286.25	$15,048.33						BUS	Electric Only	Electric Only	R015		100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
HVAC+R - MN	In-Depth Study	Beneficial Electrification Studies				$8,680.00	$21,148.00						BUS	Beneficial Electrification	Electric Only	R022		100%	100%	100%	100%												
HVAC+R - MN	Aerators	Sink Aerator -restroom, elec water heating (per aerator)	.6 gallons per minute restroom faucet aerator	2.2 gallons per minute faucet	9	$8.00	$8.00	1,933	0.004	0.0	$169.23	MN-BUS-FLAT	Bus	Electric Only	Combo	S001	19.1	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Aerators	Sink Aerator -kitchen, elec water heating (per aerator)	1.5 gallons per minute kitchen faucet aerator	2.2 gallons per minute faucet	9	$8.00	$8.00	389	0.000	0.0	$24.73	MN-BUS-FLAT	Bus	Electric Only	Combo	S002	19.1	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Aerators	CHW Pre-Rinse Sprayer - electric water heating	1.28 gallons per minute sprayer	1.60 gallons per minute sprayer	5	$45.00	$45.00	455	0.001	0.0	$40.95	MN-BUS-FLAT	Bus	Electric Only	Combo	S003	19.1	100%	100%	100%	100%	100	100	100	-	-	-	100	100	100	-	-	-
HVAC+R - MN	Aerators	Faucet Aerator (Restroom), gas water heating	.5 gallons per minute restroom faucet aerator	2.2 gallons per minute faucet	9	$8.00	$8.00	0	0.000	8.1	$169.23		Bus	Gas Only	Combo	S004	19.1	100%	100%	100%	100%	-	-	-	40	40	40	-	-	-	40	40	40
HVAC+R - MN	Aerators	Faucet Aerator (Kitchen), gas water heating	1.5 gallons per minute kitchen faucet aerator	2.2 gallons per minute faucet	9	$8.00	$8.00	0	0.000	1.6	$24.73		Bus	Gas Only	Combo	S005	19.1	100%	100%	100%	100%	-	-	-	40	40	40	-	-	-	40	40	40
HVAC+R - MN	Aerators	CHW Pre-Rinse Sprayer - gas water heating	1.28 gallons per minute sprayer	1.60 gallons per minute sprayer	5	$45.00	$45.00	0	0.000	1.9	$40.95		Bus	Gas Only	Combo	S006	19.1	100%	100%	100%	100%	-	-	-	40	40	40	-	-	-	40	40	40
Indirect Impact EFS (Market Transformation) - MN	Panel Upgrade	Panel Upgrade	Upgraded panel to handle electrification load	As built panel		$2,000.00	$2,000.00	0	0.000	0.0	$0.00		RES	Beneficial Electrification	Electric Only			100%	100%	100%	100%	550	650	750				500	600	700			
Insulation Rebates - MN	Attic Insulation - Electric Heating and Cooling	Attic insulation in homes with electric heating / electric cooling	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$679.84	$1,744.82	3,196	0.170	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I031	8.1	100%	100%	100%	100%	7	7	7	-	-	-	7	7	7	-	-	-
Insulation Rebates - MN	Attic Insulation - Electric Heating Only	Attic insulation in homes with electric heating / no cooling	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$525.65	$1,314.13	494	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I032	8.1	100%	100%	100%	100%	4	4	4	-	-	-	4	4	4	-	-	-
Insulation Rebates - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for combo customers	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$828.09	$2,455.78	44	0.084	8.9	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I033	8.1	100%	100%	100%	100%	943	1,037	1,141	943	1,037	1,141	943	1,037	1,141	943	1,037	1,141
Insulation Rebates - MN	Attic Insulation - Gas Heating Only	Attic insulation in homes with gas heating / no cooling	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$779.05	$2,007.53	0	0.000	9.1	$0.00		Res	Gas Only	Combo	I034	8.1	100%	100%	100%	100%	-	-	-	30	33	36	-	-	-	30	33	36
Insulation Rebates - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for gas-only customers	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$930.14	$3,196.63	46	0.088	9.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I035	8.1	100%	100%	100%	100%	-	-	-	96	105	116	-	-	-	96	105	116
Insulation Rebates - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for electric-only customers	Home with R49 or more attic insulation	Existing home with R19 or less attic insulation	20	$120.00	$2,221.21	49	0.093	9.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I036	8.1	100%	100%	100%	100%	136	150	165	-	-	-	136	150	165	-	-	-
Insulation Rebates - MN	Wall Insulation - Electric Heating and Cooling	Wall insulation in homes with electric heating / electric cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,200.00	$4,091.80	5,792	0.379	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I037	8.2	100%	100%	100%	100%	5	5	5	-	-	-	5	5	5	-	-	-
Insulation Rebates - MN	Wall Insulation - Electric Heating Only	Wall insulation in homes with electric heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,200.00	$5,885.00	4,819	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I038	8.2	100%	100%	100%	100%	2	2	2	-	-	-	2	2	2	-	-	-
Insulation Rebates - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for combo customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,048.74	$4,196.24	221	0.425	45.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I039	8.2	100%	100%	100%	100%	93	102	113	93	102	113	93	102	113	93	102	113
Insulation Rebates - MN	Wall Insulation - Gas Heating Only	Wall insulation in homes with gas heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$906.00	$2,930.00	0	0.000	43.6	$0.00		Res	Gas Only	Combo	I040	8.2	100%	100%	100%	100%	-	-	-	8	8	8	-	-	-	8	8	8
Insulation Rebates - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for gas-only customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$961.60	$4,677.00	189	0.364	38.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I041	8.2	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
Insulation Rebates - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for electric-only customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$75.00	$4,196.24	221	0.425	45.0	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I042	8.2	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Insulation Rebates - MN	Air Sealing - Electric Heating and Cooling	Air sealing in homes with electric heating / electric cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$348.57	$1,455.44	1,852	0.073	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I043	8.3	100%	100%	100%	100%	2	2	2	2	2	2	2	2	2	2	2	2
Insulation Rebates - MN	Air Sealing - Electric Heating Only	Air sealing in homes with electric heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$200.00	$500.00	1,410	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I044	8.3	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Insulation Rebates - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for combo customers	Home with bypass air sealing performed	Existing home without air sealing	10	$335.57	$1,164.05	57	0.109	16.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I045	8.3	100%	100%	100%	100%	996	1,095	1,205	996	1,095	1,205	996	1,095	1,205	996	1,095	1,205
Insulation Rebates - MN	Air Sealing - Gas Heating Only	Air sealing in homes with gas heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$451.57	$2,500.34	0	0.000	17.7	$0.00		Res	Gas Only	Combo	I046	8.3	100%	100%	100%	100%	-	-	-	44	48	53	-	-	-	44	48	53
Insulation Rebates - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for gas-only customers	Home with bypass air sealing performed	Existing home without air sealing	10	$351.82	$1,193.63	45	0.086	12.5	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I047	8.3	100%	100%	100%	100%	-	-	-	98	108	119	-	-	-	98	108	119
Insulation Rebates - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for electric-only customers	Home with bypass air sealing performed	Existing home without air sealing	10	$45.00	$1,164.05	57	0.109	16.2	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I048	8.3	100%	100%	100%	100%	165	182	200	-	-	-	165	182	200	-	-	-
Lighting - MN	Custom Lighting Project	Custom Lighting	High Efficiency Lighting	Existing Lower Efficiency Lighting	18	$12,500.84	$41,418.26	129,186	26.387	0.0	-$245.05	MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	G010	7.1	100%	100%	100%	100%	44	44	44				44	44	44			
Lighting - MN	Indoor Agricultural Lighting	LED Grow Lighting Fixtures	LED Grow Lighting Fixture	HID or Fluorescent Fixture	20	$518.82	$630.71	7,102	1.230	0.0	$0.00	MN-BUS-GROW_LIGHTING	BUS	Electric Only	Electric Only	B009	13.6	100%	100%	100%	100%	50	50	50				400	400	400			
Lighting - MN	New Construction Indoor Agricultural Lighting	LED Grow Lighting Fixtures	LED Grow Lighting Fixture	HID or Fluorescent Fixture	20	$518.82	$630.71	7,102	1.230	0.0	$0.00	MN-BUS-GROW_LIGHTING	BUS	Electric Only	Electric Only	B156	13.6	100%	100%	100%	100%	100	100	100				1,800	1,800	1,800			
Lighting - MN	New Construction Exterior	LED Area Lighting - 200-550W	LED Fixture	HID Fixture	20	$90.00	$528.39	3,797	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B182	13.4	100%	100%	100%	100%	18	18	18				240	240	240			
Lighting - MN	Retrofit Exterior	LED Area Lighting - 200-550W	LED Area Lighting	HID Fixture	20	$90.00	$882.14	3,688	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B053	13.2	100%	100%	100%	100%	52	52	52				825	825	825			
Lighting - MN	New Construction Flat	LED Parking Garage Wall Pack 61W - 150W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$50.00	$242.57	3,536	0.404	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B195	13.4	100%	100%	100%	100%	2	2	2				10	10	10			
Lighting - MN	New Construction Exterior	LED Area Lighting - 141-199W	LED Fixture	HID Fixture	20	$60.00	$325.23	3,375	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B181	13.4	100%	100%	100%	100%	75	75	75				350	350	350			
Lighting - MN	New Construction High Bay	LED High Bay Fixture - 465-625W	LED High Bay Fixture	HID Fixture	20	$115.00	$322.52	3,316	0.591	0.0	-$14.61	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B168	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Parking Garage Wall Pack 61W - 150W	LED Parking Garage Wall Packs	Fluorescent Fixture	20	$75.00	$621.34	3,031	0.346	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B061	13.2	100%	100%	100%	100%	2	2	2				14	14	14			
Lighting - MN	New Construction High Bay	LED High Bay Fixture - 291-464W	LED High Bay Fixture	HID Fixture	20	$110.00	$497.53	2,685	0.479	0.0	-$9.17	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B167	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 465-625W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$165.00	$1,330.65	2,599	0.410	0.0	-$8.74	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B031	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 465-625W (Fluorescent Baseline)	LED High Bay Kit	Fluorescent Fixture	20	$105.00	$798.39	2,599	0.410	0.0	-$8.74	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B038	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Area Lighting - 141-199W	LED Area Lighting	HID Fixture	20	$60.00	$544.72	2,184	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B052	13.2	100%	100%	100%	100%	41	41	41				438	438	438			
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 120-144W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$192.41	2,106	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B088	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED Lamps - 120-144W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$192.41	2,106	0.314	0.0	-$6.38	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B094	13.2	100%	100%	100%	100%												
Lighting - MN	Midstream High Bay	LED Lamps - 120-144W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$192.41	2,007	0.321	0.0	-$6.16	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B145	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 291-464W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$130.00	$926.56	1,881	0.297	0.0	-$6.32	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B030	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 291-464W (Fluorescent Baseline)	LED High Bay Kit	Fluorescent Fixture	20	$50.00	$555.94	1,881	0.297	0.0	-$6.32	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B037	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Flat	LED Parking Garage lighting 61W - 83W	LED Parking Garage Fixture	HID Fixture	20	$35.00	$120.39	1,796	0.205	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B163	13.4	100%	100%	100%	100%	2	2	2				8	8	8			
Lighting - MN	Retrofit Exterior	LED Outdoor Canopy or Soffit lighting 61W - 150W	LED Outdoor Canopy Lighting	HID Fixture	20	$25.00	$331.21	1,760	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B063	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED Lamps - 145-230W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$243.81	1,687	0.270	0.0	-$5.18	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B095	13.2	100%	100%	100%	100%	2	2	2				14	14	14			
Lighting - MN	Midstream High Bay	LED Lamps - 145-230W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$243.81	1,687	0.270	0.0	-$5.18	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B146	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Parking Garage Wall Pack 26W - 60W	LED Parking Garage Wall Packs	Fluorescent Fixture	20	$60.00	$358.72	1,623	0.185	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B060	13.2	100%	100%	100%	100%	2	2	2				5	5	5			
Lighting - MN	New Construction Exterior	LED Outdoor Canopy or Soffit lighting 61W - 150W	LED Canopy Fixture	HID Fixture	20	$25.00	$79.32	1,608	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B197	13.4	100%	100%	100%	100%	4	4	4				21	21	21			
Lighting - MN	New Construction Exterior	LED Area Lighting - 120-140W	LED Fixture	HID Fixture	20	$50.00	$394.96	1,580	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B180	13.4	100%	100%	100%	100%	26	26	26				277	277	277			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 465-625W	LED High Bay Fixture	HID Fixture	20	$250.00	$1,330.65	1,574	0.248	0.0	-$5.29	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B017	13.2	100%	100%	100%	100%	1	1	1				425	425	425			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 465-625W	LED High Bay Fixture	HID Fixture	20	$105.00	$798.39	1,574	0.248	0.0	-$5.29	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B024	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED Lamps - 80-119W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$60.00	$185.20	1,564	0.250	0.0	-$4.80	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B093	13.2	100%	100%	100%	100%	7	7	7				56	56	56			
Lighting - MN	Midstream High Bay	LED Lamps - 80-119W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$60.00	$185.20	1,564	0.250	0.0	-$4.80	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B144	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 291-464W	LED High Bay Fixture	HID Fixture	20	$200.00	$926.56	1,551	0.245	0.0	-$5.22	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B016	13.2	100%	100%	100%	100%	8	8	8				367	367	367			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 291-464W	LED High Bay Fixture	HID Fixture	20	$50.00	$555.94	1,551	0.245	0.0	-$5.22	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B023	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Exterior Wall Pack 61W - 150W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$50.00	$238.24	1,534	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B192	13.4	100%	100%	100%	100%	96	96	96				550	550	550			
Lighting - MN	Retrofit High Bay	LED Lamps - 50-79W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$50.00	$86.07	1,501	0.240	0.0	-$4.60	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B092	13.2	100%	100%	100%	100%	5	5	5				70	70	70			
Lighting - MN	Midstream High Bay	LED Lamps - 50-79W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$50.00	$86.07	1,501	0.240	0.0	-$4.60	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B143	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 190-290W	LED High Bay Fixture	HID Fixture	20	$100.00	$573.58	1,492	0.235	0.0	-$5.02	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B015	13.2	100%	100%	100%	100%	20	20	20				300	300	300			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 190-290W	LED High Bay Fixture	HID Fixture	20	$40.00	$344.15	1,492	0.235	0.0	-$5.02	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B022	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Area Lighting - 120-140W	LED Area Lighting	HID Fixture	20	$50.00	$634.13	1,481	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B051	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Flat	LED Parking Garage Wall Pack 26W - 60W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$30.00	$45.99	1,428	0.163	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B194	13.4	100%	100%	100%	100%	1	1	1				3	3	3			
Lighting - MN	Retrofit Flat	LED Parking Garage Lighting 25W-60W	LED Parking Garage Lighting	HID Fixture	20	$115.00	$288.28	1,418	0.162	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B110	13.2	100%	100%	100%	100%	1	1	1				48	48	48			
Lighting - MN	New Construction Flat	LED Parking Garage Lighting 25W-60W	LED Parking Garage Fixture	HID Fixture	20	$25.00	$92.97	1,408	0.161	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B162	13.4	100%	100%	100%	100%	12	12	12				900	900	900			
Lighting - MN	Retrofit Exterior	LED Exterior Wall Pack 61W - 150W	LED Exterior Wall Packs	HID Wall Pack Fixture	20	$50.00	$390.98	1,393	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B058	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 95-189W	LED High Bay Fixture	HID Fixture	20	$90.00	$350.94	1,291	0.204	0.0	-$4.34	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B014	13.2	100%	100%	100%	100%	233	233	233				7,100	7,100	7,100			
Lighting - MN	New Construction High Bay	LED High Bay Fixture - 190-290W	LED High Bay Fixture	HID Fixture	20	$90.00	$258.90	1,283	0.229	0.0	-$4.38	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B166	13.4	100%	100%	100%	100%	31	31	31				2,200	2,200	2,200			
Lighting - MN	Retrofit Flat	LED Parking Garage lighting 61W - 83W	LED Parking Garage Lighting	HID Fixture	20	$125.00	$238.38	1,185	0.135	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B111	13.2	100%	100%	100%	100%	3	3	3				75	75	75			
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 145-230W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$75.00	$243.81	1,158	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B089	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 190-290W (Fluorescent Baseline)	LED High Bay Kit	Fluorescent Fixture	20	$40.00	$344.15	1,081	0.171	0.0	-$3.64	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B036	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Street Lighting - 140-209W	LED Street Lighting	HID Fixture	20	$50.00	$258.11	1,081	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B176	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Street Lighting - 140-209W	LED Street Lighting	HID Fixture	20	$50.00	$593.53	1,081	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B044	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 80-119W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$60.00	$185.20	1,073	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B087	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Area Lighting - 90-119W	LED Area Lighting	HID Fixture	20	$40.00	$426.06	1,072	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B050	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED Lamps - 40-49W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$40.00	$65.61	1,066	0.170	0.0	-$3.27	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B091	13.2	100%	100%	100%	100%												
Lighting - MN	Midstream High Bay	LED Lamps - 40-49W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$40.00	$65.61	1,066	0.170	0.0	-$3.27	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B142	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 190-290W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$100.00	$525.46	1,040	0.164	0.0	-$3.50	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B029	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 50-79W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$50.00	$86.07	1,030	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B086	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Parking Garage Wall Pack <= 25W	LED Parking Garage Wall Packs	Fluorescent Fixture	20	$30.00	$275.01	946	0.108	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B059	13.2	100%	100%	100%	100%	3	3	3				15	15	15			
Lighting - MN	Retrofit Exterior	LED Area Lighting - 66-89W	LED Area Lighting	HID Fixture	20	$35.00	$324.98	945	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B049	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Wall Pack 26W - 60W	LED Exterior Wall Packs	HID Wall Pack Fixture	20	$30.00	$276.55	907	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B057	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Area Lighting - 90-119W	LED Fixture	HID Fixture	20	$40.00	$357.58	900	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B179	13.4	100%	100%	100%	100%	58	58	58				810	810	810			
Lighting - MN	Retrofit Exterior	LED Area Lighting - 45-65W	LED Area Lighting	HID Fixture	20	$35.00	$322.64	893	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B048	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Flat	LED Parking Garage Wall Pack <= 25W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$15.00	$45.99	819	0.094	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B193	13.4	100%	100%	100%	100%	2	2	2				11	11	11			
Lighting - MN	Retrofit Exterior	LED Street Lighting - 110-139W	LED Street Lighting	HID Fixture	20	$40.00	$562.34	814	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B043	13.2	100%	100%	100%	100%	1	1	1				5	5	5			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 95-189W	LED High Bay Fixture	HID Fixture	20	$30.00	$353.02	806	0.127	0.0	-$2.71	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B021	13.2	100%	100%	100%	100%	1	1	1				8	8	8			
Lighting - MN	New Construction Exterior	LED Street Lighting - 110-139W	LED Street Lighting	HID Fixture	20	$40.00	$138.69	794	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B175	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Interior Fixture 26W - 50W	LED Downlight Fixture	Incandescent Fixture	20	$40.00	$114.52	758	0.122	0.0	-$2.54	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B158	13.4	100%	100%	100%	100%	60	60	60				1,900	1,900	1,900			
Lighting - MN	New Construction Exterior	LED Outdoor Canopy or Soffit lighting 25W - 60W	LED Canopy Fixture	HID Fixture	20	$20.00	$145.93	747	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B196	13.4	100%	100%	100%	100%	15	15	15				108	108	108			
Lighting - MN	Retrofit Exterior	LED Outdoor Canopy or Soffit lighting 25W - 60W	LED Outdoor Canopy Lighting	HID Fixture	20	$20.00	$325.74	744	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B062	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction High Bay	LED High Bay Fixture - 95-189W	LED High Bay Fixture	HID Fixture	20	$80.00	$141.14	739	0.132	0.0	-$2.52	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B165	13.4	100%	100%	100%	100%	76	76	76				4,080	4,080	4,080			
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 40-49W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$40.00	$65.61	731	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B085	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Exterior Wall Pack 26W - 60W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$30.00	$54.94	717	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B191	13.4	100%	100%	100%	100%	150	150	150				1,025	1,025	1,025			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 95-189W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$90.00	$351.31	703	0.111	0.0	-$2.36	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B028	13.2	100%	100%	100%	100%												

Measure Description					Economic Assumptions							Customer Information						Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 55-74W	LED High Bay Fixture	HID Fixture	20	$50.00	$196.16	648	0.102	0.0	-$2.18	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B012	13.2	100%	100%	100%	100%	5	5	5				50	50	50			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 55-74W	LED High Bay Fixture	HID Fixture	20	$30.00	$166.86	648	0.102	0.0	-$2.18	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B019	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Area Lighting - 66-89W	LED Fixture	HID Fixture	20	$35.00	$273.23	648	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B178	13.4	100%	100%	100%	100%	29	29	29				230	230	230			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 95-189W (Fluorescent Baseline)	LED High Bay Kit	Fluorescent Fixture	20	$30.00	$353.02	636	0.100	0.0	-$2.14	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B035	13.2	100%	100%	100%	100%	4	4	4				151	151	151			
Lighting - MN	New Construction Exterior	LED Exterior Downlight 26W - 50W	LED Downlight Fixture	Incandescent Fixture	20	$40.00	$114.52	610	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B160	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Street Lighting - 56-79W	LED Street Lighting	HID Fixture	20	$25.00	$270.63	579	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B173	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Street Lighting - 56-79W	LED Street Lighting	HID Fixture	20	$25.00	$454.87	579	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B041	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED Lamps - 30-39W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$30.00	$73.66	575	0.092	0.0	-$1.76	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B090	13.2	100%	100%	100%	100%	4	4	4				29	29	29			
Lighting - MN	Midstream High Bay	LED Lamps - 30-39W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$30.00	$73.66	575	0.092	0.0	-$1.76	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B141	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Interior Fixture 26W - 50W	LED Interior Fixtures	Incandescent Fixture	20	$50.00	$178.03	567	0.114	0.0	-$1.90	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B101	13.2	100%	100%	100%	100%	20	20	20				850	850	850			
Lighting - MN	Midstream Troffer	LED Interior Fixture 26W - 50W	LED Interior Fixtures	Incandescent Fixture	20	$50.00	$178.03	567	0.114	0.0	-$1.90	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B151	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Parking Garage lighting 61W-83W (Fluorescent Baseline)	LED Parking Garage Lighting	Fluorescent Fixture	20	$125.00	$412.85	560	0.064	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B108	13.2	100%	100%	100%	100%	1	1	1				61	61	61			
Lighting - MN	New Construction High Bay	LED High Bay Fixture - 75-94W	LED High Bay Fixture	HID Fixture	20	$40.00	$185.78	534	0.095	0.0	-$1.82	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B164	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Street Lighting - 80-109W	LED Street Lighting	HID Fixture	20	$25.00	$59.43	533	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B174	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Street Lighting - 80-109W	LED Street Lighting	HID Fixture	20	$25.00	$280.41	533	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B042	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Downlight 26W - 50W	LED Interior Fixtures	Incandescent Fixture	20	$50.00	$178.03	520	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B105	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Wall Pack <= 25W	LED Exterior Wall Packs	HID Wall Pack Fixture	20	$15.00	$221.73	475	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B056	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Linear Ambient >=61W	LED Linear Ambients	Fluorescent Fixture	20	$38.00	$246.17	467	0.090	0.0	-$1.54	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B066	13.2	100%	100%	100%	100%	100	100	100				2,300	2,300	2,300			
Lighting - MN	Retrofit Troffer	LED Linear Ambient Retrofit Kit >=61W	LED Linear Ambient Kits	Fluorescent Fixture	20	$38.00	$184.63	467	0.090	0.0	-$1.54	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B069	13.2	100%	100%	100%	100%	2	2	2				22	22	22			
Lighting - MN	New Construction Troffer	LED Linear Ambient >=61W	LED Linear Ambient Fixture	Fluorescent Fixture	20	$25.00	$170.05	467	0.090	0.0	-$1.54	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B186	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Linear Ambient Retrofit Kit >=61W	LED Linear Ambient Kits	Fluorescent Fixture	20	$38.00	$108.50	467	0.090	0.0	-$1.54	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B189	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 45-54W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$50.00	$160.47	465	0.073	0.0	-$1.56	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B025	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 45-54W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$30.00	$140.00	465	0.073	0.0	-$1.56	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B032	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Interior Fixture <= 25W	LED Interior Fixtures	Incandescent Fixture	20	$35.00	$58.73	438	0.088	0.0	-$1.47	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B099	13.2	100%	100%	100%	100%	75	75	75				2,700	2,700	2,700			
Lighting - MN	Midstream Troffer	LED Interior Fixture <= 25W	LED Interior Fixtures	Incandescent Fixture	20	$35.00	$58.73	438	0.088	0.0	-$1.47	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B149	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 45-54W	LED High Bay Fixture	HID Fixture	20	$50.00	$166.87	437	0.069	0.0	-$1.47	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B011	13.2	100%	100%	100%	100%	5	5	5				50	50	50			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 45-54W	LED High Bay Fixture	HID Fixture	20	$30.00	$155.00	437	0.069	0.0	-$1.47	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B018	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 75-94W	LED High Bay Fixture	HID Fixture	20	$50.00	$240.04	432	0.068	0.0	-$1.45	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B013	13.2	100%	100%	100%	100%	15	15	15				1,000	1,000	1,000			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 75-94W	LED High Bay Fixture	HID Fixture	20	$30.00	$144.02	432	0.068	0.0	-$1.45	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B020	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 55-74W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$50.00	$235.49	407	0.064	0.0	-$1.37	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B026	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 55-74W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$30.00	$125.43	407	0.064	0.0	-$1.37	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B033	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Downlight <= 25W	LED Interior Fixtures	Incandescent Fixture	20	$35.00	$58.73	402	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B103	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Flat	LED Stairwell Fixtures	LED Stairwell Fixture	HID or Fluorescent Fixture	20	$40.00	$78.13	399	0.054	0.0	-$1.31	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B169	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Exterior Lamps - 30-39W (HID Base)	LED Screw-in Lamps	HID Lamp	9	$30.00	$73.66	395	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B084	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit High Bay	LED High Bay Fixture - 75-94W (Fluorescent Baseline)	LED High Bay Fixture	Fluorescent Fixture	20	$50.00	$240.04	388	0.061	0.0	-$1.31	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B027	13.2	100%	100%	100%	100%	104	104	104				750	750	750			
Lighting - MN	Retrofit High Bay	LED High Bay Fixture Kit - 75-94W (Fluorescent Baseline)	LED High Bay Kit	Fluorescent Fixture	20	$30.00	$144.02	388	0.061	0.0	-$1.31	MN-BUS-Light High Bay	BUS	Electric Only	Electric Only	B034	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Street Lighting - 45-55W	LED Street Lighting	HID Fixture	20	$25.00	$253.22	384	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B172	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Street Lighting - 45-55W	LED Street Lighting	HID Fixture	20	$25.00	$420.42	384	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B040	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Stairwell Fixtures	LED Stairwell Fixture	HID or Fluorescent Fixture	20	$40.00	$165.67	375	0.051	0.0	-$1.23	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B010	13.2	100%	100%	100%	100%	29	29	29				451	451	451			
Lighting - MN	Retrofit Exterior	LED Area Lighting - 35-44W	LED Area Lighting	HID Fixture	20	$35.00	$200.20	371	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B047	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Parking Garage Lighting 15W-24W	LED Parking Garage Lighting	HID or Fluorescent Fixture	20	$100.00	$196.00	350	0.040	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B109	13.2	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Area Lighting - 45-65W	LED Fixture	HID Fixture	20	$35.00	$296.27	347	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B177	13.4	100%	100%	100%	100%	11	11	11				200	200	200			
Lighting - MN	Retrofit Refrigerated	LED Ref and Frz Cases 5' or 6' doors	LED Linear Tubes	Fluorescent Tubes	20	$45.00	$163.75	333	0.059	0.0	$0.00	MN-BUS-Light Refrigerated	BUS	Electric Only	Electric Only	B071	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Flat	LED Exit Sign	Exit Sign Retrofit and Replacement	Incandescent Exit Sign	20	$25.00	$81.64	331	0.045	0.0	-$1.09	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B070	13.2	100%	100%	100%	100%	43	43	43				575	575	575			
Lighting - MN	New Construction Refrigerated	LED Ref and Frz Cases 5' or 6' doors	LED Strip Lighting	Fluorescent Tubes	20	$35.00	$87.03	301	0.044	0.0	$0.00	MN-BUS-Light Refrigerated	BUS	Electric Only	Electric Only	B161	13.4	100%	100%	100%	100%	1	1	1				12	12	12			
Lighting - MN	Retrofit Flat	LED Parking Garage Lighting 25W-60W (Fluorescent Baseline)	LED Parking Garage Lighting	Fluorescent Fixture	20	$115.00	$355.32	280	0.032	0.0	$0.00	MN-BUS-Light Flat	BUS	Electric Only	Electric Only	B107	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Linear Ambient 36-60W	LED Linear Ambients	Fluorescent Fixture	20	$25.00	$169.22	269	0.052	0.0	-$0.89	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B065	13.2	100%	100%	100%	100%	210	210	210				3,854	3,854	3,854			
Lighting - MN	Retrofit Troffer	LED Linear Ambient Retrofit Kit 36-60W	LED Linear Ambient Kits	Fluorescent Fixture	20	$25.00	$126.92	269	0.052	0.0	-$0.89	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B068	13.2	100%	100%	100%	100%	21	21	21				515	515	515			
Lighting - MN	New Construction Troffer	LED Linear Ambient 36-60W	LED Linear Ambient Fixture	Fluorescent Fixture	20	$20.00	$112.67	269	0.052	0.0	-$0.89	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B185	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Linear Ambient Retrofit Kit 36-60W	LED Linear Ambient Kits	Fluorescent Fixture	20	$25.00	$70.37	269	0.052	0.0	-$0.89	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B188	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Troffer Fixture	LED Troffer Fixture	Fluorescent Fixture	20	$29.42	$148.22	264	0.049	0.0	-$0.07	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B054	13.2	100%	100%	100%	100%	860	860	860				33,000	33,000	33,000			
Lighting - MN	New Construction Exterior	LED Exterior Wall Pack <= 25W	LED Wall Pack Fixture	HID Wall Pack Fixture	20	$15.00	$22.30	254	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B190	13.4	100%	100%	100%	100%	66	66	66				600	600	600			
Lighting - MN	Retrofit Exterior	LED Area Lighting - 15-24W	LED Area Lighting	HID Fixture	20	$35.00	$209.46	250	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B045	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Area Lighting - 25-34W	LED Area Lighting	HID Fixture	20	$35.00	$197.26	248	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B046	13.2	100%	100%	100%	100%												
Lighting - MN	Network Lighting Controls	Networked Lighting Controls	Lighting Fixture with Networked Lighting Controls or Networked LLLC	Lighting Fixture with Manual Switch	15	$35.64	$86.02	244	0.047	0.0	-$0.15	MN-BUS-Light-Network-Controls	BUS	Electric Only	Electric Only	B001	13.1	100%	100%	100%	100%	19	19	19				2,500	2,500	2,500			
Lighting - MN	New Construction Lighting Controls	Networked Lighting Controls	Lighting Fixture with Networked Lighting Controls or Networked LLLC	Lighting Fixture with Manual Switch	15	$35.64	$72.53	244	0.047	0.0	-$0.15	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B155	13.1	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Interior Fixture <= 25W	LED Downlight Fixture	Incandescent Fixture	20	$25.00	$12.54	241	0.039	0.0	-$0.81	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B157	13.4	100%	100%	100%	100%	170	170	170				10,700	10,700	10,700			
Lighting - MN	New Construction Exterior	LED Street Lighting - 30-44W	LED Street Lighting	HID Fixture	20	$15.00	$240.28	240	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B171	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Exterior	LED Street Lighting - 30-44W	LED Street Lighting	HID Fixture	20	$15.00	$394.82	240	0.000	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	B039	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Troffer Retrofit Kit	LED Troffer Kit	Fluorescent Fixture	20	$29.19	$148.52	210	0.044	0.0	-$0.06	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B055	13.2	100%	100%	100%	100%	76	76	76				4,084	4,084	4,084			
Lighting - MN	Retrofit Troffer	LED Linear Ambient <=35W	LED Linear Ambients	Fluorescent Fixture	20	$20.00	$149.06	208	0.040	0.0	-$0.69	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B064	13.2	100%	100%	100%	100%	166	166	166				6,800	6,800	6,800			
Lighting - MN	Retrofit Troffer	LED Linear Ambient Retrofit Kit <=35W	LED Linear Ambient Kits	Fluorescent Fixture	20	$20.00	$111.80	208	0.040	0.0	-$0.69	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B067	13.2	100%	100%	100%	100%	71	71	71				1,124	1,124	1,124			
Lighting - MN	New Construction Troffer	LED Linear Ambient <=35W	LED Linear Ambient Fixture	Fluorescent Fixture	20	$15.00	$95.94	208	0.040	0.0	-$0.69	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B184	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Linear Ambient Retrofit Kit <=35W	LED Linear Ambient Kits	Fluorescent Fixture	20	$20.00	$58.67	208	0.040	0.0	-$0.69	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B187	13.4	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Interior Fixture 26W - 50W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$35.00	$176.73	204	0.041	0.0	-$0.68	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B102	13.2	100%	100%	100%	100%	9	9	9				350	350	350			
Lighting - MN	Midstream Troffer	LED Interior Fixture 26W - 50W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$35.00	$176.73	204	0.041	0.0	-$0.68	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B152	13.3	100%	100%	100%	100%												
Lighting - MN	New Construction Exterior	LED Exterior Downlight <= 25W	LED Downlight Fixture	Incandescent Fixture	20	$25.00	$12.54	194	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B159	13.4	100%	100%	100%	100%												
Lighting - MN	New Construction Troffer	LED Troffer Fixture	LED Troffer Fixture	Fluorescent Fixture	20	$30.00	$83.99	190	0.036	0.0	-$0.01	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B183	13.4	100%	100%	100%	100%	300	300	300				13,200	13,200	13,200			
Lighting - MN	Retrofit Exterior	LED Exterior Downlight 26W - 50W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$35.00	$176.73	187	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B106	13.2	100%	100%	100%	100%												
Lighting - MN	Midstream Tube	LED Tube Type B 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	10	$3.00	$23.72	178	0.033	0.0	-$0.60	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B139	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Tube Type B 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	10	$3.00	$23.72	177	0.033	0.0	-$0.60	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B079	13.2	100%	100%	100%	100%	24	24	24				2,300	2,300	2,300			
Lighting - MN	Retrofit Troffer	LED Interior Fixture <= 25W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$25.00	$55.46	171	0.034	0.0	-$0.57	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B100	13.2	100%	100%	100%	100%	85	85	85				7,560	7,560	7,560			
Lighting - MN	Midstream Troffer	LED Interior Fixture <= 25W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$25.00	$55.46	171	0.034	0.0	-$0.57	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B150	13.3	100%	100%	100%	100%												
Lighting - MN	Midstream Tube	LED Tube Type A 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	11	$2.00	$13.73	162	0.030	0.0	-$0.54	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B138	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Tube Type A 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	10	$2.00	$13.73	162	0.030	0.0	-$0.54	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B078	13.2	100%	100%	100%	100%	19	19	19				7,500	7,500	7,500			
Lighting - MN	Retrofit Exterior	LED Exterior Downlight <= 25W (CFL Base)	LED Interior Fixtures	CFL Fixture	20	$25.00	$55.46	156	0.000	0.0	$0.00	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	B104	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED PL/G based CFL Replacement lamp Type B	LED PL/G based CFL Replacement lamp	CFL Lamp	11	$7.00	$18.11	137	0.027	0.0	-$0.46	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B097	13.2	100%	100%	100%	100%	30	30	30				2,803	2,803	2,803			
Lighting - MN	Midstream Troffer	LED PL/G based CFL Replacement lamp Type B	LED PL/G based CFL Replacement lamp	CFL Lamp	11	$7.00	$26.26	128	0.025	0.0	-$0.43	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B148	13.3	100%	100%	100%	100%												
Lighting - MN	Lighting Controls	High End Trim - LLLC	Luminaire Level Sensor	Manual Switch	15	$20.03	$63.56	119	0.020	0.0	-$0.02	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B008	13.1	100%	100%	100%	100%	7	7	7				1,991	1,991	1,991			
Lighting - MN	Retrofit Screw In	LED Interior Screw In Fixture Retrofit	LED Retrofit Kit	Halogen, Incandescent, or CFL Fixture	9	$10.07	$2.67	119	0.021	0.0	-$0.41	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B121	13.3	100%	100%	100%	100%												
Lighting - MN	Midstream Screw In	LED Interior Screw In Fixture Retrofit	LED Retrofit Kit	Halogen, Incandescent, or CFL Fixture	9	$10.07	$2.67	119	0.021	0.0	-$0.41	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B131	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Troffer	LED Track Lighting 15W - 30W	LED Track Lighting Fixture	Halogen, Incandescent Fixture	20	$15.00	$58.55	112	0.011	0.0	-$0.31	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B098	13.2	100%	100%	100%	100%	4	4	4				400	400	400			
Lighting - MN	Retrofit Troffer	LED PL/G based CFL Replacement lamp	LED PL/G based CFL Replacement lamp	CFL Lamp	11	$7.00	$10.75	108	0.021	0.0	-$0.36	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B096	13.2	100%	100%	100%	100%	81	81	81				6,883	6,883	6,883			
Lighting - MN	Midstream Troffer	LED PL/G based CFL Replacement lamp	LED PL/G based CFL Replacement lamp	CFL Lamp	11	$7.00	$20.66	108	0.021	0.0	-$0.36	MN-BUS-Light Troffer	BUS	Electric Only	Electric Only	B147	13.3	100%	100%	100%	100%												
Lighting - MN	Lighting Controls	Occupancy & Photo Cell Sensor	Sensor	Manual Switch	8	$8.58	$27.98	107	0.018	0.0	-$0.06	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B004	13.1	100%	100%	100%	100%	1	1	1				25	25	25			
Lighting - MN	Lighting Controls	Occupancy & Photo Cell Sensor - LLLC	Luminaire Level Sensor	Manual Switch	15	$8.58	$27.98	107	0.018	0.0	-$0.06	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B007	13.1	100%	100%	100%	100%	19	19	19				1,200	1,200	1,200			
Lighting - MN	Midstream Tube	LED Tube Type C 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	20	$5.00	$34.67	105	0.020	0.0	-$0.35	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B140	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Tube Type C 4 foot T5	LED Linear Tubes	T5 Fluorescent Tubes	20	$5.00	$34.67	105	0.020	0.0	-$0.35	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B080	13.2	100%	100%	100%	100%	1	1	1				50	50	50			
Lighting - MN	Midstream Tube	LED Linear Tube Type A 4 foot	LED Linear Tubes	Fluorescent Tubes	11	$2.00	$7.13	91	0.017	0.0	-$0.30	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B135	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type A 4 foot	LED Linear Tubes	Fluorescent Tubes	10	$2.00	$7.13	91	0.017	0.0	-$0.30	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B075	13.2	100%	100%	100%	100%	210	210	210				37,000	37,000	37,000			
Lighting - MN	New Construction Tube	LED Tubes	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$10.56	88	0.015	0.0	-$0.30	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B170	13.4	100%	100%	100%	100%												
Lighting - MN	Midstream Tube	LED Linear Tube Type B 4 foot	LED Linear Tubes	Fluorescent Tubes	10	$3.00	$16.20	83	0.016	0.0	-$0.28	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B136	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Type B 4 foot	LED Linear Tubes	Fluorescent Tubes	10	$3.00	$16.20	83	0.016	0.0	-$0.28	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B076	13.2	100%	100%	100%	100%	538	538	538				135,000	135,000	135,000			
Lighting - MN	Midstream Tube	LED Linear Tube Type C 4 foot	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$25.07	80	0.015	0.0	-$0.27	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B137	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type C 4 foot	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$25.07	80	0.015	0.0	-$0.27	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B077	13.2	100%	100%	100%	100%	15	15	15				19,040	19,040	19,040			
Lighting - MN	Retrofit Tube	LED Linear Tube Type A 3 foot	LED Linear Tubes	Fluorescent Tubes	10	$2.00	$3.97	80	0.015	0.0	-$0.27	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B081	13.2	100%	100%	100%	100%	1	1	1				10	10	10			
Lighting - MN	Retrofit Screw In	LED Interior Lamp - PAR38	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$10.85	$11.54	78	0.014	0.0	-$0.27	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B116	13.3	100%	100%	100%	100%	199	199	199				17,000	17,000	17,000			
Lighting - MN	Midstream Screw In	LED Interior Lamp - PAR38	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$10.85	$11.54	78	0.014	0.0	-$0.27	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B126	13.3	100%	100%	100%	100%												
Lighting - MN	Lighting Controls	Occupancy Sensor	Sensor	Manual Switch	8	$3.00	$27.23	75	0.013	0.0	-$0.04	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B002	13.1	100%	100%	100%	100%	123	123	123				11,000	11,000	11,000			
Lighting - MN	Lighting Controls	Occupancy Sensor - LLLC	Luminaire Level Sensor	Manual Switch	15	$3.00	$27.23	75	0.013	0.0	-$0.04	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B005	13.1	100%	100%	100%	100%	4	4	4				96	96	96			

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Lighting - MN	New Construction Lighting Controls	Occupancy & Photo Cell Sensor	Sensor	Manual Switch	8	$3.00	$27.98	107	0.018	0.0	-$0.04	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B154	13.1	100%	100%	100%	100%												
Lighting - MN	New Construction Lighting Controls	Occupancy Sensor	Sensor	Manual Switch	8	$3.00	$27.23	75	0.013	0.0	-$0.04	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B153	13.1	100%	100%	100%	100%												
Lighting - MN	Retrofit Screw In	LED Interior Lamp - BR40	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$6.58	$5.27	63	0.011	0.0	-$0.22	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B117	13.3	100%	100%	100%	100%												
Lighting - MN	Midstream Screw In	LED Interior Lamp - BR40	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$6.58	$5.27	63	0.011	0.0	-$0.22	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B127	13.3	100%	100%	100%	100%	34	34	34				1,800	1,800	1,800			
Lighting - MN	Retrofit Screw In	LED Interior Lamp - A Lamps	LED Lamp	Halogen, Incandescent, or CFL Lamp	4	$3.99	$1.62	61	0.011	0.0	-$0.21	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B112	13.3	100%	100%	100%	100%	50	50	50				10,000	10,000	10,000			
Lighting - MN	Midstream Screw In	LED Interior Lamp - A Lamps	LED Lamp	Halogen, Incandescent, or CFL Lamp	4	$3.99	$1.62	61	0.011	0.0	-$0.21	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B122	13.3	100%	100%	100%	100%	1,485	1,485	1,485				95,000	95,000	95,000			
Lighting - MN	Lighting Controls	Photocell Sensor	Sensor	Manual Switch	8	$5.16	$24.48	60	0.013	0.0	-$0.03	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B003	13.1	100%	100%	100%	100%												
Lighting - MN	Lighting Controls	Photocell Sensor - LLLC	Luminaire Level Sensor	Manual Switch	15	$5.16	$24.48	60	0.013	0.0	-$0.03	MN-BUS-Light-Sensor	BUS	Electric Only	Electric Only	B006	13.1	100%	100%	100%	100%	9	9	9				1,200	1,200	1,200			
Lighting - MN	Midstream Tube	LED Linear Tube Type A 2 foot	LED Linear Tubes	Fluorescent Tubes	11	$2.00	$5.00	59	0.011	0.0	-$0.20	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B132	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type A 2 foot	LED Linear Tubes	Fluorescent Tubes	10	$2.00	$5.00	59	0.011	0.0	-$0.20	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B072	13.2	100%	100%	100%	100%	33	33	33				3,000	3,000	3,000			
Lighting - MN	Retrofit Tube	LED Linear Tube Type C 3 foot	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$23.36	56	0.011	0.0	-$0.19	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B083	13.2	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type B 3 foot	LED Linear Tubes	Fluorescent Tubes	10	$3.00	$13.38	53	0.010	0.0	-$0.18	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B082	13.2	100%	100%	100%	100%	4	4	4				7	7	7			
Lighting - MN	Retrofit Screw In	LED Interior Lamp - PAR30	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.41	$4.77	48	0.008	0.0	-$0.16	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B114	13.3	100%	100%	100%	100%	137	137	137				15,000	15,000	15,000			
Lighting - MN	Midstream Screw In	LED Interior Lamp - PAR30	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.41	$4.77	48	0.008	0.0	-$0.16	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B124	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Screw In	LED Interior Lamp - BR30	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.76	$1.40	43	0.008	0.0	-$0.15	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B115	13.3	100%	100%	100%	100%												
Lighting - MN	Midstream Screw In	LED Interior Lamp - BR30	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.76	$1.40	43	0.008	0.0	-$0.15	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B125	13.3	100%	100%	100%	100%	148	148	148				20,000	20,000	20,000			
Lighting - MN	Midstream Tube	LED Linear Tube Type B 2 foot	LED Linear Tubes	Fluorescent Tubes	10	$3.00	$8.10	42	0.008	0.0	-$0.14	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B133	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type B 2 foot	LED Linear Tubes	Fluorescent Tubes	10	$3.00	$16.73	41	0.008	0.0	-$0.14	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B073	13.2	100%	100%	100%	100%	30	30	30				4,000	4,000	4,000			
Lighting - MN	Midstream Tube	LED Linear Tube Type C 2 foot	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$21.65	33	0.006	0.0	-$0.11	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B134	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Tube	LED Linear Tube Type C 2 foot	LED Linear Tubes	Fluorescent Tubes	20	$5.00	$21.65	33	0.006	0.0	-$0.11	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B074	13.2	100%	100%	100%	100%	2	2	2				100	100	100			
Lighting - MN	Retrofit Screw In	LED Interior Lamp - PAR20, R20	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$4.38	$3.18	26	0.005	0.0	-$0.09	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B113	13.3	100%	100%	100%	100%	67	67	67				4,500	4,500	4,500			
Lighting - MN	Midstream Screw In	LED Interior Lamp - PAR20, R20	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$4.38	$3.18	26	0.005	0.0	-$0.09	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B123	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Screw In	LED Interior Lamp - MR16	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.45	$6.95	25	0.004	0.0	-$0.09	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B119	13.3	100%	100%	100%	100%	152	152	152				17,000	17,000	17,000			
Lighting - MN	Midstream Screw In	LED Interior Lamp - MR16	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$5.45	$6.95	25	0.004	0.0	-$0.09	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B129	13.3	100%	100%	100%	100%												
Lighting - MN	Retrofit Screw In	LED Interior Lamp - Decorative (B, BA, Candle)	LED Lamp	Halogen, Incandescent, or CFL Lamp	4	$4.19	$5.94	25	0.004	0.0	-$0.08	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B120	13.3	100%	100%	100%	100%												
Lighting - MN	Midstream Screw In	LED Interior Lamp - Decorative (B, BA, Candle)	LED Lamp	Halogen, Incandescent, or CFL Lamp	4	$4.19	$5.94	25	0.004	0.0	-$0.08	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B130	13.3	100%	100%	100%	100%	244	244	244				55,000	55,000	55,000			
Lighting - MN	Retrofit Screw In	LED Interior Lamp - PAR16	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$3.29	$1.27	22	0.004	0.0	-$0.07	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B118	13.3	100%	100%	100%	100%	30	30	30				1,800	1,800	1,800			
Lighting - MN	Midstream Screw In	LED Interior Lamp - PAR16	LED Lamp	Halogen, Incandescent, or CFL Lamp	5	$3.29	$1.27	22	0.004	0.0	-$0.07	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B128	13.3	100%	100%	100%	100%												
Lighting - MN	Lighting Redesign	Lighting Redesign Implementation	Redesign Lighting Solution Installed	Existing Overlit Lighting System	20	$9,174.72	$87,556.11	162,234	11.975			MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	R017		100%	100%	100%	100%	4	4	4				4	4	4			
Lighting - MN	Lighting Redesign	Lighting Redesign Studies	Redesign Lighting Solution Study	Existing Overlit Lighting System		$23,392.50	$33,453.20						BUS	Electric Only	Electric Only	R016		100%	100%	100%	100%	4	4	4				4	4	4			
Load Strategy Analysis - MN	Behavioral Load Strategy Analysis	Behavioral Changes	Behavior changes that reduce energy use	No change in behavior	3	$1,462.25	$0.00	0	0.000	1,462.3	$0.00	MN-BUS-RECOM	Bus	Combo	Combo	C004		100%	100%	100%	100%	7	7	7	1	1	1	7	7	7	1	1	1
Load Strategy Analysis - MN	Peak Partner Rewards	New Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$3,657.00	$0.00	684	113.920	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T015	4.2	100%	100%	100%	100%												
Load Strategy Analysis - MN	Peak Partner Rewards	Existing Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$3,657.00	$0.00	684	113.920	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T016	4.2	100%	100%	100%	100%												
Load Strategy Analysis - MN	Custom Load Strategy Analysis Project	Custom Load Strategy Analysis Project	New Equipment	Less Efficient Product/Systems	16	$13,157.33	$26,308.00	200,621	29.239	0.0	$0.00	MN-BUS-RECM_OUT	BUS	Electric Only	Electric Only	G020	7.1	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
Load Strategy Analysis - MN	Custom Load Strategy Analysis Gas Project	Custom Load Strategy Analysis Gas Project	New or Optimized System or Equipment	Old or less efficient systems or equipment	15	$3,688.67	$17,980.33	0	0.000	737.8	$42.67	MN-BUS-CUSTOM_	Bus	Gas Only	Gas Only	G034	7.1	100%	100%	100%	100%	-	-	-	2	2	2	-	-	-	2	2	2
Load Strategy Analysis - MN	Efficiency Controls Electric Project	Load Strategy Analysis Efficiency Controls Electric Project	New Building Controls	Old Building Controls	15	$8,375.64	$52,277.85	170,777	2.244	0.0	$1,461.23	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	G035	7.1	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
Load Strategy Analysis - MN	Efficiency Controls Gas Project	Load Strategy Analysis Efficiency Controls Gas Project	New Building Controls	Old Building Controls	15	$4,005.47	$47,311.88	0	0.000	801.1	$1,195.19		Bus	Gas Only	Gas Only	G036	7.1	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
Load Strategy Analysis - MN	Load Strategy Analysis Prescriptive	Average Compressed Air/FSO Project	Optimized System	Old System	11	$9,000.00	$14,222.00	50,910	11.905	0.0	$0.00	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	J048	9.1	100%	100%	100%	100%	8	8	8	-	-	-	8	8	8	-	-	-
Load Strategy Analysis - MN	Energy Information Installation	Energy Information Installation	New Load Strategy Analysis	No Load Strategy Analysis		$12,495.71	$42,319.35							Combo	Combo	R020		100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	1
Low Income Home Energy Squad - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$15.00	$15.00	68	0.009	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A003	1.5	100%	100%	100%	100%							2	3	3			
Low Income Home Energy Squad - MN	Dehumidifier Recycling	Dehumidifier Removal and Recycling	Removal of dehumidifier	Existing dehumidifier	5	$15.00	$15.00	824	0.426	0.0	$1.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	A009	1.1	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	ENERGY STAR Dehumidifier	Installation of ENERGY STAR Dehumidifier	ENERGY STAR Dehumidifier (Current ENERGY STAR Criteria)	Standard Efficiency Dehumidifier (Current Federal Standard)	12	$220.00	$220.00	111	0.034	0.0	$0.00	MN-RES-ESTARREF	Res	Electric Only	Combo	A071	1.8	100%	100%	100%	100%							8	10	12			
Low Income Home Energy Squad - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I076	8.4	100%	100%	100%	100%							38	48	59			
Low Income Home Energy Squad - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I077	8.4	100%	100%	100%	100%							7	9	11			
Low Income Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I078	8.4	100%	100%	100%	100%							1,664	2,080	2,600	1,664	2,080	2,600
Low Income Home Energy Squad - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	0	0.000	1.8	$0.00		Res	Gas Only	Combo	I079	8.4	100%	100%	100%	100%										156	195	243
Low Income Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for gas-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I080	8.4	100%	100%	100%	100%							-	-	-	-	-	-
Low Income Home Energy Squad - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$12.00	$12.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I081	8.4	100%	100%	100%	100%							-	-	-	-	-	-
Low Income Home Energy Squad - MN	Home Energy Squad Service	Home Energy Squad Service	Tier One Energy Squad Service			$70.00	$70.00							Combo	Combo	J022	9.1	100%	100%	100%	100%	2,521	3,152	3,939	945	1,181	1,477						
Low Income Home Energy Squad - MN	Home Lighting DI	3-WAY 5W-9W-16W	3-WAY 5W-9W-16W	Existing Incandescent Bulb	18	$5.00	$5.00	34	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K023	13.1	100%	100%	100%	100%							-	-	-			
Low Income Home Energy Squad - MN	Home Lighting DI	LED - A-lamp (15W)	15w Standard LED (100w Equivalent)	Existing Incandescent Bulb	18	$5.00	$5.00	93	0.011	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K024	13.1	100%	100%	100%	100%							2,131	2,664	3,330			
Low Income Home Energy Squad - MN	Home Lighting DI	LED - A-lamp (9W)	9w Standard LED (60w Equivalent)	Existing Incandescent Bulb	18	$5.00	$5.00	56	0.007	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K025	13.1	100%	100%	100%	100%							13,476	16,845	21,057			
Low Income Home Energy Squad - MN	Home Lighting DI	LED - Candelabra (5W)	LED - Candelabra (5W)	Existing Incandescent Bulb	20	$5.00	$5.00	15	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K026	13.1	100%	100%	100%	100%							5,531	6,913	8,642			
Low Income Home Energy Squad - MN	Home Lighting DI	LED - Flood (10W)	10W VALUE led (60W Equivalent)	Existing Incandescent Bulb	20	$5.00	$5.00	36	0.005	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K027	13.1	100%	100%	100%	100%							6,048	7,560	9,450			
Low Income Home Energy Squad - MN	Home Lighting DI	LED - Globe (6W)	6w Globe LED Dim	Existing Incandescent Bulb	20	$5.00	$5.00	40	0.006	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K028	13.1	100%	100%	100%	100%							2,800	3,500	4,375			
Low Income Home Energy Squad - MN	Home Lighting DI	Replace Compact Flourescent Lamps (CFLs) with LEDs	A-Line LED	Existing CFL	18	$5.00	$5.00	11	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K029	13.1	100%	100%	100%	100%							541	677	846			
Low Income Home Energy Squad - MN	Home Lighting DI	Replace Compact Flourescent Lamps (CFLs) with LEDs	Specialty LED	Existing CFL	20	$5.00	$5.00	3	0.000	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K030	13.1	100%	100%	100%	100%							208	260	325			
Low Income Home Energy Squad - MN	Home Lighting DI	A19 Smart LED Bulb	A19 Smart LED Bulb	Existing Incandescent Bulb	18	$12.99	$12.99	13	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K072	13.1	100%	100%	100%	100%							-	-	-			
Low Income Home Energy Squad - MN	Home Lighting DI	BR30 Smart LED Bulb	BR30 Smart LED Bulb	Existing Incandescent Bulb	18	$17.99	$17.99	14	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K073	13.1	100%	100%	100%	100%							-	-	-			
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) - Gas Only Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Gas Only	U046	17.6	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) combo customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U047	17.6	100%	100%	100%	100%							96	120	150	96	120	150
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Programmable T-stat (Elec Cooling & Gas Heat) electric only customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Electric Only	U048	17.6	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Second Programmable Thermostat - Combo Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	39	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U050	17.6	100%	100%	100%	100%							7	8	10	7	8	10
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Second Programmable Thermostat - Electric Only	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	39	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Electric Only	U051	17.6	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	Programmable Thermostat	Install Second Programmable Thermostat - Gas Only Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	39	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Gas Only	U052	17.6	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	Programmable Thermostat	Programming of Existing T-stat (Elec Cooling & Gas Heat) - Combo Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U054	17.6	100%	100%	100%	100%							35	44	54	35	44	54
Low Income Home Energy Squad - MN	Programmable Thermostat	Programming of Existing T-stat (Elec Cooling & Gas Heat) - Electric Only Customer	New T-stat w/ Auto setup by 1.2 F for cooling assume 2.3 ton AC, 13.4 SEER and setback of 2.1 F for heating with 80% AFUE furnace	Existing home w/ no auto setup or setback temps	10	$35.00	$35.00	79	0.086	6.8	$0.00	MN-RES-Cooling_DX	RES	Combo	Electric Only	U055	17.6	100%	100%	100%	100%												
Low Income Home Energy Squad - MN	Saver's Switch	Residential AC Switch	Utility Load Control for control period with smart switch	No Control, No Switch	15	$90.00	$90.00	1	0.984		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U059	17.8	100%	100%	100%	100%							-	-	-	-	-	-
Low Income Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	U071	17.7	100%	100%	100%	100%							16	20	25			
Low Income Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U073	17.7	100%	100%	100%	100%							184	230	288	184	230	288
Low Income Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	76	0.180	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U078	17.7	100%	100%	100%	100%							4	5	7			
Low Income Home Energy Squad - MN	Smart Thermostat	Install Energy Star certified smart thermostat - GAS ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$125.00	$125.00	0	0.000	5.5	$0.00		RES	Gas Only	Gas Only	U083	17.7	100%	100%	100%	100%										4	5	7

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Low Income Home Energy Squad - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.25	$1.25	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S023	19.1	100%	100%	100%	100%							19	24	29			
Low Income Home Energy Squad - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	91	0.013	0.0	$8.12	MN-RES-SFWHT	Res	Electric Only	Combo	S024	19.1	100%	100%	100%	100%							146	183	229			
Low Income Home Energy Squad - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.25	$1.25	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S050	19.1	100%	100%	100%	100%										100	125	156
Low Income Home Energy Squad - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.50	$1.50	0	0.000	0.4	$8.12		Res	Gas Only	Combo	S051	19.1	100%	100%	100%	100%										553	692	864
Low Income Home Energy Squad - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S119	19.1	100%	100%	100%	100%							83	104	130			
Low Income Home Energy Squad - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S120	19.1	100%	100%	100%	100%							28	35	44			
Low Income Home Energy Squad - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S121	19.1	100%	100%	100%	100%							28	36	44			
Low Income Home Energy Squad - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	344	0.025	0.0	$30.71	MN-RES-SFWHT	Res	Electric Only	Combo	S122	19.1	100%	100%	100%	100%							2	3	3			
Low Income Home Energy Squad - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S157	19.1	100%	100%	100%	100%										318	397	497
Low Income Home Energy Squad - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.50	$3.50	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S158	19.1	100%	100%	100%	100%										114	143	179
Low Income Home Energy Squad - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S159	19.1	100%	100%	100%	100%										94	118	147
Low Income Home Energy Squad - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$9.50	$9.50	0	0.000	1.5	$30.71		Res	Gas Only	Combo	S160	19.1	100%	100%	100%	100%										15	19	23
Low Income Home Energy Squad - MN	Water Heater DR	Demand response capability on grid enabled electric resistance water heater	Demand response from electric resistance water heater	No management of water heater time of use	1	$100.00	$200.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	S183	19.2	100%	100%	100%	100%							2	3	3			
Low Income Home Energy Squad - MN	Electric Water Heater Setback	Electric Water Heater Setback	setback WH setpoint to 120 F	Existing WH at setpoint of 130 F	8	$0.00	$0.00	94	0.011	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S193	19.2	100%	100%	100%	100%							2	3	3			
Low Income Home Energy Squad - MN	Gas Water Heater Setback	Gas Water Heater Setback	setback WH setpoint to 120 F	Existing WH at setpoint of 130 F	8	$0.00	$0.00			0.4	$0.00		RES	Gas Only	Combo	S194	19.2	100%	100%	100%	100%										163	204	255
Low Income Home Energy Squad - MN	Water Heater Pipe Insulation	Water Heater Pipe Insulation - ER water heater	R-2 Pipe insulation added to 6ft after water heater	Bare pipe	13	$21.78	$21.78	277	0.032	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	S272	19.5	100%	100%	100%	100%							20	25	31			
Low Income Home Energy Squad - MN	Water Heater Pipe Insulation	Water Heater Pipe Insulation - Gas water heater	R-2 Pipe insulation added to 6ft after water heater	Bare pipe	13	$21.78	$21.78	0	0.000	14.7	$0.00	MN-RES-FLAT	Res	Gas Only	Combo	S273	19.5	100%	100%	100%	100%										8	10	13
Low Income Multi-Family Building Efficiency - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$18.00	$18.00	68	0.009	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A074	1.5	100%	100%	100%	100%	705	740	777				1,410	1,481	1,555			
Low Income Multi-Family Building Efficiency - MN	Refrigerator Recycling	Freezer Removal and Recycling	Removal of freezer	Existing primary unit - age mostly >10 years	7	$50.00	$50.00	943	0.051	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A078	1.11	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Primary Refrigerator	Existing Primary Unit - age mostly > 15 years	8	$50.00	$50.00	851	0.108	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A107	1.11	100%	100%	100%	100%	1	2	2				5	6	7			
Low Income Multi-Family Building Efficiency - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Secondary Refrigerator	Existing Secondary Unit - age mostly > 15 years	8	$50.00	$50.00	1,095	0.097	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A079	1.11	100%	100%	100%	100%	1	2	2				4	6	9			
Low Income Multi-Family Building Efficiency - MN	ENERGY STAR Refrigerator	Freezer Replacement	ENERGY STAR ® Freezers	Industry Standard	11	$347.94	$347.94	43	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A082	1.9	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$823.87	$823.87	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A084	1.9	100%	100%	100%	100%	800	1,000	1,100				800	1,000	1,100			
Low Income Multi-Family Building Efficiency - MN	Business Saver's Switch	Commercial AC Switch Single Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	2	1.208	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T027	4.3	100%	100%	100%	100%	-	-	-				-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	Business Saver's Switch	Commercial AC Switch Multi Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	4	2.703	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T028	4.3	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	AC Rewards - Business	Business Smart Thermostat - DR Direct Install	New Installation of DR Capable Smart Thermostat	Non communicating thermostat	5	$255.00	$255.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T034	4.4	100%	100%	100%	100%	2	2	2				4	4	4			
Low Income Multi-Family Building Efficiency - MN	AC Rewards - Business	Business Smart Thermostat - BYOT	Existing Dispatchable Device	Non communicating thermostat	5	$100.00	$100.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T035	4.4	100%	100%	100%	100%	1	1	1				2	4	5			
Low Income Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & GAS	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	7.7	$0.00	MN-BUS-COOL_OUT	BUS	Combo	Combo	T036	4.4	100%	100%	100%	100%	2	2	2	2	2	2	6	6	6	6	6	6
Low Income Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC ONLY	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T037	4.4	100%	100%	100%	100%	2	2	2				6	6	6	6	6	6
Low Income Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	865	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T038	4.4	100%	100%	100%	100%	-	-	-				-	-	-	1	2	2
Low Income Multi-Family Building Efficiency - MN	Custom Electric Low Income Multi-Family Building Efficiency Project	Custom Electric LI MFBE	Efficient Equipment	Inefficient Equipment	17	$959.11	$4,466.44	11,814	1.368	0.0	-$49.19	MN-RES-FLAT	BUS	Electric Only	Electric Only	G037	7.1	100%	100%	100%	100%	2	2	2				2	2	2	-	-	-
Low Income Multi-Family Building Efficiency - MN	Custom Gas Low Income Multi-Family Building Efficiency Project	Custom Gas LI MFBE	Efficient Equipment	Inefficient Equipment	20	$2,750.17	$77,971.67	0	0.000	5,500.3	$0.00		BUS	Gas Only	Gas Only	G038	7.1	100%	100%	100%	100%				2	2	2	-	-	-	2	2	2
Low Income Multi-Family Building Efficiency - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I088	8.4	100%	100%	100%	100%	4	5	5				8	9	10			
Low Income Multi-Family Building Efficiency - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I089	8.4	100%	100%	100%	100%	4	5	5				8	9	10			
Low Income Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I090	8.4	100%	100%	100%	100%	3	3	4	3	3	4	5	6	7	5	6	7
Low Income Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	0	0.000	1.8	$0.00		Res	Gas Only	Combo	I091	8.4	100%	100%	100%	100%	2	2	2				3	3	3			
Low Income Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I092	8.4	100%	100%	100%	100%	2	2	2				3	3	3			
Low Income Multi-Family Building Efficiency - MN	Renter Kit Window Film - Gas Heating Only	Window film in homes with gas heating	Window with seasonal window film installed	Untreated window	1	$0.00	$0.00	0	0.000	0.1	$0.00		Res	Gas Only	Combo	I093	8.5	100%	100%	100%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Cooling Project	Efficient Cooling Equipment	Baseline System	20	$1,650.67	$2,827.00	1,229	1.554			MN-BUS-COOLING	BUS	Electric Only	Combo	J028	9.1	100%	100%	100%	100%	1	1	1				1	1	1			
Low Income Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Lighting Project	LED Lighting	Old System	16	$385.85	$1,742.82	4,783	0.385		-$8.21	MN-BUS-LITE_CI_	BUS	Electric Only	Combo	J029	9.1	100%	100%	100%	100%	2	3	3				4	6	8			
Low Income Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Motor Project	Efficient Motors & Drives	Old System	15	$58.33	$196.15	2,431				MN-BUS-MOTORASD	BUS	Electric Only	Combo	J030	9.1	100%	100%	100%	100%	2	3	3				8	10	11			
Low Income Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Electric Heating Project	Efficient Heating Equipment	Old System	10	$96.00	$96.00	11,454	0.024		$326.45	MN-BUS-FLAT	BUS	Electric Only	Combo	J031	9.1	100%	100%	100%	100%	1	2	3				1	2	3			
Low Income Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Gas Heating Project	Efficient Heating Equipment	Old System	10	$473.56	$1,513.02			60.7			BUS	Gas Only	Combo	J032	9.1	100%	100%	100%	100%				2	4	6				2	4	6
Low Income Multi-Family Building Efficiency - MN	Home Lighting DI	Replace screw-in CFL within tenant units with LEDs	LED Bulbs	Removed CFL Lamp	20	$5.50	$5.50	8	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K052	13.1	100%	100%	100%	100%	64	70	85				640	700	850	-	-	-
Low Income Multi-Family Building Efficiency - MN	Home Lighting DI	Replace screw-in incandescents within tenant units with LEDs	LED Bulbs	Existing Incandescent Bulb	19	$4.97	$4.97	15	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K053	13.1	100%	100%	100%	100%	640	700	850				6,400	7,000	8,500	-	-	-
Low Income Multi-Family Building Efficiency - MN	Home Lighting DI	LED Nightlight	LED Nightlight	Incandescent Nightlight	8	$1.40	$1.40	30	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K054	13.1	100%	100%	100%	100%	10	12	13				100	125	130	-	-	-
Low Income Multi-Family Building Efficiency - MN	Home Lighting DI	Renter Kit 9W LED	9W LED	Existing Incandescent Bulb	18	$4.80	$4.80	10	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K058	13.1	100%	100%	92%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Home Lighting DI	Renter Kit 11W LED	11W LED	Existing Incandescent Bulb	18	$5.00	$5.00	12	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K059	13.1	100%	100%	92%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - GWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$31.88	$31.88	0	0.000	2.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	M101	12.7	100%	100%	100%	100%				40	50	53				200	250	263
Low Income Multi-Family Building Efficiency - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - EWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$57.38	$57.38	506	0.099	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Combo	M104	12.7	100%	100%	100%	100%	4	5	5				4	5	5			
Low Income Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Combo Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Combo	M111	12.17	100%	100%	100%	100%	8	9	10	8	9	10	15	17	19	15	17	19
Low Income Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Electric Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Electric Only	M112	12.17	100%	100%	100%	100%	8	9	10				15	17	19			
Low Income Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Gas Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Gas Only	M113	12.17	100%	100%	100%	100%				5	6	6				10	11	12
Low Income Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC ONLY	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M114	12.17	100%	100%	100%	100%	3	3	4				5	6	7			
Low Income Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & ELEC HEAT	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	314	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M115	12.17	100%	100%	100%	100%	3	3	4				5	6	7			
Low Income Multi-Family Building Efficiency - MN	Lighting DI	Replace screw-in incandescents in common areas with screw-in LEDs	LED Bulbs	Existing Incandescent Bulb	4	$5.00	$5.00	284	0.042	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B202	13.5	100%	100%	100%	100%	40	50	60				800	1,000	1,500			
Low Income Multi-Family Building Efficiency - MN	Lighting DI	Replace screw-in CFLs in common areas with screw-in LEDs	LED Bulbs	Existing CFL Bulb	4	$4.85	$4.85	218	0.033	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B203	13.5	100%	100%	100%	100%	4	5	6				80	100	150			
Low Income Multi-Family Building Efficiency - MN	Lighting DI	Replace fluorescent tubes in common areas with LED tubes - 2ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$6.50	$6.50	44	0.005	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B208	13.5	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Lighting DI	Replace fluorescent tubes in common areas with LED tubes - 4ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$13.00	$13.00	114	0.013	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B209	13.5	100%	100%	100%	100%	52	60	69				520	598	688			
Low Income Multi-Family Building Efficiency - MN	Wall AC	Wall Air Conditioner Replacement	Average Energy Star Wall AC w/o Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$706.69	$706.69	58	0.071	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U168	17.11	100%	100%	100%	100%	500	600	700				500	600	700			
Low Income Multi-Family Building Efficiency - MN	Room Air Conditioner Recycling	Wall Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	Existing Window AC Unit	5	$40.75	$40.75	642	0.781	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U169	17.11	100%	100%	100%	100%	500	600	700				500	600	700			
Low Income Multi-Family Building Efficiency - MN	Window AC	Window Air Conditioner Replacement	Average Energy Star Window AC with Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$443.12	$443.12	54	0.066	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U170	17.11	100%	100%	100%	100%	30	40	50				60	80	100			
Low Income Multi-Family Building Efficiency - MN	Room Air Conditioner Recycling	Window Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr Window AC Unit	Existing Window AC Unit	5	$40.75	$40.75	591	0.720	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U171	17.11	100%	100%	100%	100%	30	40	50				60	80	100			
Low Income Multi-Family Building Efficiency - MN	Res MSHP	Non-ducted Multi-Split Heat Pump w/ Electric Resistance baseline	Residential Mini-Split Heat Pump (Nominal 1.8 Tons with 18.9 SEER2, 12.9 EER2, 10.2 HSPF2) with electric resistance heat backup	Spot Cooling Solution needed with Exsisting Electric Resistance Heating	15	$506.11	$506.11	5,959	0.196	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U176	17.4	100%	100%	100%	100%	30	35	40				60	70	80			
Low Income Multi-Family Building Efficiency - MN	Res ASHP	Centrally ducted ASHP Cooling size basis w/ER baseline	Quality Installation of Qualifying ASHP sized for Cooling Load - 2 Ton 16 SEER2 & 12 EER2 & 9 HSPF2 with existing ER heat backup	Non-Quality Installation of 13.4 SEER2 AC Sized at 2 tons in home with existing electric resistance heat	18	$9,942.00	$9,942.00	5,329	0.532	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U177	17.3	100%	100%	100%	100%	10	12	13				10	12	13			
Low Income Multi-Family Building Efficiency - MN	EFS - Res ASHP Cooling	Centerally ducted dual fuel ASHP	Cooling Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$5,373.17	$5,373.17	371	0.122	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U180	17.3	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$5,373.17	$5,373.17	-4,768	0.000	40.1	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U181	17.3	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	Res ccASHP	Centerally ducted cold climate ASHP w/ electric resistance baseline	Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 8.1 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$11,011.81	$11,011.81	8,190	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Electric Only	Combo	U182	17.12	100%	100%	100%	100%	-	-	-				-	-	-			

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Low Income Multi-Family Building Efficiency - MN	Res ccMSHP	Non-ducted cold climate Multi-Split Heat Pump w/ Electric Resistance Heat backup	Installation of Cold Climate Mini-Split Heat Pump (2.75 Tons 20.5 SEER2, 13.3 EER2, 11.5 HSPF2) with 3 indoor heads and Electric Resistance heat backup	Installation of comparable size code minimum AC with Exsisting Electric Resistance Heating	15	$9,255.48	$9,255.48	11,471	0.656	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U184	17.13	100%	100%	100%	100%	5	10	15				5	10	15			
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccMSHP Cooling	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Cooling Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$5,393.09	$5,393.09	269	0.013	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U221	17.13	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$5,393.09	$5,393.09	-4,402	0.000	39.6	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U222	17.13	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	EFS - Res MSHP Cooling	Non-ducted dual fuel MSHP w/ gas furnace backup	Cooling Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	15	$3,427.65	$3,427.65	360	0.381	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U223	17.4	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	15	$3,427.65	$3,427.65	-2,002	0.000	23.2	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U224	17.4	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccASHP Cooling	Centerally ducted dual fuel cold climate ASHP	Cooling Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$9,741.82	$9,741.82	195	0.413	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Combo	Combo	U225	17.12	100%	100%	100%	100%	2.0	3.0	5.0	1.0	2.0	1.0	2	3	5	1.00	2.00	2.00
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$9,741.82	$9,741.82	-5,559	0.000	44.4	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U226	17.12	100%	100%	100%	100%	1.0	2.0	1.0	1.0	1.0	2.0	1	2	1	1.00	1.00	2.00
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	98	0.014	0.0	$7.39	MN-RES-SFWHT	Res	Electric Only	Combo	S224	19.1	100%	100%	100%	100%	40	44	48	-	-	-	40	44	48			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S225	19.1	100%	100%	100%	100%	73	80	88				73	80	88			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S226	19.1	100%	100%	100%	100%	73	80	88				73	80	88			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S227	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S228	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	98	0.014	0.0	$7.39	MN-RES-SFWHT	Res	Electric Only	Combo	S229	19.1	100%	100%	60%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Aerators - EWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S230	19.1	100%	100%	60%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	0	0.000	0.4	$7.39		Res	Gas Only	Combo	S231	19.1	100%	100%	100%	100%				229	252	277				229	252	277
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S232	19.1	100%	100%	100%	100%				436	480	528				436	480	528
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S233	19.1	100%	100%	100%	100%				145	160	176				145	160	176
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S234	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S235	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	0	0.000	0.4	$7.39		Res	Gas Only	Combo	S236	19.1	100%	100%	60%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Aerators - GWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S237	19.1	100%	100%	60%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S238	19.1	100%	100%	100%	100%	-	-	-				40	44	48			
Low Income Multi-Family Building Efficiency - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S239	19.1	100%	100%	100%	100%	-	-	-				13	14	15			
Low Income Multi-Family Building Efficiency - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S240	19.1	100%	100%	100%	100%	-	-	-				5	6	7			
Low Income Multi-Family Building Efficiency - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S241	19.1	100%	100%	100%	100%	-	-	-				2	2	2			
Low Income Multi-Family Building Efficiency - MN	Showerheads - EWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S242	19.1	100%	100%	65%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S243	19.1	100%	100%	100%	100%				158	174	191				158	174	191
Low Income Multi-Family Building Efficiency - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S244	19.1	100%	100%	100%	100%				53	58	64				53	58	64
Low Income Multi-Family Building Efficiency - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S245	19.1	100%	100%	100%	100%				20	22	24				20	22	24
Low Income Multi-Family Building Efficiency - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S246	19.1	100%	100%	100%	100%				7	8	9				7	8	9
Low Income Multi-Family Building Efficiency - MN	Showerheads - GWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S247	19.1	100%	100%	65%	100%				-	-	-				-	-	-
Low Income Multi-Family Building Efficiency - MN	Water Heater Setback	Water Heater Setback	Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00	4,875	0.556			MN-RES-SFWHT	RES	Electric Only	Combo	S248	19.2	100%	100%	100%	100%	-	-	-				-	-	-			
Low Income Multi-Family Building Efficiency - MN	Water Heater Setback	Water Heater Setback	Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00	4,875	0.556			MN-RES-SFWHT	RES	Electric Only	Combo	S249	19.2	100%	100%	100%	100%	-	1	1				2	3	3			
Multi-Family Building Efficiency - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$18.00	$18.00	68	0.009	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A005	1.5	100%	100%	100%	100%	3,000	3,500	4,000	-	-	-	6,000	7,000	8,000			
Multi-Family Building Efficiency - MN	Refrigerator Recycling	Freezer Removal and Recycling	Removal of freezer	Existing primary unit - age mostly >10 years	7	$50.00	$50.00	943	0.108	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A076	1.11	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Multi-Family Building Efficiency - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Secondary Refrigerator	Existing Secondary Unit - age mostly > 15 years	8	$50.00	$50.00	1,095	0.125	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A077	1.11	100%	100%	100%	100%	1	2	3	-			5	6	7	-	-	-
Multi-Family Building Efficiency - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Primary Refrigerator	Existing Primary Unit - age mostly > 15 years	8	$50.00	$50.00	851	0.097	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A105	1.11	100%	100%	100%	100%	4	5	6	-	-	-	50	60	70			
Multi-Family Building Efficiency - MN	Business Saver's Switch	Commercial AC Switch Single Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	2	1.208	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T017	4.3	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-			
Multi-Family Building Efficiency - MN	Business Saver's Switch	Commercial AC Switch Multi Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	4	2.703	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T018	4.3	100%	100%	100%	100%	-	-	-	-	-	-	5	8	10			
Multi-Family Building Efficiency - MN	AC Rewards - Business	Business Smart Thermostat - DR Direct Install	New Installation of DR Capable Smart Thermostat	Non communicating thermostat	5	$255.00	$255.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T029	4.4	100%	100%	100%	100%	10	20	25	-	-	-	20	40	50			
Multi-Family Building Efficiency - MN	AC Rewards - Business	Business Smart Thermostat - BYOT	Existing Dispatchable Device	Non communicating thermostat	5	$100.00	$100.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T030	4.4	100%	100%	100%	100%	10	20	25				20	40	50			
Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & GAS	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	7.7	$0.00	MN-BUS-COOL_OUT	BUS	Combo	Combo	T031	4.4	100%	100%	100%	100%	5	5	6	5	5	6	20	21	22	20	21	22
Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC ONLY	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T032	4.4	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-			
Multi-Family Building Efficiency - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	865	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T033	4.4	100%	100%	100%	100%	3	4	5	-	-	-	13	16	17			
Multi-Family Building Efficiency - MN	Custom Electric Multi-Family Building Efficiency Project	Custom Electric MFBE	Efficient Equipment	Inefficient Equipment	17	$959.11	$4,466.44	11,814	1.368	0.0	-$49.19	MN-RES-FLAT	BUS	Electric Only	Electric Only	G012	7.1	100%	100%	100%	100%	3	4	5	-	-	-	3	4	5			
Multi-Family Building Efficiency - MN	Custom Gas Multi-Family Building Efficiency Project	Custom Gas MFBE	Efficient Equipment	Inefficient Equipment	20	$2,750.17	$77,971.67	0	0.000	5,500.3	$0.00		BUS	Gas Only	Gas Only	G013	7.1	100%	100%	100%	100%				5	7	8				5	7	8
Multi-Family Building Efficiency - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I082	8.4	100%	100%	100%	100%	0	0	0	-	-	-	1	1	1			
Multi-Family Building Efficiency - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I083	8.4	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-			
Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I084	8.4	100%	100%	100%	100%	10	13	16	10	13	16	40	50	63	40	50	63
Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	0	0.000	1.8	$0.00		Res	Gas Only	Combo	I085	8.4	100%	100%	100%	100%	-	-	-	1	1	2				1	1	2
Multi-Family Building Efficiency - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$30.00	$30.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I086	8.4	100%	100%	100%	100%	3	4	5	-	-	-	3	4	5			
Multi-Family Building Efficiency - MN	Renter Kit Window Film - Gas Heating Only	Window film in homes with gas heating	Window with seasonal window film installed	Untreated window	1	$0.00	$0.00	0	0.000	0.1	$0.00		Res	Gas Only	Combo	I087	8.5	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-			
Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Cooling Project	Efficient Cooling Equipment	Baseline System	20	$1,650.67	$2,827.00	1,229	1.554			MN-BUS-COOLING	BUS	Electric Only	Combo	J023	9.1	100%	100%	100%	100%	5	10	15	-	-	-	5	10	15			
Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Lighting Project	LED Lighting	Old System	16	$385.85	$1,742.82	4,783	0.385		-$8.21	MN-BUS-LITE_CI_	BUS	Electric Only	Combo	J024	9.1	100%	100%	100%	100%	28	33	36	-	-	-	28	33	36			
Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Motor Project	Efficient Motors & Drives	Old System	15	$58.33	$196.15	2,431				MN-BUS-MOTORASD	BUS	Electric Only	Combo	J025	9.1	100%	100%	100%	100%	8	10	12				8	10	12			
Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Electric Heating Project	Efficient Heating Equipment	Old System	10	$96.00	$96.00	11,454	0.024		$326.45	MN-BUS-FLAT	BUS	Electric Only	Combo	J026	9.1	100%	100%	100%	100%	10	15	30	-	-	-	10	15	30			
Multi-Family Building Efficiency - MN	Multi-Family Prescriptive	Average Gas Heating Project	Efficient Heating Equipment	Old System	10	$473.56	$1,513.02			60.7			BUS	Gas Only	Combo	J027	9.1	100%	100%	100%	100%	-	-	-	18	20	22				18	20	22
Multi-Family Building Efficiency - MN	Home Lighting DI	Renter Kit 11W LED	11W LED	Existing Incandecent Bulb	18	$5.00	$5.00	12	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K037	13.1	100%	100%	92%	100%	1	1	1	-	-	-	2	3	3			
Multi-Family Building Efficiency - MN	Home Lighting DI	Renter Kit 9W LED	9W LED	Existing Incandecent Bulb	18	$4.80	$4.80	10	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K038	13.1	100%	100%	92%	100%	1	1	1	-	-	-	2	3	3			
Multi-Family Building Efficiency - MN	Home Lighting DI	Replace screw-in CFL within tenant units with LEDs	LED Bulbs	Removed CFL Lamp	20	$5.50	$5.50	8	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K039	13.1	100%	100%	100%	100%	320	352	387	-	-	-	3,200	3,520	3,872			
Multi-Family Building Efficiency - MN	Home Lighting DI	Replace screw-in incandescents within tenant units with LEDs	LED Bulbs	Existing Incandecent Bulb	19	$4.97	$4.97	15	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K040	13.1	100%	100%	100%	100%	3,200	3,520	3,872	-	-	-	32,000	35,200	38,720			
Multi-Family Building Efficiency - MN	Home Lighting DI	LED Nightlight	LED Nightlight	Incandecent Nightlight	8	$1.40	$1.40	30	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K041	13.1	100%	100%	100%	100%	640	704	774	-	-	-	6,400	7,400	7,700			
Multi-Family Building Efficiency - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - GWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$31.88	$31.88	0	0.000	2.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	M100	12.7	100%	100%	100%	100%				1	1	1				2	3	5

Measure Description					Economic Assumptions									Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Multi-Family Building Efficiency - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - EWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$57.38	$57.38	506	0.099	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Combo	M103	12.7	100%	100%	100%	100%	1	1	1	-	-	-	2	3	5			
Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Combo Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Combo	M106	12.17	100%	100%	100%	100%	12	13	14	12	13	14	23	25	28	23	25	28
Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Electric Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Electric Only	M107	12.17	100%	100%	100%	100%	12	13	14				23	25	28			
Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Gas Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Gas Only	M108	12.17	100%	100%	100%	100%				8	9	10				15	17	19
Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC ONLY	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M109	12.17	100%	100%	100%	100%	4	5	6				20	25	30			
Multi-Family Building Efficiency - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & ELEC HEAT	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	314	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M110	12.17	100%	100%	100%	100%	4	5	6				20	25	30			
Multi-Family Building Efficiency - MN	Lighting DI	Replace screw-in incandescents in common areas with screw-in LEDs	LED Bulbs	Existing Incandescent Bulb	4	$5.00	$5.00	284	0.036	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B198	13.5	100%	100%	100%	100%	200	250	300	-	-	-	4,000	5,000	7,500	-	-	-
Multi-Family Building Efficiency - MN	Lighting DI	Replace screw-in CFLs in common areas with screw-in LEDs	LED Bulbs	Existing CFL Bulb	4	$4.85	$4.85	218	0.028	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B199	13.5	100%	100%	100%	100%	20	25	30	-	-	-	400	500	750	-	-	-
Multi-Family Building Efficiency - MN	Lighting DI	Replace fluorescent tubes in common areas with LED tubes - 2ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$6.50	$6.50	44	0.005	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B206	13.5	100%	100%	100%	100%	-	-	-				-	-	-			
Multi-Family Building Efficiency - MN	Lighting DI	Replace fluorescent tubes in common areas with LED tubes - 4ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$13.00	$13.00	114	0.013	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B207	13.5	100%	100%	100%	100%	104	120	138				1,040	1,196	1,376			
Multi-Family Building Efficiency - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	98	0.014	0.0	$7.39	MN-RES-SFWHT	Res	Electric Only	Combo	S025	19.1	100%	100%	100%	100%	40	44	49				80	88	97			
Multi-Family Building Efficiency - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S026	19.1	100%	100%	100%	100%	57	62	68				113	124	136			
Multi-Family Building Efficiency - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S027	19.1	100%	100%	100%	100%	51	56	62				102	112	123			
Multi-Family Building Efficiency - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S028	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Multi-Family Building Efficiency - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S029	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Multi-Family Building Efficiency - MN	Aerators - EWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$0.00	$0.00	98	0.014	0.0	$7.39	MN-RES-SFWHT	Res	Electric Only	Combo	S030	19.1	100%	100%	60%	100%	6	6	7				11	12	13			
Multi-Family Building Efficiency - MN	Aerators - EWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.00	$0.00	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S031	19.1	100%	100%	60%	100%	-	-	-				-	-	-			
Multi-Family Building Efficiency - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	0	0.000	0.4	$7.39		Res	Gas Only	Combo	S052	19.1	100%	100%	100%	100%				227	250	275				454	499	549
Multi-Family Building Efficiency - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S053	19.1	100%	100%	100%	100%				340	374	412				680	748	823
Multi-Family Building Efficiency - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S054	19.1	100%	100%	100%	100%				108	119	131				215	237	261
Multi-Family Building Efficiency - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S055	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Multi-Family Building Efficiency - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S056	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Multi-Family Building Efficiency - MN	Aerators - GWH	Renter Kit Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$0.00	$0.00	0	0.000	0.4	$7.39		Res	Gas Only	Combo	S057	19.1	100%	100%	60%	100%				6	6	7				11	12	13
Multi-Family Building Efficiency - MN	Aerators - GWH	Renter Kit Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.00	$0.00	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S058	19.1	100%	100%	60%	100%				-	-	-				-	-	-
Multi-Family Building Efficiency - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S123	19.1	100%	100%	100%	100%	55	61	67	-	-	-	110	121	133			
Multi-Family Building Efficiency - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S124	19.1	100%	100%	100%	100%	19	21	23	-	-	-	37	41	45			
Multi-Family Building Efficiency - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S125	19.1	100%	100%	100%	100%	55	61	67	-	-	-	110	121	133			
Multi-Family Building Efficiency - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S126	19.1	100%	100%	100%	100%	9	10	11	-	-	-	18	20	22			
Multi-Family Building Efficiency - MN	Showerheads - EWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S127	19.1	100%	100%	65%	100%	9	10	11	-	-	-	18	20	22			
Multi-Family Building Efficiency - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S161	19.1	100%	100%	100%	100%	-	-	-	220	242	266				439	483	531
Multi-Family Building Efficiency - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S162	19.1	100%	100%	100%	100%	-	-	-	73	81	89				146	161	177
Multi-Family Building Efficiency - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S163	19.1	100%	100%	100%	100%				220	242	266				439	483	531
Multi-Family Building Efficiency - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S164	19.1	100%	100%	100%	100%				33	37	40				66	73	80
Multi-Family Building Efficiency - MN	Showerheads - GWH	Renter Kit Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S165	19.1	100%	100%	65%	100%				4	4	5				7	8	9
Multi-Family Building Efficiency - MN	Water Heater Setback	Electric Water Heater Setback	Electrically heated Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00	4,875	0.556		$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S195	19.2	100%	100%	100%	100%	1	2	3				10	15	20			
Multi-Family Building Efficiency - MN	Water Heater Setback	Gas Water Heater Setback	Gas heated Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00			25.9	$0.00		RES	Gas Only	Combo	S196	19.2	100%	100%	100%	100%				2	3	4				10	15	20
Nonprofit Energy Savings Program - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$20.00	$20.00	68	0.009	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A075	1.5	100%	100%	75%	100%	100	120	140				200	240	280			
Nonprofit Energy Savings Program - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Primary Refrigerator	Existing Primary Unit - age mostly > 15 years	8	$50.00	$50.00	851	0.097	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A109	1.11	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	Refrigerator Recycling	Freezer Removal and Recycling	Removal of freezer	Existing primary unit - age mostly >10 years	7	$50.00	$50.00	943	0.108	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A080	1.11	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Secondary Refrigerator	Existing Secondary Unit - age mostly > 15 years	8	$50.00	$50.00	1,095	0.125	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A081	1.11	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	ENERGY STAR Refrigerator	Freezer Replacement	ENERGY STAR ® Freezers	Industry Standard	11	$347.94	$347.94	43	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A083	1.9	100%	100%	100%	100%	3	4	5				3	4	5			
Nonprofit Energy Savings Program - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$823.87	$823.87	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A085	1.9	100%	100%	100%	100%	13	25	36				25	50	75			
Nonprofit Energy Savings Program - MN	Business Saver's Switch	Commercial AC Switch Single Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	2	1.208	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T023	4.3	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Business Saver's Switch	Commercial AC Switch Multi Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	4	2.703	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T024	4.3	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	AC Rewards - Business	Business Smart Thermostat - DR Direct Install	New Installation of DR Capable Smart Thermostat	Non communicating thermostat	5	$255.00	$255.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T039	4.4	100%	100%	100%	100%	8	10	13				8	10	13			
Nonprofit Energy Savings Program - MN	AC Rewards - Business	Business Smart Thermostat - BYOT	Existing Dispatchable Device	Non communicating thermostat	5	$100.00	$100.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T040	4.4	100%	100%	100%	100%	8	10	13				8	10	13			
Nonprofit Energy Savings Program - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & GAS	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$110.00	$110.00	333	0.000	7.7	$0.00	MN-BUS-COOL_OUT	BUS	Combo	Combo	T041	4.4	100%	100%	100%	100%	-	1	1	-	1	1	-	1	1	-	1	1
Nonprofit Energy Savings Program - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC ONLY	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$110.00	$110.00	333	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T042	4.4	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$110.00	$110.00	865	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T043	4.4	100%	100%	100%	100%	-	1	1				-	1	1			
Nonprofit Energy Savings Program - MN	Custom Electric Nonprofit Building Efficiency Project	Custom Electric NESP	Efficient Equipment	Inefficient Equipment	17	$959.11	$4,466.44	11,814	1.368	0.0	-$49.19	MN-RES-FLAT	BUS	Electric Only	Electric Only	G039	7.1	100%	100%	100%	100%	3	6	9				3	6	9			
Nonprofit Energy Savings Program - MN	Custom Gas Nonprofit Building Efficiency Project	Custom Gas NESP	Efficient Equipment	Inefficient Equipment	20	$2,750.17	$77,971.67	0	0.000	5,500.3	$0.00		BUS	Gas Only	Gas Only	G040	7.1	100%	100%	100%	100%				3	6	9				3	6	9
Nonprofit Energy Savings Program - MN	Weatherstripping - Electric Heating and Cooling	Weatherstripping in homes with electric heating / electric cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$33.00	$33.00	322	0.012	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I094	8.4	100%	100%	100%	100%	1	2	3				1	2	3			
Nonprofit Energy Savings Program - MN	Weatherstripping - Electric Heating Only	Weatherstripping in homes with electric heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$33.00	$33.00	316	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I095	8.4	100%	100%	100%	100%	1	2	3				1	2	3			
Nonprofit Energy Savings Program - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for combo customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$33.00	$33.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I096	8.4	100%	100%	100%	100%	3	6	11	3	6	11	6	11	22	6	11	22
Nonprofit Energy Savings Program - MN	Weatherstripping - Gas Heating Only	Weatherstripping in homes with gas heating / no cooling	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$33.00	$33.00	0	0.000	1.8	$0.00		Res	Gas Only	Combo	I097	8.4	100%	100%	100%	100%				1	1	1				1	1	1
Nonprofit Energy Savings Program - MN	Weatherstripping - Gas Heating / Electric Cooling	Weatherstripping in homes with gas heating / electric cooling for electric-only customers	Weatherstripped door achieving 0.18 CFM/(linear ft of crack) leakage rate	Existing door with 0.55 CFM/(linear ft of crack) leakage rate	10	$33.00	$33.00	6	0.012	1.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Electric Only	I098	8.4	100%	100%	100%	100%	1	1	1				1	1	1			
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Cooling Project	Efficient Cooling Equipment	Baseline System	20	$1,650.67	$2,827.00	1,229	1.554			MN-BUS-COOLING	BUS	Electric Only	Combo	J043	9.1	100%	100%	100%	100%	3	6	9				3	6	9			
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Lighting Project	LED Lighting	Old System	16	$385.85	$1,742.82	4,783	0.385			MN-BUS-LITE_CI_	BUS	Electric Only	Combo	J044	9.1	100%	100%	100%	100%	6	12	18				6	12	18			
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Motor Project	Efficient Motors & Drives	Old System	15	$58.33	$196.15	2,431				MN-BUS-MOTORASD	BUS	Electric Only	Combo	J045	9.1	100%	100%	100%	100%	1	2	3	1	2	3	1	2	3	1	2	3
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Electric Heating Project	Efficient Heating Equipment	Old System	10	$96.00	$96.00	11,454	0.024			MN-BUS-FLAT	BUS	Electric Only	Combo	J046	9.1	100%	100%	100%	100%	2	4	6				2	4	6			
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Gas Heating Project	Efficient Heating Equipment	Old System	10	$473.56	$1,513.02			60.7			BUS	Gas Only	Combo	J049	9.1	100%	100%	100%	100%				10	15	20				10	15	20
Nonprofit Energy Savings Program - MN	Non-Profit Prescriptive	Average Foodservice Project	Efficient Foodservice Equipment	Old System	16	$784.04	$3,517.23	7,063	1.009	81.6	$54.61	MN-BUS-FLAT	BUS	Combo	Combo	J047	9.1	100%	100%	100%	100%	-	-	1	-	-	1	-	-	1	-	-	1
Nonprofit Energy Savings Program - MN	Home Lighting – LI Kit Giveaways	4 x 9W A-lamp	LED: 4 x 9W A lamp	Existing Incandecent Bulb	18	$4.26	$4.26	38	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K001	13.1	100%	100%	99%	100%	190,000	199,500	209,475	-	-	-	200,000	210,000	220,500			
Nonprofit Energy Savings Program - MN	Home Lighting – LI Kit Giveaways	LED Nightlight	LED Nightlight	Incandecent Nightlight	8	$1.40	$1.40	30	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K002	13.1	100%	100%	99%	100%	10,000	10,500	11,025	-	-	-	10,000	10,500	11,025			
Nonprofit Energy Savings Program - MN	Home Lighting DI	Replace screw-in CFL within tenant units with LEDs	LED Bulbs	Removed CFL Lamp	20	$5.50	$5.50	8	0.001	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K055	13.1	100%	100%	100%	100%	36	40	43				108	118	130			
Nonprofit Energy Savings Program - MN	Home Lighting DI	Replace screw-in incandescents within tenant units with LEDs	LED Bulbs	Existing Incandecent Bulb	19	$4.97	$4.97	15	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K056	13.1	100%	100%	100%	100%	36	40	43				108	118	130			
Nonprofit Energy Savings Program - MN	Home Lighting DI	LED Nightlight	LED Nightlight	Incandecent Nightlight	8	$1.40	$1.40	30	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K057	13.1	100%	100%	100%	100%	36	40	43				108	118	130			
Nonprofit Energy Savings Program - MN	Mini Split	Mini-Split Heat Pump	MSHP size 1.2 tons, 21.27 SEER, 10.50 HSPF	DX cooling, 1.2 tons, 13 SEER; ER heating, 3.412 HSPF	18	$3,439.53	$3,439.53	512	0.000	0.0	$0.00	MN-BUS-COOLING	Bus	Electric Only	Electric Only	L032	11.9	100%	100%	100%	100%	2	4	6				2	4	6			
Nonprofit Energy Savings Program - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - GWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$31.88	$31.88	0	0.000	2.2	$0.00	MN-BUS-FLAT	Bus	Gas Only	Combo	M102	12.7	100%	100%	100%	100%				18	20	24				18	20	24
Nonprofit Energy Savings Program - MN	Pipe Insulation	Pipe Insulation 120-150 Degree - Direct Install - EWH	6 ft of pipe with new insulation	6 ft of pipe with no or old insulation	13	$57.38	$57.38	506	0.099	0.0	$0.00	MN-BUS-FLAT	Bus	Electric Only	Combo	M105	12.7	100%	100%	100%	100%	2	3	4				2	3	4			
Nonprofit Energy Savings Program - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Combo Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Combo	M116	12.17	100%	100%	100%	100%	4	4	5	1	2	3	7	8	9	1	2	3
Nonprofit Energy Savings Program - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Electric Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Electric Only	M117	12.17	100%	100%	100%	100%	4	5	5				8	9	10			

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Nonprofit Energy Savings Program - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & GAS - Gas Only Customer	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	3.8	$0.00	MN-BUS-COOL_OUT	Bus	Combo	Gas Only	M118	12.17	100%	100%	100%	100%				1	2	3				1	2	3
Nonprofit Energy Savings Program - MN	Programmable Thermostats - DI	Install programmable thermostats - AC ONLY	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	48	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M119	12.17	100%	100%	100%	100%	2	2	2				3	3	3			
Nonprofit Energy Savings Program - MN	Programmable Thermostats - DI	Install programmable thermostats - AC & ELEC HEAT	Programmable thermostat	Existing manual thermostat	8	$35.00	$35.00	314	0.000	0.0	$0.00	MN-BUS-COOL_OUT	Bus	Electric Only	Combo	M120	12.17	100%	100%	100%	100%	1	1	1				2	2	2			
Nonprofit Energy Savings Program - MN	Lighting DI	Replace screw-in incandescents in common areas with screw-in LEDs	LED Bulbs	Existing Incandescent Bulb	4	$5.00	$5.00	284	0.042	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B204	13.5	100%	100%	100%	100%	100	125	131				200	250	262			
Nonprofit Energy Savings Program - MN	Lighting DI	Replace screw-in CFLs in common areas with screw-in LEDs	LED Bulbs	Existing Incandescent Bulb	4	$5.00	$5.00	284	0.042	0.0	$0.00	MN-BUS-Light Screw In	BUS	Electric Only	Electric Only	B205	13.5	100%	100%	100%	100%	10	12	13				20	25	26			
Nonprofit Energy Savings Program - MN	Lighting DI	Replace fluorescent tubes with LED tubes - 2ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$6.50	$6.50	44	0.005	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B210	13.5	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Lighting DI	Replace fluorescent tubes with LED tubes - 4ft T8 Type A	Linear LED Tubes	Existing Fluorescent Tube	7	$13.00	$13.00	114	0.013	0.0	$0.00	MN-BUS-Light Tube	BUS	Electric Only	Electric Only	B211	13.5	100%	100%	100%	100%	500	600	720				1,000	1,200	1,440			
Nonprofit Energy Savings Program - MN	Wall AC	Wall Air Conditioner Replacement	Average Energy Star Wall AC w/o Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$706.69	$706.69	58	0.071	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U172	17.11	100%	100%	100%	100%	5	6	8				10	12	15			
Nonprofit Energy Savings Program - MN	Room Air Conditioner Recycling	Wall Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	Existing Window AC Unit	5	$40.75	$40.75	642	0.781	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U173	17.11	100%	100%	100%	100%	5	6	8				10	12	15			
Nonprofit Energy Savings Program - MN	Window AC	Window Air Conditioner Replacement	Average Energy Star Window AC with Louvers 10,000 Btu/hr 10.8 CEER Window AC Unit	Existing Window AC Unit	9	$443.12	$443.12	54	0.066	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U174	17.11	100%	100%	100%	100%	5	6	8				5	6	8			
Nonprofit Energy Savings Program - MN	Room Air Conditioner Recycling	Window Air Conditioner Removal and Recycling	Removal of Standard 10,000 Btu/hr Window AC Unit	Existing Window AC Unit	5	$40.75	$40.75	591	0.720	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U175	17.11	100%	100%	100%	100%	5	6	8				5	6	8			
Nonprofit Energy Savings Program - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	98	0.014	0.0	$7.39	MN-RES-SFWHT	Res	Electric Only	Combo	S197	19.1	100%	100%	100%	100%	1	2	2				1	2	2			
Nonprofit Energy Savings Program - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$2.86	$2.86	0	0.000	0.4	$7.39		Res	Gas Only	Combo	S198	19.1	100%	100%	100%	100%				30	50	60				90	108	130
Nonprofit Energy Savings Program - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S199	19.1	100%	100%	100%	100%	9	11	13				9	11	13			
Nonprofit Energy Savings Program - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S200	19.1	100%	100%	100%	100%				30	50	60				90	108	130
Nonprofit Energy Savings Program - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S201	19.1	100%	100%	100%	100%	2	3	13				2	3	13			
Nonprofit Energy Savings Program - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S202	19.1	100%	100%	100%	100%				10,000	11,000	12,100				10,000	11,000	12,100
Nonprofit Energy Savings Program - MN	Showerheads - EWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	604	0.044	0.0	$54.01	MN-RES-SFWHT	Res	Electric Only	Combo	S203	19.1	100%	100%	100%	100%	2	3	13				2	3	13			
Nonprofit Energy Savings Program - MN	Showerheads - GWH	Primary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	2.6	$54.01		Res	Gas Only	Combo	S204	19.1	100%	100%	100%	100%				5	8	25				10	15	50
Nonprofit Energy Savings Program - MN	Water Heater Setback	Electric Water Heater Setback	Electrically heated Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00	4,875	0.556	0.0	$0.00	MN-RES-SFWHT	Res	Electric Only	Combo	S205	19.2	100%	100%	100%	100%	1	2	3				1	2	3			
Nonprofit Energy Savings Program - MN	Water Heater Setback	Gas Water Heater Setback	Gas heated Building hot water system with setback	Building hot water system without setback	2	$30.00	$30.00	0	0.000	25.9	$0.00		Res	Gas Only	Combo	S206	19.2	100%	100%	100%	100%				10	20	30				10	20	30
Nonprofit Energy Savings Program - MN	Aerators - EWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S250	19.1	100%	100%	100%	100%	3	4	4				9	11	13			
Nonprofit Energy Savings Program - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	73	0.010	0.0	$6.50	MN-RES-SFWHT	Res	Electric Only	Combo	S251	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Aerators - EWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with electric DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	103	0.015	0.0	$9.21	MN-RES-SFWHT	Res	Electric Only	Combo	S252	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Aerators - GWH	Primary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S253	19.1	100%	100%	100%	100%				30	50	65				90	108	130
Nonprofit Energy Savings Program - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$1.48	$1.48	0	0.000	0.3	$6.50		Res	Gas Only	Combo	S254	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Nonprofit Energy Savings Program - MN	Aerators - GWH	Secondary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with natural gas DHW heater	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$4.00	$4.00	0	0.000	0.4	$9.21		Res	Gas Only	Combo	S255	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Nonprofit Energy Savings Program - MN	Showerheads - EWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S256	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Showerheads - EWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with electric DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	79	0.006	0.0	$7.04	MN-RES-SFWHT	Res	Electric Only	Combo	S257	19.1	100%	100%	100%	100%	-	-	-				-	-	-			
Nonprofit Energy Savings Program - MN	Showerheads - GWH	Secondary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$5.60	$5.60	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S258	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Nonprofit Energy Savings Program - MN	Showerheads - GWH	Secondary Handheld Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with natural gas DHW heater	1.5 GPM Handheld Showerhead	2.5 GPM Showerhead	10	$16.25	$16.25	0	0.000	0.3	$7.04		Res	Gas Only	Combo	S259	19.1	100%	100%	100%	100%				-	-	-				-	-	-
Nonprofit Energy Savings Program - MN	Showerheads	Foodbank Energy Efficiency Distribution - Primary Showerhead	1.5 GPM showerhead w/ mixed fuel type water heater	2.5 GPM showerhead w/ mixed fuel type water heater	10	$6.22	$6.22	37	0.003	2.4	$54.01	MN-RES-SFWHT	RES	Combo	Combo	S278	19.1	100%	100%	48%	100%	10,000	10,500	11,025	100,000	105,000	110,250	10,000	10,500	11,025	100,000	105,000	110,250
Outdoor Equipment - MN	Electric Lawn Mower	Push Lawn Mower - EFS between electric and gasoline fuel	Electric Push Lawn Mower	Gasoline Powered Push Lawn Mower	10	$75.00	$75.00	-26	0.000	6.9	$0.00	MN-RES-Lawn Mower	Res	Electrification - Gasoline	Electric Only	A098	1.12	100%	100%	100%	100%	450	450	450				450	450	450	450	450	450
Outdoor Equipment - MN	Electric Lawn Mower	Riding Lawn Mower - EFS between electric and gasoline fuel	Electric Riding Lawn Mower	Gasoline Powered Riding Lawn Mower	10	$200.00	$800.00	-140	0.000	20.0	$0.00	MN-RES-Lawn Mower	Res	Electrification - Gasoline	Electric Only	A099	1.12	100%	100%	100%	100%	50	50	50				50	50	50	50	50	50
Outdoor Equipment - MN	Electric Lawn Mower	Electric Commercial Lawn Mower	Electric Commercial Lawn Mower, Push	Gas Lawn Mower	10	$300.00	$75.00	-500	-0.050	150.0	$0.00	MN-BUS-Lawn Mower	BUS	Electrification - Gasoline	Electric Only	A111	1.13	100%	100%	100%	100%	45	45	45				45	45	45	45	45	45
Outdoor Equipment - MN	Electric Lawn Mower	Electric Commercial Lawn Mower	Electric Commercial Lawn Mower, Riding	Gas Lawn Mower	10	$800.00	$800.00	-1,750	-0.233	250.0	$0.00	MN-BUS-Lawn Mower	BUS	Electrification - Gasoline	Electric Only	A112	1.13	100%	100%	100%	100%	5	5	5				5	5	5	5	5	5
~~Outdoor Equipment - MN~~	~~Electric Bicycle~~	~~Electric Bicycle - EFS between electric and gasoline fuel~~	~~Electric Bicycle~~	~~Internal Combustion Vehicle~~	~~10~~	~~$400.00~~	~~$2,792.71~~	~~-43~~	~~-0.009~~	~~57.1~~	~~$114.40~~	~~MN-RES-E-Bike~~	~~Res~~	~~Electrification - Gasoline~~	~~Electric Only~~	~~A115~~	~~1.14~~	~~100%~~	~~100%~~	~~100%~~	~~100%~~	-	-	-				-	-	-	-	-	-
~~Outdoor Equipment - MN~~	~~Electric Bicycle~~	~~Electric Bicycle - EFS between electric and gasoline fuel - Income Qualified~~	~~Electric Bicycle~~	~~Internal Combustion Vehicle~~	~~10~~	~~$1,200.00~~	~~$2,792.71~~	~~-43~~	~~-0.009~~	~~57.1~~	~~$114.40~~	~~MN-RES-E-Bike~~	~~Res~~	~~Electrification - Gasoline~~	~~Electric Only~~	~~A116~~	~~1.14~~	~~100%~~	~~100%~~	~~100%~~	~~100%~~	-	-	-				-	-	-	-	-	-
Peak Partner Rewards - MN	Peak Partner Rewards	New Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$7,261.00	$0.00	1,357	226.213	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T009	4.2	100%	100%	100%	100%	15	25	25				40	45	50			
Peak Partner Rewards - MN	Peak Partner Rewards	Existing Participating Customer	Reduction of building electrical load by a program agreed upon amount when the electric grid experiences peak demand periods	No control	1	$7,261.00	$0.00	1,357	226.213	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T010	4.2	100%	100%	100%	100%	50	55	75				40	45	50			
Process & Commercial Efficiency - MN	Behavioral	Behavioral Changes	Behavior changes that reduce energy use	No change in behavior	3	$1,462.25	$0.00	189,195	38.119		$0.00	MN-BUS-RECOM	Bus	Electric Only	Electric Only	C003		100%	100%	100%	100%	1	2	2				1	2	2			
Process & Commercial Efficiency - MN	EDA	PE/CE Parent for gas EDA projects	More Efficient than Code Building	Code-Compliant Building	20	$15,693.46	$258,931.57	0	0.000	3,138.7	$0.00	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D008		100%	100%	100%	100%				5	6	6				5	6	6
Process & Commercial Efficiency - MN	EDA	PE/CE Parent for electric EDA projects	More Efficient than Code Building	Code-Compliant Building	20	$74,044.20	$232,412.19	513,074	106.876	0.0	$0.00	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D009		100%	100%	100%	100%	5	5	5				5	5	5			
Process & Commercial Efficiency - MN	EEB	PE/CE Parent for gas EEB projects	More Efficient than Code Building	Code-Compliant Building	20	$3,748.77	$11,816.06	0	0.000	484.5	$235.56	MN-BUS-CUSTOM	BUS	Gas Only	Gas Only	D022		100%	100%	100%	100%				6	7	7				6	7	7
Process & Commercial Efficiency - MN	EEB	PE/CE Parent for electric EEB projects	More Efficient than Code Building	Code-Compliant Building	20	$3,378.93	$13,738.63	42,814	8.874	0.0	$207.65	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	D023		100%	100%	100%	100%	5	5	5				5	5	5			
Process & Commercial Efficiency - MN	Custom Electric Process & Commercial Efficiency Project	Custom Electric PE/CE Project	New or Optimized System or Equipment	Old or less efficient systems or equipment	18	$15,075.21	$135,613.39	231,747	37.050	554.0	$23,099.47	MN-BUS-CUSTOM	BUS	Electric Only	Electric Only	G014	7.1	100%	100%	100%	100%	50	40	40				50	40	40			
Process & Commercial Efficiency - MN	Custom Gas Process & Commercial Efficiency Project	Custom Gas PE/CE Project	New or Optimized System or Equipment	Old or less efficient systems or equipment	12	$49,050.12	$328,629.14	0	0.000	10,066.8	$42,625.36		Bus	Gas Only	Gas Only	G015	7.1	100%	100%	100%	100%				12	11	11				12	11	11
Process & Commercial Efficiency - MN	Efficiency Controls Gas Project	Commercial Efficiency Controls Gas Project	New Building Controls	Old Building Controls	15	$4,005.47	$47,311.88	0	0.000	801.1	$1,195.19		Bus	Gas Only	Gas Only	G025	7.1	100%	100%	100%	100%				7	7	7				7	7	7
Process & Commercial Efficiency - MN	Efficiency Controls Electric Project	Commercial Efficiency Controls Electric Project	New Building Controls	Old Building Controls	15	$8,375.64	$52,277.85	170,777	2.244	0.0	$1,461.23	MN-BUS-RECM_OUT	Bus	Electric Only	Electric Only	G026	7.1	100%	100%	100%	100%	12	10	10				12	10	10			
Process & Commercial Efficiency - MN	Data Center Efficiency Implementation	CE Data Center Custom Project	High Efficiency Product/system	Less Efficient Product/Systems	20	$5,708.54	$86,625.00	146,829	7.547	0.0	$2,000.00	MN-BUS-Data Center Blend	Bus	Electric Only	Electric Only	G027	7.1	100%	100%	100%	100%	1	2	2				1	2	2			
Process & Commercial Efficiency - MN	Load Shifting	Equipment Based Load Shift	Equipment-based load shift to off peak hours	Unshifted peak load	15	$22,500.00	$50,000.00	0	50.000	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	G044	7.1	100%	100%	100%	100%	1	1	1				1	1	1			
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	98.6	$0.00	MN-BUS-CUSTOM	BUS	Beneficial Electrification	Combo	G049	7.1	100%	100%	100%	100%	2	2	2	2	2	2	2	2	2	2	2	2
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gasoline Equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	820.0	$0.00	MN-BUS-CUSTOM	BUS	Electrification - Gasoline	Combo	G054	7.1	100%	100%	100%	100%												
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Propane Equipment	Efficient electric equipment	20	$862.70	$12,000.00	-6,165	0.000	1,077.6	$0.00	MN-BUS-CUSTOM	BUS	Electrification - Propane	Combo	G055	7.1	100%	100%	100%	100%												
Process & Commercial Efficiency - MN	Process & Commercial Efficiency - MN	Average Cooling Project	More efficient cooling equipment	Baseline System	20	$2,966.07	$4,352.01	14,070	1.891	0.0	$0.00	MN-BUS-COOLING	BUS	Electric Only	Electric Only	J012	9.1	100%	100%	100%	100%	25	25	25				25	25	25			
Process & Commercial Efficiency - MN	Process & Commercial Efficiency - MN	Average Compressed Air/FSO Project	Optimized System	Old System	11	$4,987.86	$6,681.45	71,219	8.646	0.0	$38.17	MN-BUS-CUSTCAIR	BUS	Electric Only	Electric Only	J013	9.1	100%	100%	100%	100%	37	40	40				37	40	40			
Process & Commercial Efficiency - MN	Process & Commercial Efficiency - MN	Average Lighting Project	Optimized System	Old System	20	$6,332.44	$24,443.45	78,472	14.282	0.0	-$201.81	MN-BUS-LIGHTING	BUS	Electric Only	Electric Only	J014	9.1	100%	100%	100%	100%	500	400	350				500	400	350			
Process & Commercial Efficiency - MN	Process & Commercial Efficiency - MN	Average Motor Project	Optimized System	Old System	15	$10,536.68	$29,975.51	175,911	26.327	0.0	$0.00	MN-BUS-MOTORASD	BUS	Electric Only	Electric Only	J015	9.1	100%	100%	100%	100%	320	310	305				320	310	305			
Process & Commercial Efficiency - MN	Process & Commercial Efficiency - MN	Average Heating Project	New System	Old System	20	$2,354.60	$11,695.68	0	0.000	1,023.0	-$43.33		BUS	Gas Only	Gas Only	J016	9.1	100%	100%	100%	100%				20	20	20				20	20	20
Process & Commercial Efficiency - MN	Load Shifting	Average Load Shift Project	Load Shifted Operation	Existing Operation	1	$750.00	$0.00	0	25.000			MN-BUS-EIS Load Shift	BUS	Electric Only	Electric Only	J050	9.1	100%	100%	100%	100%	1	1	1				1	1	1			
Process & Commercial Efficiency - MN	CE	System Optimization and Annual Achievement Bonuses				$7,832.30	$0.00						BUS	Combo	Combo	R006		100%	100%	100%	100%	3	3	3	1	1	1	3	3	3	1	1	1
Process & Commercial Efficiency - MN	In-Depth Study	Study				$9,398.80	$11,009.90						BUS	Combo	Combo	R018		100%	100%	100%	100%	3	3	3	1	1	1	3	3	3	1	1	1
Process & Commercial Efficiency - MN	PE Bonuses	System Optimization and Annual Achievement Bonuses				$30,067.90	$0.00						BUS	Combo	Combo	R019		100%	100%	100%	100%	5	5	5	2	2	2	5	5	5	2	2	2
Process & Commercial Efficiency - MN	In-Depth Study	Beneficial Electrification Studies				$8,680.00	$21,148.00						BUS	Beneficial Electrification	Electric Only	R023		100%	100%	100%	100%	3	3	3	3	3	3	3	3	3			
Refrigerator Recycling - MN	Dehumidifier Recycling	Dehumidifier Removal and Recycling	Removal of dehumidifier	Existing dehumidifier	5	$0.00	$0.00	824	0.426	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	A006	1.1	100%	100%	100%	100%	-	-	-				-	-	-			
Refrigerator Recycling - MN	Refrigerator Recycling	Freezer Removal and Recycling	Removal of freezer	Existing primary unit - age mostly >10 years	7	$50.00	$50.00	943	0.108	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A056	1.11	100%	100%	100%	100%	1,400	1,420	1,440				1,400	1,420	1,440			
Refrigerator Recycling - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Primary Refrigerator	Existing Primary Unit - age mostly > 15 years	8	$50.00	$50.00	851	0.097	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A104	1.11	100%	100%	100%	100%	2,800	2,840	2,880				2,800	2,840	2,880			
Refrigerator Recycling - MN	Refrigerator Recycling	Refrigerator Removal and Recycling	Removal of Secondary Refrigerator	Existing Secondary Unit - age mostly > 15 years	8	$50.00	$50.00	1,095	0.125	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A057	1.11	100%	100%	100%	100%	2,800	2,840	2,880				2,800	2,840	2,880			
Refrigerator Recycling - MN	Saver's Switch	Residential AC Switch	Utility Load Control for control period with smart switch	No Control, No Switch	15	$90.00	$90.00	1	0.984		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U061	17.8	100%	100%	100%	100%	-	-	-				-	-	-			
Refrigerator Recycling - MN	Room Air Conditioner Recycling	Remove and Recycling Room AC	Removal of Standard 10,000 Btu/hr Window AC Unit	Existing Window AC Unit	5	$0.00	$0.00	542	0.781		$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U106	17.11	100%	100%	100%	100%	-	-	-				-	-	-			
Residential Demand Response - MN	Behavioral Residential	Behavioral Demand Response	Treatment	Control	1	$0.00	$0.00	0	0.022		$0.00	MN-RES-PEAK_CNT	Res	DR	Combo	C019		100%	100%	100%	100%	750,000	750,000	750,000	-	-	-	750,000	750,000	750,000	-	-	-
Residential Demand Response - MN	AC Rewards-DR	Residential Smart Thermostat - Direct Install	Utility Load Control for control period with Tier II or III thermostat	Existing standard manual or Non Utilized Tier I Thermostat	5	$190.00	$190.00	2	1.109	0.0	$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U001	17.7	100%	100%	100%	100%	500	500	500	-	-	-	500	500	500	-	-	-
Residential Demand Response - MN	AC Rewards-DR	Residential Smart Thermostat - Townhomes - Direct Install	Utility Load Control for control period with Tier II or III thermostat	Existing standard manual or Non Utilized Tier I Thermostat	5	$190.00	$190.00	1	0.706	0.0	$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U020	17.7	100%	100%	100%	100%	50	50	50	-	-	-	50	50	50	-	-	-
Residential Demand Response - MN	AC Rewards-DR	Residential Smart Thermostat - Multifamily - Direct Install	Utility Load Control for control period with Tier II or III thermostat	Existing standard manual or Non Utilized Tier I Thermostat	5	$190.00	$190.00	1	0.386	0.0	$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U022	17.7	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
Residential Demand Response - MN	AC Rewards-DR	Residential Smart Thermostat - BYOT	Utility Load Control for control period with Tier II or III thermostat	Existing standard manual or Non Utilized Tier I Thermostat	5	$100.00	$0.00	2	1.109		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U028	17.7	100%	100%	100%	100%	7,000	6,500	5,500	-	-	-	7,000	6,500	5,500	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Residential Demand Response - MN	Saver's Switch	MN - Residential AC Switch	Utility Load Control for control period with smart switch	No control, no switch	15	$0.00	$0.00	1	0.984		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U056	17.8	100%	100%	100%	100%	14,000	14,000	14,000	-	-	-	14,000	14,000	14,000	-	-	-
Residential Demand Response - MN	Saver's Switch	MN - Residential WH Switch	Utility Load Control for control period with smart switch	No control, no switch	15	$0.00	$0.00	2	0.200		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U057	17.8	100%	100%	100%	100%	250	250	250	-	-	-	250	250	250	-	-	-
Residential Demand Response - MN	AC Rewards-DR	Residential Smart Thermostat Annual Incentive	Utility Load Control for control period with Tier II or III thermostat	Existing standard manual or Non Utilzed Tier I Thermostat	1	$25.00	$0.00	0	0.000	0.0	$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	U227	17.7	100%	100%	100%	100%	52,565	59,630	65,695	-	-	-	52,565	59,630	65,695	-	-	-
Residential Demand Response - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045)	Heat Pump Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$325.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Combo	S184	19.2	100%	100%	100%	100%	50	50	50	-	-	-	50	50	50	-	-	-
Residential Demand Response - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045) - Annual Re Enrollment	Heat Pump Water Heater w/ DR Management - Re Enrollment of Existing Customer	No management of water heater time of use	1	$25.00	$0.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Combo	S185	19.2	100%	100%	100%	100%	-	50	100	-	-	-	-	50	100	-	-	-
Residential Demand Response - MN	Water Heater DR	Demand response capability on grid enabled electric resistance water heater (CTA 2045)	Electric Resistance Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$325.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	S189	19.2	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Residential Demand Response - MN	Water Heater DR	Demand response capability on existing electric resistance water heater equipped with demand response capable retrofit device (DR switch w/ Non-CTA 2045)	Electric Resistance Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$0.00	1	0.213		$0.00	MN-RES-PEAK_CNT	RES	DR	Combo	S190	19.2	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Residential HVAC - MN	ENERGY STAR Dehumidifier	Installation of ENERGY STAR Dehumidifier	ENERGY STAR Dehumidifier (Current ENERGY STAR Criteria)	Standard Efficiency Dehumidifier (Current Federal Standard)	12	$35.00	$50.00	116	0.041	0.0	$0.00	MN-RES-ESTARREF	Res	Electric Only	Combo	A068	1.8	100%	100%	100%	100%	75	75	75	-	-	-	75	75	75	-	-	-
Residential HVAC - MN	Smart Thermostat	Direct Install Smart Thermostat EE - AC & Gas Heating - Combo	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$110.00	$110.00	76	0.180	5.5	$0.00	MN-RES-RATE_AC	RES	Combo	Combo	U002	17.7	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Residential HVAC - MN	Smart Thermostat	Direct Install Smart Thermostat EE - AC & Gas Heating - Combo - Townhomes	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$110.00	$110.00	48	0.114	2.9	$0.00	MN-RES-RATE_AC	RES	Combo	Combo	U021	17.7	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Residential HVAC - MN	Smart Thermostat	Direct Install Smart Thermostat EE - AC & Gas Heating - Combo - Multifamily	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$110.00	$110.00	26	0.063	0.8	$0.00	MN-RES-RATE_AC	RES	Combo	Combo	U023	17.7	100%	100%	100%	100%	-	-	-	-	-	-	-	-	-	-	-	-
Residential HVAC - MN	Boiler	95% Efficient Boiler	95% Efficient Boiler	84% Efficient Boiler	20	$400.00	$3,001.00	0	0.000	13.4	$0.00		RES	Gas Only	Combo	U032	17.5	100%	100%	100%	100%	-	-	-	800	800	800	-	-	-	800	800	800
Residential HVAC - MN	Furnace	95% Efficient Furnace in Existing Home	95% Efficient Furnace in existing home	80% Efficient Furnace	18	$200.00	$736.00	0	0.000	10.9	$0.00		RES	Gas Only	Combo	U035	17.5	100%	100%	100%	100%	-	-	-	500	500	500	-	-	-	500	500	500
Residential HVAC - MN	Furnace	95% Efficient Furnace in New Home	95% Efficient Furnace in new home	90% Efficient Furnace	18	$100.00	$165.00	0	0.000	2.4	$0.00		RES	Gas Only	Combo	U037	17.5	100%	100%	100%	100%	-	-	-	3	3	3	-	-	-	3	3	3
Residential HVAC - MN	Furnace	96% Efficient Furnace in Existing Home	96% Efficient Furnace in existing home	80% Efficient Furnace	18	$300.00	$950.00	0	0.000	11.7	$0.00		RES	Gas Only	Combo	U038	17.5	100%	100%	100%	100%	-	-	-	11,000	11,000	11,000	-	-	-	11,000	11,000	11,000
Residential HVAC - MN	Furnace	96% Efficient Furnace in New Home	96% Efficient Furnace in new home	90% Efficient Furnace	18	$150.00	$379.00	0	0.000	3.0	$0.00		RES	Gas Only	Combo	U040	17.5	100%	100%	100%	100%	-	-	-	75	75	75	-	-	-	75	75	75
Residential HVAC - MN	Furnace	97% Efficient Furnace in Existing Home	97% Efficient Furnace in existing home	80% Efficient Furnace	18	$400.00	$1,048.00	0	0.000	12.4	$0.00		RES	Gas Only	Combo	U041	17.5	100%	100%	100%	100%	-	-	-	1,950	1,950	1,950	-	-	-	1,950	1,950	1,950
Residential HVAC - MN	Furnace	97% Efficient Furnace in New Home	97% Efficient Furnace in new home	90% Efficient Furnace	18	$200.00	$477.00	0	0.000	3.5	$0.00		RES	Gas Only	Combo	U043	17.5	100%	100%	100%	100%	-	-	-	15	15	15	-	-	-	15	15	15
Residential HVAC - MN	Smart Thermostat	Eco+	Smart Thermostat Optimization with eco+	Smart thermostat	10	$0.00	$0.00	17	0.040	0.0	$0.00	MN-RES-RATE_AC	RES	Electric Only	Combo	U094	17.1	100%	100%	100%	100%	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Residential HVAC - MN	Res MSHP	Non-Ducted Mini-Split Heat Pump w/ Electric Resistance Baseline	Residential Mini-Split Heat Pump (Nominal 1.8 Tons with 18.9 SEER2, 12.9 EER2, 10.2 HSPF2) with Electric Resistance baseline	Spot Cooling Solution needed with Exsisting Electric Resistance Heating	15	$600.00	$506.11	5,959	0.196	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U107	17.4	100%	100%	100%	100%	15	15	15	-	-	-	15	15	15	-	-	-
Residential HVAC - MN	Res AC	Installation of new AC 15.2 SEER2 2.25 tons	Quality Installation of 15.2 SEER2 2.25 tons	Non-Quality Installation of 13.4 SEER2 (Baseline and Model) 2 tons	18	$450.00	$439.19	235	0.439	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U111	17.1	100%	100%	100%	100%	10,250	10,250	10,250	-	-	-	10,250	10,250	10,250	-	-	-
Residential HVAC - MN	Res AC w/ Furnace	Installation of new AC 15.2 SEER2 2.25 tons w/ assoc furnace	Non - Quality Installation of 15.2 SEER2 2.25 tons with Associated Furnace	Non-Quality Installation of 13.4 SEER2 (Baseline and Model) 2.25 tons	18	$300.00	$207.27	95	0.015	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U113	17.1	100%	100%	100%	100%	5,250	5,250	5,250	-	-	-	5,250	5,250	5,250	-	-	-
Residential HVAC - MN	Res AC	Provide Quality Installation of new AC 13.4 SEER2 2.25 tons	Quality Installation of 13.4 SEER2 2.25 tons	Non-Quality Installation of 13.4 SEER2 2 tons	18	$150.00	$240.38	159	0.488	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U115	17.1	100%	100%	100%	100%	11,250	11,250	11,250	-	-	-	11,250	11,250	11,250	-	-	-
Residential HVAC - MN	Res AC w/ Furnace	Provide Quality Installation of new AC 13.4 SEER2 2.25 tons w/ assoc furnace	Quality Installation of 13.4 SEER2 2.25 tons w/ assoc furnace	Non-Quality Installation of 2.5 Ton AC 13.4 SEER2 2 tons	18	$150.00	$240.38	159	0.424	5.6	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U116	17.1	100%	100%	100%	100%	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Residential HVAC - MN	Res AC w/ Furnace	Provide Quality Installation of new AC 15.2 SEER2 2.25 tons w/ assoc furnace	Quality Installation of 15.2 SEER2 2.25 tons w/ assoc furnace	Non-Quality Installation of 2.25 Ton AC 15.2 SEER2	18	$150.00	$231.92	140	0.424	5.6	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U117	17.1	100%	100%	100%	100%	3,850	3,850	3,850	-	-	-	3,850	3,850	3,850	-	-	-
Residential HVAC - MN	Res ASHP	Centrally ducted ASHP Cooling size basis w/ER baseline	Quality Installation of Qualifying ASHP sized for Cooling Load - 2 Ton 15.2 SEER2 & 10 EER2 & 9 HSPF2 with existing ER heat backup	Non-Quality Installation of 13.4 SEER2 AC Sized at 2 tons in home with existing electric resistance heat	18	$350.00	$2,595.98	6,792	0.249	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U127	17.3	100%	100%	100%	100%	75	75	75	-	-	-	75	75	75	-	-	-
Residential HVAC - MN	Res GSHP	Installation of High Efficiency GSHP equipment Existing Home	Quality Installation of GLHP Brine to Air with 55,690 BTUH heating, 18 EER2, 4.0 COP	Non-Quality Installation of 2.5 Ton 13.4 SEER2 AC and Electric Resistance Heat	20	$2,320.42	$11,219.60	29,237	1.039	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U131	17.3	100%	100%	100%	100%	20	20	20	-	-	-	20	20	20	-	-	-
Residential HVAC - MN	Res GSHP	Installation of High Efficiency GSHP equipment New Home	Quality Installation of GLHP Brine to Air with 55,690 BTUH heating, 18 EER2, 4.0 COP	Non-Quality Installation of 2.5 Ton 13.4 SEER2 AC and Electric Resistance Heat	20	$2,320.42	$10,848.02	25,211	0.861	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U132	17.3	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Residential HVAC - MN	Res ccASHP	Centerally ducted cold climate ASHP w/ electric resistance baseline	Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 8.1 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$2,000.00	$11,011.81	10,520	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Electric Only	Combo	U149	17.12	100%	100%	100%	100%	5.0	5.0	5.0	5.0	5.0	5.0	5	5	5	5.00	5.00	5.00
Residential HVAC - MN	Res ccMSHP	Non-ducted cold climate Multi-Split Heat Pump w/ Electric Resistance Heat backup	Installation of Cold Climate Mini-Split Heat Pump (2.75 Tons 20.5 SEER2, 13.3 EER2, 11.5 HSPF2) with 3 indoor heads and Electric Resistance heat backup	Installation of comparable size code minimum AC with Exsisting Electric Resistance Heating	15	$2,000.00	$7,275.48	14,658	0.656	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U157	17.13	100%	100%	100%	100%	80	80	80	-	-	-	80	80	80	-	-	-
Residential HVAC - MN	EFS - Res GSHP Cooling	Cooling Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$9,587.20	237	0.794	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U228	17.3	100%	100%	100%	100%	20	40	80	-	-	-	20	40	80	-	-	-
Residential HVAC - MN	EFS - Res GSHP Heating	Heating Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$9,587.19	-6,550	0.000	110.3	$0.00	MN-EFS-RES GSHP	RES	Beneficial Electrification	Combo	U229	17.3	100%	100%	100%	100%	20	40	80	20	40	80	20	40	80	20	40	80
Residential HVAC - MN	EFS - Res GSHP Cooling	Cooling Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$9,587.20	237	0.794	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U237	17.3	100%	100%	100%	100%	20	40	80	-	-	-	20	40	80	-	-	-
Residential HVAC - MN	EFS - Res GSHP Heating	Heating Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$0.00	0	0.000	0.0	$0.00	MN-EFS-RES GSHP	RES	Beneficial Electrification	Electric Only	U238	17.3	100%	100%	100%	100%	20	40	80	20	40	80	20	40	80	20	40	80
Residential HVAC - MN	Smart Thermostat	BYOT EE - AC & Electric Heating	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$0.00	76	0.180	0.0	$0.00	MN-RES-HMEFF	RES	Electric Only	Electric Only	U185	17.7	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Residential HVAC - MN	Smart Thermostat	BYOT EE - AC & Gas Heating - Combo Customer	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$0.00	76	0.180	5.5	$0.00	MN-RES-RATE_AC	RES	Combo	Combo	U186	17.7	100%	100%	100%	100%	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Residential HVAC - MN	Smart Thermostat	BYOT EE - AC & Gas Heating - Electric Only Customer	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$0.00	76	0.180	5.5	$0.00	MN-RES-RATE_AC	RES	Combo	Electric Only	U187	17.7	100%	100%	100%	100%	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Residential HVAC - MN	Smart Thermostat	BYOT EE - Gas Heating Gas Only Customer	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$0.00	0	0.000	5.5	$0.00		RES	Gas Only	Gas Only	U188	17.7	100%	100%	100%	100%	-	-	-	150	150	150	-	-	-	150	150	150
Residential HVAC - MN	EFS - Res ASHP Cooling	Centerally ducted dual fuel ASHP	Cooling Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$4,072.21	236	0.007	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U189	17.3	100%	100%	100%	100%	100	200	400	100	200	400	100	200	400	100	200	400
Residential HVAC - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$1,100.00	$4,072.21	-4,597	0.000	39.0	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U190	17.3	100%	100%	100%	100%	100	200	400	100	200	400	100	200	400	100	200	400
Residential HVAC - MN	EFS - Res ASHP Cooling	Centerally ducted dual fuel ASHP	Cooling Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$4,072.21	236	0.007	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Electric Only	U233	17.3	100%	100%	100%	100%	100	200	400	100	200	400	100	200	400	100	200	400
Residential HVAC - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$600.00	$0.00	0	0.000	0.0	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Electric Only	U234	17.3	100%	100%	100%	100%	100	200	400	100	200	400	100	200	400	100	200	400
Residential HVAC - MN	EFS - Res ccASHP Cooling	Centerally ducted dual fuel cold climate ASHP	Cooling Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$9,741.82	165	0.071	0.0	$164.60	MN-RES-Cooling_DX	RES	Combo	Combo	U197	17.12	100%	100%	100%	100%	25.0	50.0	100.0	25.0	50.0	100.0	25	50	100	25.00	50.00	100.00
Residential HVAC - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$1,500.00	$9,741.82	-7,201	0.000	54.2	$217.21	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U198	17.12	100%	100%	100%	100%	25.0	50.0	100.0	25.0	50.0	100.0	25	50	100	25.00	50.00	100.00
Residential HVAC - MN	EFS - Res ccASHP Cooling	Centerally ducted dual fuel cold climate ASHP	Cooling Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$9,741.82	165	0.071	0.0	$164.60	MN-RES-Cooling_DX	RES	Combo	Electric Only	U239	17.12	100%	100%	100%	100%	25.0	50.0	100.0	25.0	50.0	100.0	25	50	100	25.00	50.00	100.00
Residential HVAC - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$1,500.00	$0.00	0	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Electric Only	U240	17.12	100%	100%	100%	100%	25.0	50.0	100.0	25.0	50.0	100.0	25	50	100	25.00	50.00	100.00
Residential HVAC - MN	EFS - Res ccMSHP Cooling	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Cooling Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$500.00	$5,393.09	269	0.013	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U205	17.13	100%	100%	100%	100%	75	150	300	-	-	-	75	150	300	-	-	-

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Residential HVAC - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$1,500.00	$5,393.09	-5,782	0.000	52.1	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U206	17.13	100%	100%	100%	100%	75	150	300	75	150	300	75	150	300	75	150	300
Residential HVAC - MN	EFS - Res ccMSHP Cooling	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Cooling Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$500.00	$5,393.09	269	0.013	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U235	17.13	100%	100%	100%	100%	75	150	300	-	-	-	75	150	300	-	-	-
Residential HVAC - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$1,500.00	$0.00	0	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Electric Only	U236	17.13	100%	100%	100%	100%	75	150	300	75	150	300	75	150	300	75	150	300
Residential HVAC - MN	EFS - Res MSHP Cooling	Non-ducted dual fuel MSHP w/ gas furnace backup	Cooling Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$500.00	$1,100.28	302	0.017	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U213	17.4	100%	100%	100%	100%	110	225	450	-	-	-	110	225	450	-	-	-
Residential HVAC - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$1,100.00	$1,100.28	-2,782	0.000	29.5	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U214	17.4	100%	100%	100%	100%	110	225	450	110	225	450	110	225	450	110	225	450
Residential HVAC - MN	EFS - Res MSHP Cooling	Non-ducted dual fuel MSHP w/ gas furnace backup	Cooling Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$500.00	$1,100.28	302	0.017	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U241	17.4	100%	100%	100%	100%	110	225	450	-	-	-	110	225	450	-	-	-
Residential HVAC - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$1,100.00	$0.00	0	0.000	0.0	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Electric Only	U242	17.4	100%	100%	100%	100%	110	225	450	110	225	450	110	225	450	110	225	450
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,192	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S067	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,557	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S068	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,953	0.337	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S069	19.2	100%	100%	100%	100%	15	30	60	15	30	60	15	30	60	15	30	60
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,172	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S070	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,536	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S071	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$400.00	$784.00	2,933	0.335	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S072	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Electric Resistance Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,192	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S073	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling ASHP Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,557	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S074	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,953	0.337	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S075	19.2	100%	100%	100%	100%	5	10	20	5	10	20	5	10	20	5	10	20
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Electric Resistance Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,172	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S076	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling ASHP Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,536	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S077	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$500.00	$784.00	2,933	0.335	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S078	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater <= 40 Gal - Medium Draw	Minimum Efficiency Storage Water Heater	13	$75.00	$126.88	0	0.000	2.8	$0.00		RES	Gas Only	Combo	S169	19.2	100%	100%	100%	100%	-	-	-	90	90	90	-	-	-	90	90	90
Residential HVAC - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater <= 40 Gal - High Draw	Minimum Efficiency Storage Water Heater	13	$75.00	$260.86	0	0.000	1.8	$0.00		RES	Gas Only	Combo	S170	19.2	100%	100%	100%	100%	-	-	-	200	200	200	-	-	-	200	200	200
Residential HVAC - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater > 40 Gal - Medium Draw	Minimum Efficiency Storage Water Heater	13	$75.00	$119.30	0	0.000	3.6	$0.00		RES	Gas Only	Combo	S171	19.2	100%	100%	100%	100%	-	-	-	50	50	50	-	-	-	50	50	50
Residential HVAC - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater > 40 Gal - High Draw	Minimum Efficiency Storage Water Heater	13	$75.00	$384.34	0	0.000	2.0	$0.00		RES	Gas Only	Combo	S172	19.2	100%	100%	100%	100%	-	-	-	300	300	300	-	-	-	300	300	300
Residential HVAC - MN	Water Heater	High Efficiency Tankless Water Heater	High Efficiency Tankless Water Heater - High Draw	Minimum Efficiency Storage Water Heater	20	$250.00	$861.92	0	0.000	7.7	$0.00		RES	Gas Only	Combo	S173	19.2	100%	100%	100%	100%	-	-	-	200	200	200	-	-	-	200	200	200
Residential HVAC - MN	Water Heater	High Efficiency Tankless Water Heater	High Efficiency Tankless Water Heater - Medium Draw	Minimum Efficiency Storage Water Heater	20	$250.00	$541.99	0	0.000	8.1	$0.00		RES	Gas Only	Combo	S174	19.2	100%	100%	100%	100%	-	-	-	50	50	50	-	-	-	50	50	50
Residential HVAC - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$400.00	$1,359.04	-941	-0.107	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S216	19.2	100%	100%	100%	100%	30	60	120	30	60	120	30	60	120	30	60	120
Residential HVAC - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$400.00	$1,359.04	-959	-0.110	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S217	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Residential HVAC - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$500.00	$1,359.04	-941	-0.107	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S218	19.2	100%	100%	100%	100%	15	30	60	15	30	60	15	30	60	15	30	60
Residential HVAC - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$500.00	$1,359.04	-959	-0.110	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S219	19.2	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Saver's Switch for Business - MN	Business Saver's Switch	Commercial AC Switch Single Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	2	1.208	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T002	4.3	100%	100%	100%	100%	1,600	1,600	1,600				1,600	1,600	1,600			
Saver's Switch for Business - MN	Business Saver's Switch	Commercial AC Switch Multi Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	4	2.703	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T003	4.3	100%	100%	100%	100%	500	500	500				500	500	500			
Saver's Switch for Business - MN	AC Rewards - Business	Business Smart Thermostat - DR Direct Install	New Installation of DR Capable Smart Thermostat	Non communicating thermostat	5	$255.00	$255.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T004	4.4	100%	100%	100%	100%	1,000	1,500	2,000				1,000	1,500	2,000			
Saver's Switch for Business - MN	AC Rewards - Business	Business Smart Thermostat - BYOT	Existing Dispatchable Device	Non communicating thermostat	5	$100.00	$100.00	14	2.081	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	DR	Electric Only	T005	4.4	100%	100%	100%	100%	-	-	-				-	-	-			
Saver's Switch for Business - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & GAS	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	7.7	$0.00	MN-BUS-COOL_OUT	BUS	Combo	Combo	T006	4.4	100%	100%	100%	100%	167	350	350	83	150	150	167	350	350	83	150	150
Saver's Switch for Business - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC ONLY	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	333	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T007	4.4	100%	100%	100%	100%	735	985	1,485				735	985	1,485			
Saver's Switch for Business - MN	AC Rewards - Business	Install Energy Star certified smart thermostat - AC & ELEC HEAT	Energy Star Certified Thermostat	Manual or programmable thermostat	10	$95.00	$95.00	865	0.000	0.0	$0.00	MN-BUS-COOL_OUT	BUS	Electric Only	Electric Only	T008	4.4	100%	100%	100%	100%	15	15	15				15	15	15			
Saver's Switch for Business - MN	Commercial AC Switch	Commercial AC Switch Single Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	1	0.806	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	Electric Only	Electric Only	L029	11.14	100%	100%	100%	100%												
Saver's Switch for Business - MN	Commercial AC Switch	Commercial AC Switch Multi Stage - MN	Utility load control for control period with smart switch	No control, no switch	15	$0.00	$0.00	3	2.113	0.0	$0.00	MN-BUS-PEAK_CNT	BUS	Electric Only	Electric Only	L030	11.14	100%	100%	100%	100%												
School Education Kits - MN	Advanced Power Strip	Advanced Power Strip	Tier 1 Advanced Power Strip	Standard Power Strip	7	$20.00	$20.00	68	0.009	0.0	$0.00	MN-RES-FLAT	RES	Electric Only	Combo	A117	1.5	100%	100%	71%	100%							7,500	7,550	7,600	-	-	-
School Education Kits - MN	Home Lighting DI	2x 11 Watt LED Bulbs	LED: 2 x 11 W	45 lm/W Equivalent	18	$9.62	$9.62	44	0.005	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K042	13.1	100%	100%	93%	100%							29,000	29,420	29,870	-	-	-
School Education Kits - MN	Home Lighting DI	15 Watt LED Bulbs	LED: 15W	45 lm/W Equivalent	18	$2.79	$2.79	38	0.004	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K043	13.1	100%	100%	92%	100%							-	-	-	-	-	-
School Education Kits - MN	Home Lighting DI	4W-8W-14W 3-WAY LED	4W-8W-14W 3-WAY LED	45 lm/W Equivalent	18	$2.65	$2.65	19	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K044	13.1	100%	100%	92%	100%							5,500	5,500	5,500	-	-	-
School Education Kits - MN	Home Lighting DI	4x 5W Candle LED	4x 5W Candle LED	Incandescent Equivalent	20	$10.60	$10.60	103	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K045	13.1	100%	100%	92%	100%							5,500	5,500	5,500	-	-	-
School Education Kits - MN	Home Lighting DI	2x 6W Globe LED	2x 6W Globe LED	45 lm/W Equivalent	20	$5.30	$5.30	12	0.002	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K046	13.1	100%	100%	92%	100%							5,500	5,500	5,500	-	-	-
School Education Kits - MN	Home Lighting DI	8W Reflector LED	8W Reflector LED	45 lm/W Equivalent	20	$2.65	$2.65	11	0.015	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K047	13.1	100%	100%	92%	100%							5,500	5,500	5,500	-	-	-
School Education Kits - MN	Home Lighting DI	2x 9 Watt LED Bulbs	LED: 2 x 9W	45 lm/W Equivalent	18	$3.19	$3.19	17	0.019	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K048	13.1	100%	100%	91%	100%							34,500	35,370	36,266	-	-	-
School Education Kits - MN	Home Lighting - Direct Install	2x 13 Watt LED Bulbs	LED: 2 x 13W	45 lm/W Equivalent	18	$10.18	$10.18	81	0.000	0.0	$0.00	MN-RES-SFLIT	RES	Electric Only	Combo	K049	13.1	100%	100%	92%	100%							13,000	13,100	13,150	-	-	-
School Education Kits - MN	Home Lighting - Direct Install	LED Nightlight	LED Nightlight	Incandescent Nightlight	8	$1.40	$1.40	31	0.000	0.0	$0.00	MN-BUS-RECM_OUT	RES	Electric Only	Combo	K050	13.1	100%	100%	93%	100%							47,500	48,470	49,416	-	-	-
School Education Kits - MN	Programmable Thermostat	Programming of Existing T-stat (Elec Cooling & Gas Heat)	Program Existing T-stat w/ Auto setup by 1 F for cooling and setback of 1 F for heating	Existing home w/ no auto setup or setback temps	10	$0.00	$0.00	52	0.066	3.3	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U232	17.6	100%	100%	40%	100%							36,500	36,970	37,470	21,500	22,020	22,503
School Education Kits - MN	Aerators - EWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with unknown DHW heater (EWH portion)	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.22	$1.22	74	0.010	0.0	$5.71	MN-RES-SFWHT	Res	Electric Only	Combo	S032	19.1	100%	100%	39%	100%							3,480	3,530	3,584	-	-	-
School Education Kits - MN	Aerators - EWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with unknown DHW heater (EWH portion)	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.48	$0.48	91	0.013	0.0	$8.12	MN-RES-SFWHT	Res	Electric Only	Combo	S033	19.1	100%	100%	42%	100%							4,380	4,436	4,496	-	-	-
School Education Kits - MN	Aerators - GWH	Kitchen Aerator - 1.5 GPM to replace existing 2.2 GPM aerator in home with unknown DHW heater (GWH portion)	1.5 GPM Kitchen Faucet Aerator	2.2 GPM Kitchen Faucet Aerator	10	$1.22	$1.22	0	0.000	0.3	$5.71		Res	Gas Only	Combo	S059	19.1	100%	100%	39%	100%							-	-	-	12,320	12,689	13,070
School Education Kits - MN	Aerators - GWH	Primary Bath Faucet Aerator - 0.5 GPM to replace existing 2.2 GPM aerator in home with unknown DHW heater (GWH portion)	0.5 GPM Bathroom Faucet Aerator	2.2 GPM Bathroom Faucet Aerator	10	$0.48	$0.48	0	0.000	0.4	$8.12		Res	Gas Only	Combo	S060	19.1	100%	100%	42%	100%							-	-	-	18,920	19,844	19,377
School Education Kits - MN	Showerheads - EWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with unknown DHW heater (EWH portion)	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.22	$3.22	511	0.037	0.0	$45.67	MN-RES-SFWHT	Res	Electric Only	Combo	S128	19.1	100%	100%	46%	100%							4,380	4,436	4,496	-	-	-
School Education Kits - MN	Showerheads - GWH	Primary Showerhead - 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with unknown DHW heater (GWH portion)	1.5 GPM Showerhead	2.5 GPM Showerhead	10	$3.22	$3.22	0	0.000	2.2	$45.67		Res	Gas Only	Combo	S166	19.1	100%	100%	46%	100%							-	-	-	18,920	19,377	19,802
Self Direct - MN	Custom Self-Direct Project	Self Direct Project	New Efficient Equipment	Old or less efficient systems or equipment	17	$137,301.23	$503,145.38	926,303	201.981	0.0	$0.00	MN-BUS-01BAC	BUS	Combo	Combo	G016	7.1	100%	100%	100%	100%	1	1	1	-	-	-	1	1	1	-	-	-
Whole Home Efficiency - MN	ENERGY STAR Clothes Dryer	ENERGY STAR Clothes Dryer	Energy Star Clothes Dryer >= 4.4 Cu.Ft.	Industry Standard	12	$40.00	$75.00	41	0.005	0.0	$0.00	MN-RES-SFLIT	Res	Electric Only	Combo	A017	1.6	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Front-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Front-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	244	0.036	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A029	1.7	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Combo	A030	1.7	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A094	1.7	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Front-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Front-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Front-Loading Clothes Washer	11	$10.00	$50.00	20	0.003	8.4	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A095	1.7	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Top-loading Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Top-Loading Clothes Washer w/ electric DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	52	0.008	0.0	$0.00	MN-RES-FLAT	Res	Electric Only	Combo	A031	1.7	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Electric Only	A096	1.7	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Gas Only	A097	1.7	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	ENERGY STAR Clothes Washer	Energy Star Top-Loading Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Top-Loading Clothes Washer w/ Gas DHW and Electric Dryer	Standard Top-Loading Clothes Washer	11	$10.00	$50.00	8	0.001	1.7	$0.00	MN-RES-FLAT	Res	Combo	Combo	A032	1.7	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Whole Home Efficiency - MN	ENERGY STAR Refrigerator	Refrigerator Replacement	ENERGY STAR ® Refrigerators	Industry Standard	14	$15.00	$20.00	45	0.003	0.0	$0.00	MN-RES-SFRF1	Res	Electric Only	Combo	A038	1.9	100%	100%	100%	100%	2	2	2				2	2	2			
Whole Home Efficiency - MN	ENERGY STAR Dehumidifier	Installation of ENERGY STAR Dehumidifier	ENERGY STAR Dehumidifier (Current ENERGY STAR Criteria)	Standard Efficiency Dehumidifier (Current Federal Standard)	12	$35.00	$50.00	103	0.032	0.0	$0.00	MN-RES-ESTARREF	Res	Electric Only	Combo	A073	1.8	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Attic Insulation - Electric Heating and Cooling	Attic insulation in homes with electric heating / electric cooling	Home with 868 sqft avg attic area and R50 avg upgraded insulation	Existing home with 868 sqft avg attic area and R21 avg baseline insulation	20	$683.50	$1,942.33	1,669	0.066	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I049	8.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Attic Insulation - Electric Heating Only	Attic insulation in homes with electric heating / no cooling	Home with 868 sqft avg attic area and R50 avg upgraded insulation	Existing home with 868 sqft avg attic area and R21 avg baseline insulation	20	$1,722.95	$2,566.50	3,829	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I050	8.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for combo customers	Home with 868 sqft avg attic area and R50 avg upgraded insulation	Existing home with 868 sqft avg attic area and R21 avg baseline insulation	20	$495.80	$1,840.03	27	0.051	5.4	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I051	8.1	100%	100%	100%	100%	40	44	48	40	44	48	40	44	48	40	44	48
Whole Home Efficiency - MN	Attic Insulation - Gas Heating Only	Attic insulation in homes with gas heating / no cooling	Home with 868 sqft avg attic area and R50 avg upgraded insulation	Existing home with 868 sqft avg attic area and R21 avg baseline insulation	20	$696.64	$1,692.00	0	0.000	8.3	$0.00		Res	Gas Only	Combo	I052	8.1	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	Attic Insulation - Gas Heating / Electric Cooling	Attic insulation in homes with gas heating / electric cooling for gas-only customers	Home with 868 sqft avg attic area and R50 avg upgraded insulation	Existing home with 868 sqft avg attic area and R21 avg baseline insulation	20	$390.93	$1,853.42	21	0.041	4.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I053	8.1	100%	100%	100%	100%				3	3	3				3	3	3
Whole Home Efficiency - MN	Wall Insulation - Electric Heating and Cooling	Wall insulation in homes with electric heating / electric cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,737.19	$2,316.25	8,654	0.344	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I054	8.2	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Wall Insulation - Electric Heating Only	Wall insulation in homes with electric heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$2,153.83	$2,871.77	8,489	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I055	8.2	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for combo customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$2,230.18	$2,973.57	241	0.464	48.8	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I056	8.2	100%	100%	100%	100%	36	40	44	36	40	44	36	40	44	36	40	44
Whole Home Efficiency - MN	Wall Insulation - Gas Heating Only	Wall insulation in homes with gas heating / no cooling	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,813.50	$2,418.00	0	0.000	45.1	$0.00		Res	Gas Only	Combo	I057	8.2	100%	100%	100%	100%				5	5	5				5	5	5
Whole Home Efficiency - MN	Wall Insulation - Gas Heating / Electric Cooling	Wall insulation in homes with gas heating / electric cooling for gas-only customers	Home with R11 wall cavity insulation added	Home with no wall cavity insulation	20	$1,551.75	$2,069.00	170	0.326	34.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I058	8.2	100%	100%	100%	100%				3	3	3				3	3	3
Whole Home Efficiency - MN	Air Sealing - Electric Heating and Cooling	Air sealing in homes with electric heating / electric cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$860.79	$1,366.25	3,254	0.090	0.0	$0.00	MN-RES-Cooling_DX_Heating_Elec	Res	Electric Only	Combo	I059	8.3	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Air Sealing - Electric Heating Only	Air sealing in homes with electric heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$825.00	$1,100.00	3,791	0.000	0.0	$0.00	MN-RES-Heating_Elec	Res	Electric Only	Combo	I060	8.3	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for combo customers	Home with bypass air sealing performed	Existing home without air sealing	10	$730.33	$1,028.69	68	0.130	19.6	$0.00	MN-RES-Cooling_DX	Res	Combo	Combo	I061	8.3	100%	100%	100%	100%	40	44	48	40	44	48	40	44	48	40	44	48
Whole Home Efficiency - MN	Air Sealing - Gas Heating Only	Air sealing in homes with gas heating / no cooling	Home with bypass air sealing performed	Existing home without air sealing	10	$791.00	$1,054.67	0	0.000	26.2	$0.00		Res	Gas Only	Combo	I062	8.3	100%	100%	100%	100%				10	10	10				10	10	10
Whole Home Efficiency - MN	Air Sealing - Gas Heating / Electric Cooling	Air sealing in homes with gas heating / electric cooling for gas-only customers	Home with bypass air sealing performed	Existing home without air sealing	10	$387.75	$517.00	22	0.042	6.3	$0.00	MN-RES-Cooling_DX	Res	Combo	Gas Only	I063	8.3	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	Boiler	95% Efficient Boiler	95% Efficient Boiler	84% Efficient Boiler	20	$400.00	$3,001.00	0	0.000	13.4	$0.00		RES	Gas Only	Combo	U033	17.5	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	Furnace	95% Efficient Furnace in Existing Home	95% Efficient Furnace in existing home	80% Efficient Furnace	18	$200.00	$736.00	0	0.000	10.9	$0.00		RES	Gas Only	Combo	U036	17.5	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	Furnace	96% Efficient Furnace in Existing Home	96% Efficient Furnace in existing home	80% Efficient Furnace	18	$300.00	$950.00	0	0.000	11.7	$0.00		RES	Gas Only	Combo	U039	17.5	100%	100%	100%	100%				10	10	10				10	10	10
Whole Home Efficiency - MN	Furnace	97% Efficient Furnace in Existing Home	97% Efficient Furnace in existing home	80% Efficient Furnace	18	$400.00	$1,048.00	0	0.000	12.4	$0.00		RES	Gas Only	Combo	U042	17.5	100%	100%	100%	100%				1	1	1				1	1	1
Whole Home Efficiency - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC & GAS	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	76	0.180	5.5	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U076	17.7	100%	100%	100%	100%	10	10	10	10	10	10	10	10	10	10	10	10
Whole Home Efficiency - MN	Smart Thermostat	Install Energy Star certified smart thermostat - AC ONLY	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	76	0.180	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Electric Only	U081	17.7	100%	100%	100%	100%	5	5	5				5	5	5			
Whole Home Efficiency - MN	Smart Thermostat	Install Energy Star certified smart thermostat - GAS Only	Average Single Family House with EnergyStar Smart Thermostat	Average Single Family House with Standard Thermostat	10	$50.00	$125.00	0	0.000	5.5	$0.00		RES	Gas Only	Gas Only	U086	17.7	100%	100%	100%	100%				5	5	5				5	5	5
Whole Home Efficiency - MN	Res MSHP	Non-Ducted Mini-Split Heat Pump w/ Electric Resistance Baseline	Residential Mini-Split Heat Pump (Nominal 1.8 Tons with 18.9 SEER2, 12.9 EER2, 10.2 HSPF2) with electric resistance heat backup	Spot Cooling Solution needed with Exsisting Electric Resistance Heating	15	$600.00	$506.11	5,959	0.196	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U108	17.4	100%	100%	100%	100%	5	10	15				5	10	15			
Whole Home Efficiency - MN	Res AC	Installation of new AC 15.2 SEER2 2.25 tons	Quality Installation of 15.2 SEER2 2.25 tons	Non-Quality Installation of 13.4 SEER2 (Baseline and Model) 2 tons	18	$450.00	$439.19	235	0.439	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U119	17.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Res AC w/ Furnace	Installation of new AC 15.2 SEER2 2.25 tons w/ assoc furnace	Non - Quality Installation of 15.2 SEER2 2.25 tons with Associated Furnace	Non-Quality Installation of 13.4 SEER2 (Baseline and Model) 2.25 tons	18	$300.00	$207.27	95	0.015	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U121	17.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Res AC	Provide Quality Installation of new AC 13.4 SEER2 2.25 tons	Quality Installation of 13.4 SEER2 2.25 tons	Non-Quality Installation of 2.5 Ton AC 13.4 SEER2 2 tons	18	$150.00	$240.38	159	0.488	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U123	17.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Res AC w/ Furnace	Provide Quality Installation of new AC 13.4 SEER2 2.25 tons w/ assoc furnace	Quality Installation of 13.4 SEER2 2.25 tons w/ assoc furnace	Non-Quality Installation of 2.5 Ton AC 13.4 SEER2 2 tons	18	$150.00	$240.38	159	0.424	5.6	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U124	17.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Res AC w/ Furnace	Provide Quality Installation of new AC 15.2 SEER2 2.25 tons w/ assoc furnace	Quality Installation of 15.2 SEER2 2.25 tons w/ assoc furnace	Non-Quality Installation of 2.25 Ton AC 15.2 SEER2	18	$150.00	$231.92	140	0.424	5.6	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U125	17.1	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	Res GSHP	Installation of High Efficiency GSHP equipment Existing Home	Quality Installation of GLHP Brine to Air with 55,690 BTUH heating, 18 EER2, 4.0 COP	Non-Quality Installation of 2.5 Ton 13.4 SEER2 AC and Electric Resistance Heat	20	$2,320.42	$11,219.60	29,237	1.039	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U133	17.3	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Whole Home Efficiency - MN	Res GSHP	Installation of High Efficiency GSHP equipment New Home	Quality Installation of GLHP Brine to Air with 55,690 BTUH heating, 18 EER2, 4.0 COP	Non-Quality Installation of 2.5 Ton 13.4 SEER2 AC and Electric Resistance Heat	20	$2,320.42	$10,848.02	25,211	0.861	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U134	17.3	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Whole Home Efficiency - MN	Res ASHP	Centrally ducted ASHP Cooling size basis w/ER baseline	Quality Installation of Qualifying ASHP sized for Cooling Load - 2 Ton 15.2 SEER2 & 10 EER2 & 9 HSPF2 with existing ER heat backup	Non-Quality Installation of 13.4 SEER2 AC Sized at 2 tons in home with existing electric resistance heat	18	$350.00	$2,595.98	6,792	0.249	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U135	17.3	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Whole Home Efficiency - MN	Res ccASHP	Centerally ducted cold climate ASHP w/ electric resistance baseline	Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 8.1 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$2,000.00	$11,011.81	10,520	0.000	0.0	$0.00	MN-EFS-RES ccASHP	RES	Electric Only	Combo	U150	17.12	100%	100%	100%	100%	1.0	1.0	1.0				1.0	1.0	1.0			
Whole Home Efficiency - MN	Res ccMSHP	Non-ducted cold climate Multi-Split Heat Pump w/ Electric Resistance Heat backup	Installation of Cold Climate Mini-Split Heat Pump (2.75 Tons 20.5 SEER2, 13.3 EER2, 11.5 HSPF2) with 3 indoor heads and Electric Resistance heat backup	Installation of comparable size code minimum AC with Exsisting Electric Resistance Heating	15	$2,000.00	$7,275.48	14,658	0.656	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U158	17.13	100%	100%	100%	100%	3	6	9				3	6	9			
Whole Home Efficiency - MN	EFS - Res GSHP Cooling	Cooling Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$9,587.20	237	0.794	0.0	$0.00	MN-RES-Cooling_DX	RES	Electric Only	Combo	U230	17.3	100%	100%	100%	100%	1	2	3				1	2	3			
Whole Home Efficiency - MN	EFS - Res GSHP Heating	Heating Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20	$895.83	$9,587.19	-6,550	0.000	110.3	$0.00	MN-EFS-RES GSHP	RES	Beneficial Electrification	Combo	U231	17.3	100%	100%	100%	100%	1	2	3				1	2	3			
Whole Home Efficiency - MN	EFS - Res ASHP Cooling	Centerally ducted dual fuel ASHP	Cooling Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$5,373.17	314	0.122	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U191	17.3	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$1,100.00	$5,373.17	-6,171	0.000	51.9	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U192	17.3	100%	100%	100%	100%	1	1	1	1	1	1	1	1	1	1	1	1
Whole Home Efficiency - MN	EFS - Res ccASHP Cooling	Centerally ducted dual fuel cold climate ASHP	Cooling Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$500.00	$9,741.82	165	0.071	0.0	$0.00	MN-RES-Cooling_DX	RES	Combo	Combo	U199	17.12	100%	100%	100%	100%	5.0	10.0	15.0	5.0	10.0	15.0	5	10	15	5.00	10.00	15.00
Whole Home Efficiency - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18	$1,500.00	$9,741.82	-7,201	0.000	57.5	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U200	17.12	100%	100%	100%	100%	5.0	10.0	15.0	5.0	10.0	15.0	5	10	15	5.00	10.00	15.00
Whole Home Efficiency - MN	EFS - Res ccMSHP Cooling	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Cooling Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$500.00	$5,393.09	269	0.013	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U207	17.13	100%	100%	100%	100%	5	10	15	5	10	15	5	10	15	5	10	15

Measure Description					Economic Assumptions								Customer Information					Stipulated Factors										Forecast Units					
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Load Shape	Loss Factor Segment	Savings Type	Customer Type	Index	Deemed Sheet Number	NTG (%)	Gas NTG (%)	Install Rate (%)	Realization Rate (%)	2024 Electric Participants	2025 Electric Participants	2026 Electric Participants	2024 Gas Participants	2025 Gas Participants	2026 Gas Participants	2024 Electric Units	2025 Electric Units	2026 Electric Units	2024 Gas Units	2025 Gas Units	2026 Gas Units
Whole Home Efficiency - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15	$1,500.00	$5,393.09	-4,402	0.000	39.6	$0.00	MN-EFS-RES ccASHP	RES	Beneficial Electrification	Combo	U208	17.13	100%	100%	100%	100%	5	10	15				5	10	15			
Whole Home Efficiency - MN	EFS - Res MSHP Cooling	Non-ducted dual fuel MSHP w/ gas furnace backup	Cooling Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19.8 SEER2 & 12.7 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$500.00	$1,100.28	319	0.519	0.0	$0.00	MN-RES-Cooling_DX_Heating_DX	RES	Electric Only	Combo	U215	17.4	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19.8 SEER2 & 12.7 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15	$1,100.00	$1,100.28	-2,552	0.000	29.5	$0.00	MN-EFS-RES ASHP	RES	Beneficial Electrification	Combo	U216	17.4	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,192	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S079	19.2	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,557	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S080	19.2	100%	100%	100%	100%	1	1	1				1	1	1			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,953	0.337	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S081	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Electric Resistance Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,172	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S082	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling ASHP Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,536	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S083	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater	Minimum Efficiency Electric Water Heater	13	$450.00	$784.00	2,933	0.335	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S084	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Electric Resistance Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,192	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S085	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling ASHP Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,557	0.337	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S086	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,953	0.337	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S087	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Electric Resistance Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,172	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S088	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling ASHP Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,536	0.335	0.0	$0.00	MN-RES-SFWHT	RES	Electric Only	Combo	S089	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater	Heat Pump Water Heater - Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Electric Water Heater	13	$550.00	$784.00	2,933	0.335	0.0	-$19.66	MN-RES-SFWHT	RES	Electric Only	Combo	S090	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater <= 40 Gal - Medium Draw	Minimum Efficiency Storage Water Heater	13	$100.00	$126.88	0	0.000	2.5	$0.00		RES	Gas Only	Combo	S175	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater <= 40 Gal - High Draw	Minimum Efficiency Storage Water Heater	13	$100.00	$260.86	0	0.000	1.6	$0.00		RES	Gas Only	Combo	S176	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater > 40 Gal - Medium Draw	Minimum Efficiency Storage Water Heater	13	$100.00	$119.30	0	0.000	2.5	$0.00		RES	Gas Only	Combo	S177	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	Water Heater	High Efficiency Storage Water Heater	Storage Water Heater > 40 Gal - High Draw	Minimum Efficiency Storage Water Heater	13	$100.00	$384.34	0	0.000	2.7	$0.00		RES	Gas Only	Combo	S178	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	Water Heater	Tankless Water Heater	High Efficiency Tankless Water Heater - High Draw	Minimum Efficiency Storage Water Heater	20	$275.00	$861.92	0	0.000	6.2	$0.00		RES	Gas Only	Combo	S179	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	Water Heater	Tankless Water Heater	High Efficiency Tankless Water Heater - Medium Draw	Minimum Efficiency Storage Water Heater	20	$275.00	$541.99	0	0.000	6.9	$0.00		RES	Gas Only	Combo	S180	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045)	Heat Pump Water Heater w/ DR Management	No management of water heater time of use	1	$100.00	$325.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Combo	S186	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	Water Heater DR	Load Shift & Demand response capability on new heat pump water heater (CTA 2045) - Annual Re Enrollment	Heat Pump Water Heater w/ DR Management - Re Enrollment of Existing Customer	No management of water heater time of use	1	$25.00	$0.00	152	0.071		$0.00	MN-RES-HPWH_DR	RES	DR	Combo	S187	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$450.00	$1,359.04	-941	-0.107	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S220	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$450.00	$1,359.04	-959	-0.110	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S221	19.2	100%	100%	100%	100%				3	6	10				3	6	10
Whole Home Efficiency - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$550.00	$1,359.04	-941	-0.107	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S222	19.2	100%	100%	100%	100%	3	6	10				3	6	10			
Whole Home Efficiency - MN	HP Water Heater - Gas Baseline	Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13	$550.00	$1,359.04	-959	-0.110	17.0	$0.00	MN-EFS-RES HPWH	RES	Beneficial Electrification	Combo	S223	19.2	100%	100%	100%	100%	3	6	10				3	6	10			

1.1 Dishwasher

Algorithms

$$Customer\ kW = Savings\ kW$$

$$Customer\ kWh = Savings\ kW\ \times Hours$$

$$PCkW = Savings\ kW\ \times CF$$

$$Customer\ Dth = Savings\ Dth$$

Variables

Savings kW	See Table 1.1.1.a	Kilowatt savings per unit installed.
Savings Dth	See Table 1.1.1.b	Decatherm savings per unit installed.
CF	See Table 1.1.2	Coincidence Factor
Hours	See Table 1.1.1.a	Annual Hours of Operation
Incremental costs	See Table 1.1.2	Difference in cost between the standard equipment and the more efficient equipment.
Measure Life	See Table 1.1.2	
O&M savings	See Table 1.1.2	

Customer Inputs	M&V Verified
Primary water heating fuel	Yes
Secondary water heating (booster water heating) fuel	Yes
Model Name	Yes
Model Number	Yes
Quantity	Yes
Size	Yes

Table 1.1.1.a Pre and Post Retrofit Dishwasher Electric [1]

Post-retrofit technology	Savings kW	Hours (Baseline & Efficient)
Energy Star Rated Dishwasher: Electric Water Heating without Booster Heater (Low Temperature) - Ref 3		
Under Counter	0.387	6570
Door Type	2.459	6570
Energy Star Rated Dishwasher: Electric Water Heating with Electric Booster Heater (High Temperature) - Ref 3		
Under Counter	0.483	6570
Door Type	1.806	6570
Energy Star Rated Dishwasher: Electric Water Heating with Gas Booster Heater (High Temperature) - Ref 3		
Under Counter	0.389	6570
Door Type	1.195	6570
Energy Star Rated Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)		
Under Counter	0.318	6570
Door Type	0.737	6570

Table 1.1.1.b Pre and Post Retrofit Dishwasher [1]

Post-retrofit Technology	Type	Dishwasher Dth/yr
Energy Star Rated Dishwasher: Gas Water Heating without Booster Heater (Low Temperature)	Under Counter	10.62
	Door Type	67.53
Energy Star Rated Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)	Under Counter	4.52
	Door Type	29.36
Energy Star Rated Dishwasher: Gas Water Heating with Gas Booster Heater (High Temperature) - Ref 3	Under Counter	7.11
	Door Type	46.14
Energy Star Rated Dishwasher: Electric Water Heating with Gas Booster Heater (High Temperature) - Ref 3	Under Counter	2.58
	Door Type	16.78

Table 1.1.2 Deemed Equipment Information [1]

	Incremental Cost	Measure Life (yrs)	Coincidence Factor (CF)	Non-Energy O&M Savings	Energy O&M Savings
Dishwasher: Electric Water Heating without Booster Heater (Low Temperature) - Ref 3					
Under Counter	$50.00	10	85.40%	$66.97	$0.00
Door Type	$0.00	15	85.40%	$425.95	$0.00
Dishwasher: Electric Water Heating with Electric Booster Heater (High Temperature) - Ref 3					
Under Counter	$120.00	10	85.40%	$28.52	$0.00
Door Type	$770.00	15	85.40%	$185.20	$0.00
Dishwasher: Electric Water Heating with Gas Booster Heater (High Temperature) - Ref 3					
Under Counter	$120.00	10	85.40%	$28.52	$0.00
Door Type	$770.00	15	85.40%	$185.20	$0.00
Dishwasher: Gas Water Heating without Booster Heater (Low Temperature)					
Under Counter	$50.00	10	n/a	$66.97	$0.00
Door Type	$0.00	15	n/a	$425.95	$0.00
Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)					
Under Counter	$120.00	10	n/a	$66.97	$0.00
Door Type	$770.00	15	n/a	$425.95	$0.00
Dishwasher: Gas Water Heating with Gas Booster Heater (High Temperature)					
Under Counter	$120.00	10	n/a	$7.64	$0.00
Door Type	$770.00	15	n/a	$67.61	$0.00

References:

1. ENERGY STAR

Changes from Recent Filing:

None

1.2 Food Service

Algorithms

$$Customer\ kW = Savings\ kW$$

$$Customer\ kWh = Savings\ kW\ \times Hours$$

$$PCkW = Savings\ kW\ \times CF$$

$$Customer\ Dth = (BTU\ Savings\ Factor \times Input\ Capacity)/1000000$$

Variables

Savings kW	See Table 1.2.1.a	Kilowatt savings per unit installed.
BTU Savings Factor	See Table 1.2.1.b	Annual BTU savings per Btuh input of cooking appliance
CF	See Table 1.2.2.a	Coincidence Factor
Hours	See Table 1.2.1.a	Annual Hours of Operation
Incremental costs	See Table 1.2.2.b	Difference in cost between the standard equipment and the more efficient equipment.
Measure Life	See Table 1.2.2.b	

Customer Inputs	**M&V Verified**
Model Name	Yes
Model Number	Yes
Quantity	Yes
Size	Yes
Input Capacity BTUH	Yes

Table 1.2.1.a Pre and Post Restrofit Equipment [3]

Post-retrofit technology	**Pre-retrofit technology**	**Savings kW**	**Hours (Baseline & Efficient)**
Hot Food Holding Cabinet	Hot Food Holding	0.29	5475

Table 1.2.1.b Pre and Post Restrofit Equipment [1,4]

Post-retrofit technology	**Pre-retrofit technology**	$BTU_{Cooking\_Appliance}$ Savings Factor (Btu per Btuh_In per year)
Convection Oven	Deck Oven	1,892
Conveyor Oven	Pizza Deck oven	1,542
Combi-Oven	Steamer	1,183
Fryer	Standard Fryer	328
Pasta Cooker	Range	1,689
Upright Broiler	Standard Radiant	1,041
Charbroiler	Standard Charbroiler	1,078
Salamander Broiler	Standard Salamander Broiler	885
Rotisserie Oven	Open Flame	554
Rotating Rack Oven	Deck Oven	948

Table 1.2.2.a Deemed Equipment Information [3]

	Measure Life (yrs)	**Baseline Cost**	**Incremental Cost**	**Coincidence Factor (CF)**
Hot Food Holding Cabinet	12	$2,069	$1,713	85.40%

Table 1.2.2.b Deemed Equipment Information [4]

	Measure Life (years) 2	Incremental Cost Per Name Plate Input Btuh ($/Btuh_In) [4,5]
Convection Oven	12	$0.0375
Conveyor Oven	12	$0.0590
Combi-Oven	12	$0.0356
Rotisserie Oven	12	$0.0156
Rotating Rack Oven	12	$0.0295
Fryer	12	$0.0424
Pasta Cooker	12	$0.0310
Upright Broiler	12	$0.0377
Charbroiler	12	$0.0267
Salamander Broiler	12	$0.0165

References:

1. Savings per installed BTU derived from the Arkansas Food Service Deemed Savings table
2. Minnesota TRM 3.0
3. ENERGY STAR
4. MN DER, 2012 Deemed Savings
5. Incremental costs confirmed using "Commercial Cooking Appliance Technology Assessment, FSTC Report #5011.02.2, Food Service Technology Center, 2002" and product

Changes from Recent Filing:

1.3 Ozone Laundry

Algorithms

$$Custmer\ Therms = \left(\frac{HW_e}{WH_{eff}}\right) \times W_{utiliz} \times W_{hotusage} \times \%HotWaterSavings$$

$$Customer\ Water\ Savings = W_{usage} \times W_{utiliz} \times \%Water\ Savings$$

$$O\&M\ Savings = (Water\ Savings \times (Water\ Rate + Sewer\ Rate) \div 1000) - (o\&M\ Cost \times Lb\ Capacity)$$

Variables

% Hot_Water_Savings	0.81	How much more efficient is an ozone injection machine as a rate of hot water reduction (Reference 2)
W_{usage} (gal/lb of laundry)	2.03	How efficiently a typical conventional washing machine utilized hot and cold water per unit of clothes washed (Reference 2)
% Water_Savings	25%	How much more efficient an ozone injection washing machine is compared to a typical conventional washing machine as a rate of hot and cold water reduction (Reference 2)
$W_{usage\text{-}hot}$ (gallons/lbs laundry)	1.19	Hot water used by a typical conventional washing machine (Reference 2)
HW_e(Therms/gal)	0.007193	Energy required to make 140F hot water from 51.9 F ground water
Water Rate ($/1000 gal)	3.44	Reference 3
Sewer Rate ($/1000 gal)	5.04	Reference 3
Water Heater Thermal Efficiency (WH_{Eff})	See Table 1.3.1	
O&M Cost ($ per lb capacity of washing machine)	$0.79	Reference 3
$Therm_{baseline}$ / Lb capacity of washing machine	37.9	Reference 3
Incremental costs	See Table 1.3.2	Difference in cost between the standard equipment and the more efficient equipment.
Measure Life	See Table 1.3.2	

Customer Inputs	M&V Verified	
Wutiliz (lbs laundry/yr)	Yes	Annual pounds of clothes washed per year.
Water Heater Type	Yes	Standard Gas Storage WH, Condensing Gas WH, Tankless Gas WH or Plant Gas Boiler with Storage Tank
Lb capacity of washing machine	Yes	Lb capacity of washing machine served by ozone generator

Table 1.3.1 Water Heater Efficiencies for Ozone Laundry

Water Heater Type	Thermal Eff (%)
Gas Non-Condensing Storage	80%
Gas Condensiing Storage	95%
Gas Tankless	96%
Gas Storage with Side-Arm Boiler	80%

Table 1.3.2 Measure Lifes and Incremental Costs [1,2]

	Lifetime Years	Incremental Cost
Ozone Washing Machine <=100lbs	10	$8,750.00
Ozone Washing Machine >100lbs<500lbs	10	$15,500.00
Ozone Washing Machine =>500lbs	10	$27,500.00

References:

1. MN custom rebates and conversations with Distributors (Tim Stoklosa, Clean Energy Designs in Lakewood CO)
2. Illinois 2017 TRM ; http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-TRM_Effective_010118_v6.0_Vol_2_C_and_I_020817_Final.pdf
3. St Paul 2015 Water Rate Schedule - http://mn-stpaul.civicplus.com/DocumentView.asp?DID=3493 (From 2017-2019 MN Energy Efficient Showerhead Tech Assumptions)

Changes from Recent Filing:

1.4 Steam Cookers

Algorithms

$$Customer\ Dth = Quantity \times (Therm\ Savings)/10$$

$$O\&M\ Savings = Quantity \times Water\ Savings \times Water\ Rate$$

Variables

Therm Savings	See Table 1.4.1	Therms saved by Energy Star Steam Cooker (Reference 2)
Water Savings	See Table 1.4.1	Gallons of water saved by Energy Star Steam Cooker (Reference 2)
Incremental costs	See Table 1.4.2	Difference in cost between the standard equipment and the more efficient equipment. (Reference 2)
Measure Life	See Table 1.4.2	(Reference 3)

Customer Inputs	M&V Verified
Facility Description	Yes
Number of Pans	Yes
Quantity	Yes

Table 1.4.1 Steam Cooker Savings [2]

Facility Description	Number of Pans	Therm Savings	Gallons of Water Saved
Fast Food 6am-Midnight	3	1,043	72,000
	4	1,201	96,000
	5	1,362	120,000
	6+	1,520	144,000
Fast Food 24 Hr	3	1,299	90,000
	4	1,498	120,000
	5	1,699	150,000
	6+	1,898	180,000
Casual Dining 3pm-11pm	3	348	23,500
	4	398	31,200
	5	449	39,000
	6+	499	46,800
Casual Dining 11am-11pm	3	570	39,000
	4	655	52,000
	5	724	65,000
	6+	827	78,000
Casual Dining 24 Hr	3	1,299	90,000
	4	1,498	120,000
	5	1,699	150,000
	6+	1,898	180,000
Institutional	3	537	36,500
	4	616	48,667
	5	696	60,833
	6+	776	73,000
School	3	137	9,000
	4	156	12,000
	5	175	15,000
	6+	194	18,000

Table 1.4.2 Deemed Equipment Information [4]

	Measure Life	Incremental Cost
Steam Cooker	12	$2,270.00

References:

1. Department of Energy. ENERGY STAR Commercial Steam Cooker Key Product Criteria, August 2003
2. Department of Energy. Savings Calculator for ENERGY STAR Certified Commercial Kitchen Equipment, October 2016
3. California Public Utilities Commission, Database for Energy Efficiency Resources (DEER). Spreadsheet: “DEER2014 EUL table update” February 2014
4. CleaResult Work Paper - Energy Star Steam Cooker

Changes from Recent Filing:

None

1.5 Advanced Power Strips - Replacement

Algorithms

$$Customer\ kWh = kWh_{Baseline} \times Savings\ Factor$$

$$Customer\ kW = \frac{Customer\ kWh}{Hours\ of\ Use}$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

$kWh_{Baseline}$	356	Annual average consumption of baseline power strip (References 1, 4)
Savings Factor	19%	(References 1, 5)
Hours of Use	6588	Annual Hours of Use (References 1, 5)
Coincidence Factor	83%	Peak Coincidence Factor (References 1, 6)
Lifetime	7	Measured lifetime (References 1, 3)

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0
2. Illinois Stakeholder Advisory Group. Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 6.0, Volume 3.
3. Electroinics and Energy Efficiency: A Plug Load Characterization Study SCE0284, Southern California Edison, Ohio Enrgy Utilities Technical Resouce Manual.
4. Cadmus, Only as Smart as It's Owner: A Connected Device Study.
5. Illume, Overview of the Tier 1 Advanced PowerStrip: Potential Savings and Programmatic Uses. September 15, 2014 http://www.amconservationgroup.com/wp-content/uploads/2014/12/Illume-Advanced-Powerstrip-Case-Study.pdf
6. Efficiency Vermont, Technical Reference User Manual (TRM), pages 138-141. December 31, 2018

Changes from Recent Filing:

1. None

1.6 ENERGY STAR Clothes Dryer

Algorithms

$$Customer\ kWh = Load * \left(\frac{1}{CEF_{Base}} - \frac{1}{CEF_{Eff}}\right) * N_{Cycles} * \left(\frac{\%Electric}{ADJ_{CEF}}\right)$$

$$Customer\ Coincident\ kW = \frac{Customer\ kWh}{Hours} / \times Coincidence\ Factor$$

$$Customer\ Dth = Load * \left(\frac{1}{CEF_{Base}} - \frac{1}{CEF_{Eff}}\right) * N_{Cycles} * 0.003412 * \left(\frac{\%Gas}{ADJ_{CEF}}\right)$$

Variables

Load	Table 1.6.1	Average total weight of clothes per drying cycle (Reference 3)
CEF_{Base}	Table 1.6.1	Combined energy factor of baseline unit (Reference 4)
CEF_{Eff}	Table 1.6.1	Combined energy factor of efficient unit (Reference 3)
ADJ_{CEF}	0.7	CEF Adjustment factor, =0.7 for standard dryers
N_{Cycles}	250	Annual number of dryer loads (Reference 5)
%Electric	Table 1.6.1	Percent of energy savings from electricity (Reference 6)
%Gas	Table 1.6.1	Percent of energy savings from gas (Reference 6)
Coincidence Factor	0.029	Coincidence Factor (Reference 8)
Hours	234	Annual Hours of Use (Refernce 7)
Lifetime	14	Measured Lifetime (Reference 1)

Table 1.6.1 Loads and CEF Values Across Dryer Types

Dryer Product Class	Load (lbs)	CEF_{Base}	CEF_{Eff}	%Electric	%Gas
Electric, Vented or Ventless, Standard	8.45	3.73	3.93	100%	0%
Gas, Vented, Standard	8.45	3.30	3.48	16%	84%

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 20, 2023
2. Bringing North American Clothes Dryers into the 21st Century: A Case Study in Moving Markets VEIC Grasteu Associates, CLASP 2012
3. Energy Star key product criteria for clothes dryers established May 19, 2014 https://www.energystar.gov/products/appliances/clothes_dryers/key_product_criteria
4. Title 10, Code of Federal Regulations, Part 430 - Energy Conservation Program for Consumer Products, Subpart C- energy and Water Conservation standards and Their Compliance Dates https://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=10:3.0.1.4.18.3.9.2
5. Residential Energy Consumption Survey Table HC3.7, Appliances in homes in the Northeast and Midwest Regions, 2015 https://www.eia.gov/consumption/residential/data/2015/hc/php/hc3.7.php
6. ENERGY STAR Residential Clothes Dryer Data and Analysis Draft 2 Version 1.0, August 5, 2013
7. Ecotope Inc. Dryer Field Study. Page 102 November 20, 2014 https://neea.org/img/uploads/neea-clothes-dryer-field-study.pdf
8. Navigant Consulting. EmPower Maryland Draft Final Evaluation Report Evaluation Year 4 Appliance Rebate Program March 21, 2014

Changes from Recent Filing:

Updated energy savings calculations to match MN TRM 4.0
Changed lifetime from 12 to 14 yrs

1.7 ENERGY STAR Clothes Washer

Algorithms

$$Customer\ kWh = \left(\left(\frac{Cap * N}{IMEF_{Base}}\right) * \left(CW_{Base} + \frac{DHW_{Base} * \%Electric_{DHW}}{R_{Eff}} + \left(Dry_{Base} * \%Electric_{Dry}\right)\right)\right) - \left(\left(\frac{Cap * N}{IMEF_{EE}}\right) * \left(CW_{EE} + \frac{DHW_{EE} * \%Electric_{DHW}}{R_{Eff}} + \left(Dry_{EE} * \%Electric_{Dry}\right)\right)\right)$$

$$Customer\ Coincident\ kW = \frac{Customer\ kWh}{Hours} \times Coincidence\ Factor$$

$$Customer\ Dth = \left(\left(\frac{Cap * N}{IMEF_{Base}}\right) * \left(\frac{DHW_{Base} * (1 - \%Electric_{DHW})}{R_{Eff}} + \left(Dry_{Base} * (1 - \%Electric_{Dry})\right)\right)\right) - \left(\left(\frac{Cap * N}{IMEF_{EE}}\right) * \left(\frac{DHW_{EE} * (1 - \%Electric_{DHW})}{R_{Eff}} + \left(Dry_{EE} * \left(1 - \%Electric_{Dry}\right)\right)\right)\right) * 0.003412$$

Variables

Cap	3.45	Clothes washer drum capacity (ft^3). If unknown, assume 3.45ft^3 (Reference 1).
$IMEF_{Base}$	Table 1.7.1	Integrated Modified Energy Factor for Federal Minimum equipment (ft^3/kWh/cycle) (Reference 1).
$IMEF_{EE}$	Table 1.7.1	Integrated Modified Energy Factor for EnergyStar equipment (ft^3/kWh/cycle) (Reference 1).
N	Table 1.7.1	Annual number of loads (Reference 1).
CW_{Base}	7%	Percentage of total energy consumption for clothes washer operation for baseline equipment (Reference 1).
CW_{EE}	6%	Percentage of total energy consumption for clothes washer operation for EnergyStar equipment (Reference 1).
DHW_{Base}	33%	Percentage of total energy consumption for water heating for baseline equipment (Reference 1).
DHW_{EE}	31%	Percentage of total energy consumption for water heating for EnergyStar equipment (Reference 1).
Dry_{Base}	59%	Percentage of total energy consumption for dryer operation for baseline equipment (Reference 1)
Dry_{EE}	62%	Percentage of total energy consumption for dryer operation for EnergyStar equipment (Reference 1)
$\%Electric_{DHW}$	Table 1.7.2	Percent of domestic hot water savings assumed to be electric (Reference 1).
$\%Electric_{Dry}$	Table 1.7.2	Percent of dryer savings assumed to be electric (Reference 1)
R_{Eff}	Table 1.7.2	Recovery efficiency (Reference 1).
Coincidence Factor	Table 1.7.1	Coincidence Factor (Reference 1).
Hours	Table 1.7.1	Annual Hours of Use (Reference1).
Lifetime	11	Measured Lifetime (Reference 1).

Table 1.7.1 Sector Breakout

Sector	Unit Type	$IMEF_{Base}$	$IMEF_{EE}$	N	Hours	Coincidence Factor
Single Family	Top Loading	1.84	2.76	258	258	3.8%
Single Family	Front Loading	1.57	2.06	258	258	3.8%
Mutifamily	Commercial Front Load	2.00	2.20	1241	1241	4.5%

Table 1.7.2 Washer Fuel Type by Factor

Fuel Type	$\%Electric_{DHW}$	$\%Electric_{Dry}$	R_{Eff}
Electric	100%	100%	98%
Gas	0%	0%	78%

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 20, 2023

Changes from Recent Filing:

Updated energy savings calculations to match MN TRM 4.0

1.8 ENERGY STAR Dehumidifiers

$$Customer\ kWh = CAP\ x\ Coversion\ Factor\ x\ Hours\ x\ \left(\frac{1}{EF_{Baseline}}\ -\frac{1}{EF_{Efficient}}\right)x\ \frac{1}{24}$$

$$Customer\ kW = \frac{Customer\ kWh}{Hours\ of\ Use}$$

$$Customer\ Coincident\ kW =\ Customer\ kW \times Coincidence\ Factor$$

Variables

CAP	Customer Input	Capacity (pints/day) (50 pints/day if unknown)
Conversion Factor	0.473	Conversion Constant (Liters to pint conversion factor)
Coincidence Factor	60%	Coincidence Factor (References 1, 3)
Hours	1933	Annual Hours of Use (References 1, 3)
Lifetime	12	Measure Lifetime (References 1, 2)
Incremental Cost	Table 1.8.2	Incremental Capital Cost shown by program (Reference 6)
$EF_{Baseline}$	Table 1.8.1	Energy Factor of baseline standard (Reference 1)
$EF_{Efficient}$	Table 1.8.1	Energy Factor of new ENERGY STAR unit (Reference 1)

Table 1.8.1

Product Capacity (Pints/Day)	$EF_{Baseline}$	$EF_{Efficient}$
≤ 25	≥ 1.30	≥ 1.57
> 25 to ≤ 50	≥ 1.60	≥ 1.80
> 50	≥ 2.80	≥ 3.30

Table 1.8.2

Program	Incremental Capital Cost
Home Energy Savings Program - MN	$289.00
Low Income Multi-Family - MN	$289.00
Low Income Home Energy Squad - MN	$220.00
Home Energy Squad - MN	$50.00
Whole Home Efficiency - MN	$50.00
Residential HVAC - MN	$50.00

Vendors provide actual cost data

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 31, 2023; Measure: "Residential HVAC - ENERGY STAR Dehumidifiers," Updated 9/2021
2. Savings Calculator for ENERY STAR Qualified Appliances
3. Center for Energy and Environment. Portable Dehumidification in Minnesota Single-Family Homes. September 23,2020
4. Electronic Code of Federal Regulations. Title 10, Part 430, SubpartC 430.32
5. ENERGY STAR Program Requirements for Dehumidifiers Version 5.0
6. Program Vendors

Notes:

1. This measure includes the installation of a new ENERGY STAR Dehumidifier or replacement of an old dehumidifier with an ENERGY STAR Unit.
2. Qualifying units shall be equipped with an adjustable humidistat control or shall require a remote humidistat control to operate.

Changes from Recent Filing:

1. None

1.9 ENERGY STAR Refrigerators

Algorithms

$$Customer\ kWh = \left(kWh_{Baseline} - kWh_{EnergyStar}\right)$$

$$Customer\ Coincident\ kW = \frac{Customer\ kWh}{Hours} \times Coincidence\ Factor$$

Variables

$kWh_{Baseline}$	Table 1.9.2	Annual energy consumption of the baseline efficiency unit (Reference 2).
$kWh_{EnergyStar}$	Table 1.9.2	Annual energy consumption of the ENERGY STAR unit (Reference 2).
Coincidence Factor	64%	Coincidence Factor (Reference 9).
Hours	8760	Annual Hours of Use (Reference 1).
Lifetime	Table 1.9.1	Measured Lifetime (Reference 1).

Table 1.9.1 Product Lifetime

Product	Lifetime
ENERGY STAR Refrigerators	14
ENERGY STAR Freezers	11

Table 1.9.2 Annual Energy Consumption for Refrigerators and Freezers

Product	Product Class	$kWh_{EnergyStar}$	$kWh_{Baseline}$	Energy Savings (kWh/year)
ENERGY STAR Refrigerators	Top-Mounted freezer or refrigerator only (automatic defrost)	320	356	36
ENERGY STAR Refrigerators	Side by side (automatic defrost)	384	426	42
ENERGY STAR Refrigerators	Side by side with through the door ice (automatic defrost)	514	562	48
ENERGY STAR Refrigerators	Bottom-mounted freezer (automatic defrost)	406	451	45
ENERGY STAR Refrigerators	Bottom-mounted freezer with through the door ice (automatic defrost)	562	615	53
Refrigerator Average				45
ENERGY STAR Freezers	Chest	272	302	30
ENERGY STAR Freezers	Compact Chest	345	383	38
ENERGY STAR Freezers	Compact Upright (manual defrost)	411	456	45
ENERGY STAR Freezers	Compact Upright (automatic defrost)	560	623	63
ENERGY STAR Freezers	Upright (manual defrost)	308	342	34
ENERGY STAR Freezers	Upright (automatic defrost)	412	458	46
Freezer Average				43

Table 1.9.3 Incremental Capital Cost

Program	ENERGY STAR Refrigerators	ENERGY STAR Freezers
Home Energy Savings Program - MN	$705.00	$405.00
Low Income Multi-Family - MN	$823.87	$347.94
Low Income Multi-Family Building Efficiency	$823.87	$347.94
Nonprofit Energy Savings Program - MN	$823.87	$347.94

Vendors provide actual cost data

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 20, 2023
2. 2008 Database for Energy efficient Resources, EUL/RUL (Effective/Remaining Useful Life) Values
3. Incremental costs from ENERGY STAR Appliances Savings Calculator.
4. Annual Energy Based on default unit volumes, Federal energy standards and ENERGY STAR requirements as given in the ENERGY STAR Calculator
5. Savings Calculator for ENERGY STAR- Qualified Appliances; workbook tabs 'Refrigerator Calcs,' 'Compact Refrigerator Calcs,' and 'Freezer Calcs.'
6. Code for Federal Regulations: Title 10, Chapter II, Subchapter D, Part 4303, Subpart B, Appendices A1 and B1
7. Energy Conservation Program: Standards for Residential Refrigerators, Refrigerator-Freezers, and Freezers; Final Rule, Table 1
8. ENERY STAR Program Requirements for Residential Refrigerators and Freezers, Table I.1
9. Data to support CF from "Domestic Refrigerators: Field Studies and Energy Efficiency Improvement", M. Siddhartha Bhatt, CPRI, July 2001.

Changes from Recent Filing:

1. None

Notes:

1.10 Dehumidifier Recycling

Algorithms

$$Customer\ kW = \frac{Customer\ kWh}{Hours\ of\ Use}$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Constants

Hours of Use	1933	Deemed operating hours per year (Reference 3)
Coincident Factor	100%	Probability of equipment operating during peak time (Reference 2)
Lifetime	5	Deemed remaining service lifetime of removed equipment (Reference 2)
Customer kWh	824	Deemed Average Annual Energy Consumption (kWh) (Reference 3)

Customer Inputs	M&V Verified
Existing Equipment Quantity	Yes
Product Capacity	Yes

Table 1.10.1

Program	Incremental Capital Cost
Home Energy Savings Program - MN	$15.00
Low Income Home Energy Squad - MN	$15.00
Low Income Multi-Family - MN	$15.00
Refrigerator Recycling - MN	$0.00

Vendors provide actual cost data

References:

1. Impact, Process, And Market Study Of The Connecticut Appliance Retirement Program: Overall Report; December 23, 2005; available at: https://www.energizect.com/sites/default/files/Appliance%20Retirement%2012-05.pdf

2. New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs – Residential, Multi-Family, and Commercial/Industrial Measures Version 6; April 16, 2018; available at: http://www3.dps.ny.gov/W/PSCWeb.nsf/All/72C23DECFF52920A85257F1100671BDD?OpenDocument

3. Minnesota CARD Contract 136775 Final Report - Portable Dehumidification in Minnesota Single Family Homes. Center for Energy and Environment. 2020.

Changes from Recent Filing:

1. None

Notes:

1. Assumed removal of equipment without replacement. This recycling program is achieving energy savings by preventing the old unit from entering the secondary market (Reference 1, page 20)

1.11 Refrigerator Recycling

Algorithms

$$Customer\ kWh = Existing\ Equipment\ Quantity\ \times kWh_{Base} \times Refrigerator\ Factor\ X\ Secondary\ Market\ Factor$$

$$Customer\ kW = \frac{Customer\ kWh}{Hours\ of\ Use}$$

$$Customer\ Coincident\ kW = \ Customer\ kW \times Coincidence\ Factor$$

Variables

Refrigerator Factor	Table 1.11.1	Deemed adjustment between refrigerators and freezers (Reference 3).
kWh_{Base}	Table 1.11.2	Deemed energy usage based on the age of the equipment (References 1,5,6,7,8,9).
Coincidence Factor	64%	Probability of equipment operating during peak time (Reference 4, Table 4).
Hours of Use	5,592	Annual hours in a year (8760) multiplied by the Coincidence Factor.
Lifetime	See Table 1.11.1	Deemed remaining service lifetime of removed equipment (References 2,9).

Table 1.11.1

Equipment	Refrigerator Factor	Lifetime	Secondary Market Factor
Freezer	0.85	7	1
Primary Refrigerator	1.00	8	0.85
Secondary Refrigerator	1.00	8	1

Table 1.11.2

	Standard Refrigerator
Year of equipment manufacture	kWh_{Base}
1970 and Earlier	2,344
1971	2,330
1972	2,316
1973	2,242
1974	2,205
1975	2,119
1976	1,996
1977	1,927
1978	1,879
1979	1,748
1980	1,637
1981	1,513
1982	1,505
1983	1,457
1984	1,423
1985	1,313
1986	1,324
1987	1,195
1988	1,176
1989	1,132
1990	1,129
1991	1,123
1992	1,117
1993	797
1994	792
1995	788
1996	790
1997	793
1998	795
1999	798
2000	800
2001	553
2002	550
2003	547
2004	543
2005	540
2006	537
2007	534
2008	531
2009	528
2010	525
2011	522
2012	519
2013	516
2014	429
2015	426
2016	424
2017	421

2018	419
2019	416
2020	414
2021	412

References:

1. Baseline kWh and Average to peak kW ratio from 1995 and 2012 versions of Residential Energy Data Sourcebook for the U.S. Residential Sector. Berkeley, CA: Lawrence Berkeley National Laboratory. LBNL-40297
2. Data on expected life for savings on secondary refrigerators, 9th year Persistence Study for Southern California Edison, KEMA-XENERGY, 2004
3. Estimate for annual energy use for freezers as percent of refrigerator use. See Table Final Estimates on page 6-15 of report by KEMA-XENERGY (2004). "Final Report, Measurment and Evaluation Study of 2002 Statewide Residential Appliance Recycling Program." February 13, 2004
4. Data to support CF from "Domestic Refrigerators: Field Studies and Energy Efficiency Improvement", M. Siddhartha Bhatt, CPRI, July 2001.
5. Degradation factor cited in "2006 Refrigerator/Freezer Recycling Program Evaluation", Snohomish County PUD, Kevin L. Smit, February 2007.
6. Shipment Weighted Efficiencies from Residential Energy Databook, Years 1950 - 1995, http://enduse.lbl.gov/Projects/RED.html
7. Refrigerator-Freezer Sizes and Energy Factors (Shipment-Weighted Averages), Residential Energy Databook, Years 1972 - 2010, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=5.7.5
8. Appliance Standards Awareness Project: Ref. Association of Home Appliance Manufacturers (AHAM)
9. Actual recent program data on age of recycled units were used to create weighted average energy consumption & remaining useful life of units recycled.
10. Data on Efficiency Standards, "Technical Support Document Refrigerators and Freezers", DOE, 2014.
11. Energy Star Program Requirements for Refrigerators. https://www.energystar.gov/ia/partners/product_specs/program_reqs/refrig_prog_req.pdf

Changes from Recent Filing:

Updated savings calculation by adding secondary market factor
Updated base kWh values

1.12 Lawn Equipment

Algorithms

$$Displaced\ Fuel\ [BTU] = Fuel\ Energy * Gasoline\ Displaced$$

$$Net\ Energy\ \ Savings\ \ [kWh] = (Displaced\ Fuel\ /Conversion\ kWh)\ \text{-}\ Charging\ kWh$$

$$Electric\ Usage\ Penatly[kWh] = Charging\ kWh * Quantity$$

Variables

Gasoline Displaced	Table 1.12.1	Gal/yr of Gasoline consumed by mower (Reference 19)
Charging kWh	Table 1.12.1	kWh/yr consumed for charging efficient mower (Reference 19)
Incremental Cost	Table 1.12.2	Incremental Cost of Mower Equipment (Reference 19)
Fuel Energy	120286	BTU/gal of Gasoline
Conversion MMBTU	1000000	BTU/MMBTU
Conversion kWh	3412	BTU/kWh
Lifetime	10	Years (Reference 19)

Table 1.12.1
(Reference. 1)

	Push Mower	Riding Mower
Charging kWh [kWh/yr]	26	140.4
Gasoline Displaced [Gal/yr]	6.9	20

Table 1.12.2
(Reference. 1)

	Push Mower	Riding Mower
Incremental Cost	$75	$800

Customer Inputs	**M&V Verified**
Quantity of Proposed Equipment	Yes
Mower Type	Yes

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 31, 2023; Measure: "Residential Efficient Fuel Switching - Outdoor Equipment,"

Changes from Recent Filing:

New Measure

1.13 Commercial Electric Lawn Mowers

Algorithms

$$Customer\ kWh = -Quantity\ \times kWh\ per\ Hr\ \times Annual\ Hrs$$

$$Customer\ kW = Customer\ kWh\ /(Annual\ Hours\ \times Charge\ Rate\ Ratio)$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

$$Gasoline\ Gallons = Quantity \times Gas\ Cons\ \times Annual\ Hrs$$

Variables

	Push Mower	Riding Mower	
Gas Cons	0.3	0.5	Gasoline consumption per operating hour, gallons (Ref 19)
kWh per Hr	1	3.5	Electric use per operating hour, kWh (Ref 19)
Unit Incremental Cost	$75	$800	Incremental Cost per Mower (Ref 19)
Coincidence Factor	10%	10%	Coincidence factor of electric charging, assumed
Lifetime	10	10	Lifetime (Ref 19)
Charge Rate Ratio	200%	150%	Assumed ratio of charge time to discharge time, as battery charge rates are typically slower than discharge rates.

Customer Inputs	M&V Verified	
Quantity	Yes	Quantity of mowers
Annual Hours	Yes	Annual operating hours per mower
Mower Type	Yes	

References:

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 31, 2023; Measure: "Commercial Efficient Fuel Switching - Outdoor Equipment,"

Changes from Recent Filing:

New Measure

Notes:

1. Assumed coincidence factor based on behavioral aspect, outdoor work is minimized on the hottest days of the summer, reducing the amount of charging required on those days. For those who do charge on those days, charging is assumed to begin part way through the peak period at the close of business.

2.1 Behavioral

Algorithms

$$Customer\ kWh = \left(kWh_{Baseline} - kWh_{Proposed}\right) \times F$$

$$Customer\ Coincident\ kW = (PC\ kW_{Baseline} - PC\ kW_{Proposed}\ ) \times F$$

$$Customer\ therms = \left(therms_{Baseline} - therms_{Proposed}\right) \times F$$

Variables

F	1/3	Factor to reduce the savings to 1/3 of the apparent savings over the 3 year life
C&I Lifetime	3	

Table 2.1.1

	Lifetime (yrs)
Behavioral Commercial	3
Behavioral Process	3

2.2 Behavioral Demand Response - MN

Algorithms

$$Customer\ kWh = 0$$

$$Customer\ Coincident\ kW = Control\ Cutomer\ kW\ - Treament\ Customer\ kW$$

Variables

$Treatment_{DR}$		Group of electric customers (unknown size) who do not opt out of program
$Control_{DR}$		Group of electric customers who are similar in structure (demographics, life stage, house size, geography) to the Treament Group, but receive no contact from Xcel or its contractors.
Control Customer kW	Measured by Vendor	Peak electric demand per Control household in the peak times each year. Average kW value is measured by vendor
Treatment Customer kW	Measured by Vendor	Peak electric demand per Treatment household in the peak times each year. Average kW value is measured by vendor
Lifetime	1	Assumed to be 1 year as the program induces behavior change and there is no equipment purchased.
Incremental Cost	$0.00	Assumed to be $0.00 as the program induces behavior change with no incurred capital costs
Operation & Maintenance (O&M) Savings	$0.00	Assumed to be none
NTG	100%	

Assumptions

Savings values are the average for all customers in the program
Values will be measured by vendor according to randomized control trial

References:

Changes from Recent Filing:

Created measure

2.3 High Bill Alerts - MN

Algorithms

$$Gross\ Customer\ kWh = kWh\ per\ Day\ \times Days\ per\ year$$

$$Net\ Customer\ Coincident\ kW = Gross\ Customer\ Coincident\ kW = 0$$

$$Gross\ Customer\ Dth\ = Dth\ per\ Day\ \times Days\ per\ year$$

$$Net\ Customer\ kWh = Gross\ Customer\ kWh\ + (Behavioral\ Adjustment\ \times\ Gross\ Customer\ kWh\ )$$

$$Net\ Customer\ Dth\ = Gross\ Customer\ Dth\ +\ (Behavioral\ Adjustment\ \times\ Gross\ Customer\ Dth)$$

Variables

kWh per Day	0.077	Average over all customers in the program from Cadmus Report
Dth per Day	0.00097	Average over all customers in the program from Cadmus Report
Days per Year	365	Number of days per year
Behavioral Adjustment	-2/3	This adjustment is applied to reduce the first year Gross Savings to 1/3rd of the actual savings in compliance with ordered treatment. Applies to Gross kWh, Gross Dth, Gross Coincident kW
Lifetime	1	Behavioral measures have a lifetime of 1 year
kW Saved	0	Behavioral programs assumed to not save peak demand

Assumptions

Savings value represents the average for all customers in the program regardless of whether or not they actually received an Alert
Behavioral measures do not have any demand savings
The Cadmus analysis showed more savings after the customers stopped receiving high bill alerts. We did not collect the necessary information to explain why that happens so it has not been included in this product at the moment. We will continue to monitor this during measure implementation

References:

Cadmus report on High Bill Alert Pilot Program

Changes from Recent Filing:

Incorporated the rule of 1/3 for behavioral programs into technical assumptions

2.4. Behavioral Residential

Algorithms

$$kWh\ SavedGross_{Monthly\ Treatment} = (Control\ kWh\ UsagePost_{Treatment} - Group\ Rebate\ Product\ Participation) - (Treatment\ kWh\ UsagePost_{Treatment} - Group\ Rebate\ Product\ Participation)$$

$$kWh_{Gross\ Annual} = \mathbf{\Sigma}\ kWh\ SavedGross_{Monthly\ Treatment}$$

$$Gross\ Coincident\ kW = Customer\ Daily\ kW \times Treatment\ Percent\ Savings \times Peak\ Factor \times Daily\ Usage\ at\ Peak \times Coincidence\ Factor$$

$$Dth\ Saved_{Gross\ Monthly\ Treatment} = (Control\ Dth\ UsagePost_{Treatment} - Group\ Rebate\ Product\ Participation) - (Treatment\ Dth\ UsagePost_{Treatment} - Group\ Rebate\ Product\ Participation)$$

$$Dth_{Gross\ Annual} = \mathbf{\Sigma}\ Dth\ SavedGross_{Monthly\ Treatment}$$

$$Net\ Saved\ kWh = kWhGross_{Annual} + (Behavior\ Adjustment \times kWhGross_{Annual})$$

$$Net\ Saved\ Coincident\ kW = Gross\ Coincident\ kW + (Behavior\ Adjustment \times Gross\ Coincident\ kW)$$

$$Net\ Saved\ Dth = DthGross_{Annual} + (Behavior\ Adjustment \times DthGross_{Annual})$$

Variables

$Treatment_{Print}$		Group of electric and gas customers receiving periodic paper reports providing feedback on their energy use.
$Treatment_{Email}$		Group of electric and gas customers receiving internet delivered reports that provide feedback on their energy use.
$Treatment_{Online}$		Group electric and gas customers (unknown size) who choose to opt-in to a web feedback portal that provides feedback on their energy use.
$Control_{Print}$		Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors.
$Control_{Email}$		Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors.
$Control_{Online}$		Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors.
Treatment kWh $Usage_{Post\ Treatment}$		Electrical energy use of the Treatment Group after the treatment as determined through multi-variate regression analysis.
Control kWh $Usage_{Post\ Treatment}$		Electrical energy use of the Control Group after the treatment as determined through multi-variate regression analysis.
Treatment Dth $Usage_{Post\ Treatment}$		Natural gas energy use of the Treatment Group after the treatment as determined through multi-variate regression analysis.
Control Dth $Usage_{Post\ Treatment}$		Natural gas energy use of the Control Group after the treatment as determined through multi-variate regression analysis.
Group Rebate Product Participation		Energy savings generated by participation in Xcel's rebate products for both Treatment and Control groups, kWh and Dth. Rebated product participation from other products, (e.g. new furnace), are savings that will be included in the regression analysis and deducted from the EFP results if statistically significant.
Behavioral Adjustment	-2/3	This adjustment is applied to reduce the first year Gross Savings to 1/3rd of the actual savings in compliance with ordered treatment. Applies to Gross kWh, Gross Dth, Gross Coincident kW
kWh $Saved_{Gross\ Monthly\ Treatment}$	Provided by Vendor	Monthly electric consumption savings for all homes in the treatment group.
Peak Monthly Customer kW	Provided by Vendor	Average electric demand savings per household achieved in the hour that contained the peak demand on Xcel Energy's system. Actual value is calculated each year.
Max Customer kW	Provided by Vendor	Maximum of the peak electric demand savings per household achieved in the months of June, July August or September of each year. Actual value is calculated each year.
Dth $Saved_{Gross\ Monthly\ Treatment}$	Provided by Vendor	Monthly natural gas consumption savings for all homes in the treatment group.
Peak Factor	Provided by Vendor	The ratio of energy usage in the peak hour to average hourly energy use. Actual value is calculated each year.
Daily Usage at Peak	Provided by Vendor	Percentage of energy usage in peak hour for daily total energy use. Actual value is calculated each year.
Coincidence Factor	See Table 2.2.4	Coincidence Factor used for estimating Peak Coincident kW in Forecasting. Actual Peak Coincidence at end of year performance is calculated from acutal overall system data and coincident residential customer measured performance.
Lifetime	1	Assumed to be 1 year as the program induces behavior change and there is no equipment purchased.
Incremental Cost	$0.00	Assumed to be $0.00 as the program induces behavior change with no incurred capitol costs.
Operation & Maintenance (O&M) Savings	$0.00	Assumed to be 0.
NTG	100%	

Table 2.2.4

Measure Description	Coincidence Factor
Online Energy Feedback & Tools	85%
Print Feedback Reports	96%
Email Feedback Reports	96%

References:

1. Energy Feedback Program Data 2011-2022

Changes from Recent Filing:

None

3.1 All EDA Measures

Algorithms

$$Customer\ KW = KW_{Baseline} - KW_{Proposed}$$

$$Customer\ kWh = kWh_{Baseline} - kWh_{Proposed}$$

$$Customer\ Coincident\ (PC)KW = Customer\ KW \times Coincidence\ Factor$$

$$Customer\ Dth = Dth_{Baseline} - Dth_{Proposed}$$

Variables

Baseline_kW	Calculated	Energy simulation output corresponding with the peak baseline building electrical load coincident with summer cooling design conditions.
Proposed_kW	Calculated	Energy simulation output corresponding with the peak proposed building electrical load coincident with summer cooling design conditions.
CF	Calculated	Energy simulation output corresponding with the peak proposed building electrical load coincident with summer cooling design conditions.
Baseline_kWh	Calculated	Energy simulation output corresponding with the annual baseline building electrical consumption.
Proposed_kWh	Calculated	Energy simulation output corresponding with the annual proposed building electrical consumption.
Baseline_Dth	Calculated	Energy simulation output corresponding with the annual baseline building natural gas consumption.
Proposed_Dth	Calculated	Energy simulation output corresponding with the annual proposed building natural gas consumption.

Customer Inputs	M&V Verified	
		Building Characteristics for the proposed building are defined by building design team,
		Characteristics for the baseline building are defined by the energy consultant, utilizing methodology described by ASHRAE 90.1 Standard Appendix G and supplemented by Xcel Energy where required to accommodate regulatory requirements.

References:

Changes from Recent Filing:

3.2 All EEB Measures

Description

Energy Efficient Buildings (EEB) is a holistic program including electric and gas measures. Third-party consultants work with customer design teams to identify prescriptive measures from all utility programs for new commercial buildings or retrofits of existing commercial buildings. Custom measures are used for energy savings opportunities not currently available in the prescriptive programs.

Algorithms

N/A

Variables

N/A	N/A	N/A

Customer Inputs	M&V Verified	
		Building Characteristics for the proposed building are defined by building design team, which includes engineers, contractors, and architects.

References:

Changes from Recent Filing:

3.3 Commercial Code Compliance

Algorithms

$$Program\ Net\ Annual\ Therms = (Program\ Gross\ Potential\ Annual\ Therms * Construction\ Adjustment\ Factor) * Compliance\ Rate * Annual\ Utility\ Attribution$$

$$Program\ Net\ Annual\ kWh = (Program\ Gross\ Potential\ Annual\ kWh * Construction\ Adjustment\ Factor) * Compliance\ Rate * Annual\ Utility\ Attribution$$

$$Program\ Net\ PC\ kW = \frac{Program\ Net\ Annual\ kWh}{8760}$$

Variables

Program Gross Potential Annual kWh	Calculated Value	Calculated value for annual electric savings for each program year (see Description 3.3.1).
Program Gross Potential Annual Therms	Calculated Value	Calculated value for annual gas savings for each program year (see Descrption 3.3.1)
Construction Adjustment Factor	See Description 3.3.1	Xcel Energy included an adjustment factor applied to the program gross potential annual kWh to account for differences in assumed construction volume and actual construction
Compliance Rate	Table 3.3.2	Assumed compliance rate for each year after a new code is adopted. (See Description 3.3.2)
Annual Utility Attribution	Calculated Value	Assumed 68% for construction affected by 2024 program activities, and 76% for 2025-2029 program activities (see Table 3.3.5 and Description 3.3.3).
Conversion Factor	0.001	1000kWh per MWh

Customer Inputs	M&V Verified
None	N/A

Table 3.3.1 Gross Annual Commercial Electric Savings

Program Year	Gross Potential Savings (MWh)
2024	0
2025	13,089,853
2026	52,807,129
Total	65,896,982

Table 3.3.2 Gross Annual Commercial Gas Savings

Program Year	Gross Potential Savings (Dth)
2024	0
2025	109,820
2026	1,908,322
Total	2,018,142

Table 3.3.3 Compliance Rates By Year Since Code Adopted (Program Year)

Program Year	Commercial Compliance Rate
PY1 (2024)	80%
PY2 (2025)	85%
PY3 (2026)	70%

Table 3.3.4 Assumed Code Adoption Schedule By County Group

Sector	PY0 Baseline	PY1 2024	PY2 2025	PY3 2026
Commercial	IECC2016	IECC2019	IECC2019	IECC2019

Table 3.3.5 Code Compliance Activities in Minnesota & Utilities' Proportion

Activity	Department of Labor & Industry	U of MN	AMBO	Utilities PY1 (2024)	Portion Attributable to Utilities PY1 (2024)	Utilities PY2-3 (2025-26)	Portion Attributable to Utilities PY2-3 (2025-26)
Trainings	$7,600	$3,000	$800	$24,975	68%	$50,950	81%
Circuit Rider	$144,000	$0	$0	$240,000	63%	$360,000	71%
Technical Tools	$0	$0	$0	$64,688	100%	$73,063	100%
Utility Attribution					68%		76%

Descriptions

3.3.1 Program Gross Potential Annual kWh

Gross potential savings was calculated by comparing the difference between a building's energy use intensity (EUI) that just meets a jurisdictions current energy code and a building's EUI that just meets the previous code. The gross potential savings calculation assumes that all buildings are 100% compliant with code and that there is no over- or under-performance of buildings relative to code, which prevents double counting of savings relative to new construction programs.

Minnesota adopts code statewide. As such, gross potential savings in Minnesota was conducted in two groups, one each for climate zones 6A and 7.

As discussed in Section 4.2 of the Report (page 32), under current state law, Minnesota energy codes can be updated every six years. During 2020, the last update cycle, the energy code was not updated. There were two bills in the Minnesota legislature in 2022 that could impact the energy code, but neither bill was adopted. Therefore, we assumed the state would remain on the same six year cycle during the forecast period with the next code update enforced in 2026. The Department of Labor and Industry started the review process for the 2021 IECC, so we assumed the state would adopt 2021 IECC for residential. For these calculations, we assumed that codes become effective at the start of the calendar year. The resulting code adoption schedule is shown in Table 21.1.4 Assumed Code Adoption Schedule By County Group (See CHAPTER 4.2 AND PAGE 33 OF REPORT).

Savings were calculated for each year of the program using the EUI for each building type within each county group and the code adoption schedule. Detailed information, data sources, and assumptions for construction data is discussed in the gross potential savings section of the report (Chapter 4.2 pages 30-34) and Appendix C pages C-1 through C-7.

Given actual construction starts may differ from the forecast, the Construction Adjustment Factor can be applied to account for differences between anticipated and observed construction activity.

3.3.2 Compliance Rate

The gross potential savings assumes buildings are 100% compliant with code. However, in practice, not all buildings are 100% compliant with code. Minnesota compliance studies show increasing compliance with code as time goes on, which aligns with the results from compliance studies and programs in other states. Since the commercial code will have been on the 2012 IECC for 10 years by the time the proposed program would start, and the Minnesota compliance studies show high compliance, the utilities assumed the program would not achieve substantially higher compliance rates; full compliance was assumed for PY1 and PY2. Estimates of compliance from other regions at various points throughout a code cycle were used to estimate compliance for Minnesota after the new code is enforced in 2026. In other states, after a new code is adopted, compliance rates drop to between 50 – 80%, where 50% was found in a state (Arizona) where the code hadn't changed in a long time, and the program was fairly new; and 80% (Massachusetts) was found in a state where new codes were adopted every three years and had a robust codes program. As the Minnesota code hasn't changed in over a decade, the utilities assumed 60% compliance after the new code is adopted in 2026. By 2026 the program would be fully launched, so the utilities also assumed compliance will increase by 10% each year. Compliance rates are outlined in Table 21.1.3 Compliance Rates By Number of Years since Code Adoption and Program Year (See CHAPTER 4.2 AND PAGE 35 OF REPORT).

3.3.3 Annual Utility Attribution

Attribution refers to the portion of code savings that can be credited to the utility's program efforts for increasing code compliance or assisting with the adoption of codes and standards (Cadmus. "California Statewide Codes and Standards Program Impact Evaluation Phase Two Volume Two: 2013 T24." June 23, 2017). While there is not currently a codes program in Minnesota, there are other organizations that conduct compliance improvement activities in Minnesota. To capture the influence of these activities, the utilities gathered detailed information on activities performed by key market actors within the state. These activities, as well as proposed activities designed to meet current market gaps and complement existing activities, are shown in Table 21.1.4 Code Compliance Activities in Minnesota & Utilities Proportion (See CHAPTER 4.2 PAGES 37 OF REPORT). Additional details regarding the information collected is available in the section "Attribution & Claimable Savings" of the report page 36-37. The utilities then determined the proportion of each activity the utilities were responsible for relative to other actors, and took an average of these activities to determine the total proportion of code activities for which the utilities are currently responsible, which is shown in Table 21.1.4 Code Compliance Activities in Minnesota & Utilities Proportion (See CHAPTER 4.2 PAGE 37 OF REPORT). Attribution is lower in the first program year, at 68%, as it is assumed the program will be ramping up, and Minnesota is approaching the end of a code cycle. Attribution increases to 76% in PY2-PY6 once the utilities begin ramping up code compliance support activities in anticipation of a code change. It is important to note that this calculation assumes activities conducted by other organizations that conduct compliance improvement activities in Minnesota will remain constant; no ramp up in anticipation of a code change is assumed for these organizations.

References:

1. Minnesota Code Program Development Report, January 2023, Prepared by TRC

4.1 Electric Rate Savings

Algorithms

$$Customer\ kWh = Contract\ Interrupt\ Load \text{ x } Hours$$

$$Customer\ Coincident\ kW = Contract\ Interrupt\ Load \times Coincidence\ Factor$$

$$Customer\ kW = Contract\ Interrupt\ Load$$

Variables

Contract Interrupt Load	Customer Input	Contracted Demand Reduction. Amount of electric load reduction pledged by the customer. Assumed average for forecasting is 200 kW (Reference 1)
Hours	2.0	Full Load Hours of Operation. The equivalent full load hours during a typical year that a customer achieves energy savings at the Contracted Demand Reduction by controlling their electric load. (Reference 2)
Coincidence Factor	100%	Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak (Reference 1)
Lifetime	5	Measure Life (Years)
NTG	100%	

Customer Inputs	M&V Verified	
Contracted Demand Reduction	No	
Rate Group	No	

References:

1. Contracted Demand Reduction
2. Control Period history along with customer survey data

Changes from Recent Filing:

No Changes

4.2 Peak Partner Rewards

Algorithms

$$Customer\ kWh = kW\ Commitment \times Control\ Hours$$

$$Customer\ Coincident\ kW = kW\ Commitment \times Coincidence\ Factor$$

$$Customer\ kW = kW\ Commitment$$

Variables

kW Commitment	Customer Input	Customer's average electrical load reduction during summer months
Coincidence Factor	100%	Percentage of Customer_kW savings that will coincide with peak summer kW savings
Control Hours	6	Estimated number of control hours called per year
Lifetime	1	Average contract duration

Inputs	Verified during M&V:
kW Commitment	Yes
Control Hours	Yes

References:

1. Control hours based on MN NSP Interruption history for last 5-years

Changes from Recent Filing

No Changes

4.3 Savers Switch

Algorithms

$$Customer\ kWh = (Baseline_{kW} - \ Proposed_{kW}) \times Hours$$

$$Customer\ Coincident\ kW = \ Baseline\_Efficiency \ \times \ Equipment\_Tons \times Coincidence\_Factor$$

$$Customer\ kW = Baseline\_Efficiency \times Equipment\_Tons$$

Variables

Equipment_Tons	Customer Input	AC unit tons.
Baseline_Efficiency_Single	1.091	Deemed single stage AC unit efficiency in kW/ton.
Baseline_Efficiency_Multi	1.091	Deemed multi stage AC unit efficiency in kW/ton.
Hours_Single	0.39	Deemed Full Load Hours of Operation for a single-stage smart switch.
Hours_Multi	0.27	Deemed Full Load Hours of Operation for a multi-stage smart switch.
Coincidence_Factor_Single	27.14%	Deemed Single Stage Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak. Based on analysis of metered data for actual historical Business Saver's Switch customers.
Coincidence_Factor_Multi	18.97%	Deemed Mutli-Stage Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak. Based on analysis of metered data for actual historical Business Saver's Switch customers.
Lifetime	15	Deemed Length of time the switch will be operational.
NTG	100%	Net-to-Gross factor for Saver's Switch will be 100% as customers would not have the ability to install a switch without the program.

Customer Inputs	**M&V Verified**	
AC unit tons	Yes	
Air conditioner single-stage or multi-stage	Yes	
Stage 1 and stage 2 tons (Multi-stage units only)	Yes	

References:

1. Updated PC kW & kWh savings per unit per event for smart switches. As a result other values such as coincidence factor and hours also updated.
2. Updated algorithms to match current practices.

Changes from Recent Filing:

Updated to 60% Cycling Factor

4.4 Smart Thermostat

Algorithms

$$STDR\ Customer\ kWh = Qty\_Prop\_Tons \times kWh\_Savings\_STDR$$

$$STDR\ Customer\ Coincident\ kW = Equip\_ST\_Tons \times kW\_Savings\_STDR \times STDR\_CF$$

$$STDR\ Customer\ kW = Equip\_ST\_Tons \times kW\_Savings\_STDR$$

$$STEE\ Customer\ kWh = Cooling\ kW\ Annual \times (ES\_Reduction\_Cooling) \times Cooling\ Hours$$

$$STEE\ CustomerGas\ Dth = Baseline\ Dth \times (ES\_Reduction\_Heating)$$

$$STEE\ Electric\ Heat\ kWh = Cooling\ kW\ Annual \times (ES\_Reduction\_Cooling) \times Cooling\ Hours + Heating\ kW \times (ES\_Reduction\_Heating) \times Heating\ Hours$$

$$STEE\ Customer\ Coincident\ kW = Cooling\ kW \times (ES\_Reduction\_Cooling) \times EnergyStar\_CF$$

Variables

Equip_ST_Tons	Customer Input	Quantity of Controlled tons
kW_Savings_STDR	0.368	Peak coincident kW savings per average commercial AC unit ton with a smart thermostat (Reference 3)
kWh_Savings_STDR	1.185	kWh savings per year per average commercial AC Unit ton with a smart thermostat (Reference 3).
ES_Reduction_Heating	6%	Energy Star Connected Thermostat criteria for annual heating equipment runtime reduction (Reference 3)
ES_Reduction_Cooling	9%	Energy Star Connected Thermostat criteria for annual cooling equipment runtime reduction (Reference 3)
STDR_CF	100%	Coincidence factor of demand response events
Cooling_kW	6.426	Average kW for cooling at full load
Cooling_kW_Annual	5.653	Average kW for cooling using seasonal efficiency
Cooling Hours	654	Annual cooling hours
Heating kW	5.000	Average kW for electric heating
Heating Hours	1,662	Annual heating hours
Baseline Dth	128.0	Baseline heating load per thermostat in Dth
EnergyStar_CF	0%	coincidence factor for ES Thermostats (Reference 4)
STDR Measure Life	5	Measure life for demand response DR
ES Measure Life	10	Measure life for Energy Star thermostat (Reference 4)
Incremental Cost	See Table 4.4.1	Incremental cost for ENERGY STAR smart thermostat

Customer Inputs	M&V Verified	
AC unit tons	Yes	
Air conditioner single-stage or multi-stage	Yes	
Stage 1 and stage 2 tons (Multi-stage units only)	Yes	

Table 4.4.1

Program	Cost
Nonprofit Energy Savings Program	$110.00
All Other	$95.00

References:

1. Xcel Energy, January 2016. Typical MN Business Single Stage Smart Switch Load Relief 2011-2015.
2. Xcel Energy, January 2016. Typical MN Business Dual Stage Smart Switch Load Relief 2011-2015.
3. Xcel Energy, October 2019. Commercial Smart Thermostat Demand Response Study
4. Minnesota Technical Resource Manual

Changes from Recent Filing:

No Changes

4.5 Critical Peak Pricing

Algorithms

$$Customer\ kWh = kW\ Reduction \text{ x } Control\ Hours$$

$$Customer\ Coincident\ kW = kW\ Reduction \times Coincidence\ Factor$$

$$Customer\ kW = kW\ Reduction$$

Variables

kW Reduction	Customer Input	Customer's average electrical load reduction during critical peak periods
Coincidence Factor	100%	Percentage of Customer_kW savings that will coincide with peak summer kW savings
Control Hours	16	Average number of control hours called per year (Reference 1)
Lifetime	1	Average contract duration
NTG		

Customer Inputs	M&V Verified	
kW Reduction	Yes	
Control Hours	Yes	

References:

1. Control hours based on MN NSP Interruption history for 2019-2021
2. Forecasted kW per customer based on actual load sheds from CO CPP pilot in 2020

Changes from Recent Filing:

Not applicable, new pilot

5.1 Energy Conservation Opportunity

$$Customer\ kW = kW\ Savings$$

$$Customer\ kWh = kW\ Savings \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

kWh Savings	29,167	Calculated on an individual basis. Estimate based on an average kWh savings from historical participation in the measure.
kW Savings	3.608	Calculated on an individual basis. Estimate based on an average kW savings from historical participation in the measure.
Hours	7,538	Based on average operating hours from historical participation in the measure.
Coincidence Factor	98.6%	Coincidence of energy demand savings to grid peak demand based on participation history in ECOs
Lifetime	5	Standard assumption for compressed air study life.
Incremental Cost	$390	Based on average incremental from historical participation in the measure.

References:

Historical participation in the measure for kW & kWh savings, costs & hours

Changes from Recent Filing:

Updated to recent history

5.2 Supply Side Study

$$\frac{kW}{SCFM} = \left(\frac{SCFM}{HP}\right)^{-1} \times \left(\frac{kW}{HP}\right) \div Motor\ Efficiency$$

$$Customer\ kW = Leak\ SCFM \times \left(\frac{kW}{SCFM}\right)$$

$$Customer\ kWh = Hours\ \times Customer\ kW$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Cost\ per\ Leak\ Fix \times \#\ of\ Leaks\ Fixed + Study\ Rebate$$

Variables

Leak SCFM	Study Input	Input from Compressed Air Supply Side Study
Motor Efficiency	94.0%	Assumed Average Air Compressor Motor Efficiency
SCFM / HP	4.25	Standard rule of thumb assumption for flow reduction on a typical 100 psig system with variable speed control. Savings claimed is to be later adjusted for in next Custom analysis following study.
kW / HP	0.746	Standard conversion from HP to kW.
kW / SCFM	0.187	
Hours	Study Input	Input from Compressed Air Supply Side Study
Lifetime	5	Standard assumption for compressed air study lifetime, and lifetime of a typical individual compressed air leak fix.
Coincidence Factor	100%	Savings is from flow reduction during all operating hours of the compressed air system, so is assumed to be coincident with the grid peak.
Cost per Leak Fix	$75	Standard assumption for all leak studies
# of Leaks Fixed	Study Input	Input from Compressed Air Supply Side Study

References:

(4) Analysis of Compressed Air Study participants 2017 - 2022
(7) Various anonymous retailer and vendor quotes
(10) Compressed Air Challenge (Best Practices Guide): source for baseline compressor curves, % efficiency/psi reduction, SCFM per orifice

Changes from Recent Filing:

No Changes

5.3 Cycling Dryers

Algorithms

$$Customer\ kWh = Quantity\ \times\ kWh\ Savings$$

$$Customer\ kW = Quantity\ \times\ kW\ Savings$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

Variables

kWh Savings	See Table 5.3.1	kWh savings based on Cycling Dryer rated CFM
kW Savings	See Table 5.3.1	kW savings based on Cycling Dryer rated CFM
Hours	See Table 5.3.1	Based on average operating hours from historical participation in compressed air studies.
Lifetime	20	Typical assumption for new industrial equipment
Coincidence Factor	79.7%	Coincidence of energy demand savings to grid peak demand based on Custom Compressed Air project history.
Incremental Cost	See Table 5.3.1	Incremental Cost of energy efficient equipment compared to less-efficient equipment option

Customer Inputs	M&V Verified	
Quantity of Cycling Dryers	Yes	
CFM of Cycling Dryer	Yes	

Table 5.3.1 Energy Savings and Costs For Cycling Dryers (Reference 4 & 7)

Dryer CFM	kW Savings	kWh Savings	Hours	Incremental Cost
75 CFM to 99 CFM Cycling Dryer	0.406	2,808	6,921	$1,554
100 CFM to 124 CFM Cycling Dryer	0.632	4,382	6,938	$1,686
125 CFM to 149 CFM Cycling Dryer	0.756	5,259	6,955	$1,818
150 CFM to 199 CFM Cycling Dryer	0.874	6,097	6,976	$1,950
200 CFM to 249 CFM Cycling Dryer	0.936	6,561	7,010	$2,214
250 CFM to 299 CFM Cycling Dryer	1.307	9,211	7,048	$2,478
300 CFM to 399 CFM Cycling Dryer	1.534	10,863	7,081	$2,742
400 CFM to 499 CFM Cycling Dryer	1.997	14,281	7,151	$3,271
500 CFM to 599 CFM Cycling Dryer	2.271	16,397	7,219	$3,799
600 CFM to 699 CFM Cycling Dryer	2.621	19,095	7,285	$4,327
700 CFM to 799 CFM Cycling Dryer	3.394	24,949	7,350	$4,855
800 CFM to 999 CFM Cycling Dryer	3.611	26,761	7,411	$5,384
1000 CFM to 1199 CFM Cycling Dryer	4.599	34,664	7,537	$6,440
1200 CFM to 1599 CFM Cycling Dryer	5.760	44,072	7,652	$7,497
1600 CFM to 1999 CFM Cycling Dryer	7.134	56,152	7,871	$9,610
2000 CFM to 2399 CFM Cycling Dryer	8.139	65,657	8,067	$11,723
2400 CFM to 2799 CFM Cycling Dryer	10.544	86,858	8,238	$13,837

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(7) Various anonymous retailer and vendor quotes

Changes from Recent Filing:

kW & kWh Savings updated with recent compressed air study history for all sizes
Incremental Costs updated to current market prices

5.4 Dryer Purge Demand Controls

Algorithms

$$Customer\ kWh = Quantity \times kWh\ Savings$$

$$Customer\ kW = Quantity \times kW\ Savings$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

Heatless Desiccant Dryer Variables		
kWh Savings	See Table 5.4.1	Annual kWh savings based on Heatless Desiccant Dryer rated CFM and the associated compressed air system.
kW Savings	See Table 5.4.1	Average kW savings based on Heatless Desiccant Dryer rated CFM and the associated compressed air system.
Incremental Cost	See Table 5.4.1	Incremental Cost of Purge/Dewpoint Controlled Heatless Desiccant Dryer compared to Uncontrolled Heatless Desiccant Dryer.
Heated Desiccant Dryer Variables		
kWh Savings	See Table 5.4.2	Annual kWh savings based on Heated Desiccant Dryer rated CFM and the associated compressed air system.
kW Savings	See Table 5.4.2	Average kW savings based on Heated Desiccant Dryer rated CFM and the associated compressed air system.
Incremental Cost	See Table 5.4.2	Incremental Cost of Purge/Dewpoint Controlled Heated Desiccant Dryer compared to Uncontrolled Heatless Desiccant Dryer.
Blower Purge Desiccant Dryer Variables		
kWh Savings	See Table 5.4.3	Annual kWh savings based on Blower Purge Desiccant Dryer rated CFM and the associated compressed air system.
kW Savings	See Table 5.4.3	Average kW savings based on Blower Purge Desiccant Dryer rated CFM and the associated compressed air system.
Incremental Cost	See Table 5.4.3	Incremental Cost of Purge/Dewpoint Controlled Blower Purge Desiccant Dryer compared to Uncontrolled Heatless Desiccant Dryer.

Variables

Lifetime	20	Typical assumption for new industrial equipment
Coincidence Factor	79.7%	Coincidence of energy demand savings to grid peak demand based on Custom Compressed Air project history.

Customer Inputs	M&V Verified	
Quantity of Desiccant Dryers with Demand Controls	Yes	
SCFM Rating of Dryers	Yes	
Desiccant Dryer Type	Yes	Heatless, Heated, or Blower Purge

Table 5.4.1 Heatless Desiccant Dryers w/ Purge/Dewpoint Demand Control (Reference 4 & 7)

Heatless Desiccant Dryer CFM	kW Savings	kWh Savings	Hours	Incremental Cost
90 CFM to 119 CFM Heatless Demand Control	3.845	26,652	6,931	$4,880.00
120 CFM to 159 CFM Heatless Demand Control	5.117	35,576	6,952	$4,894.00
160 CFM to 199 CFM Heatless Demand Control	6.784	47,370	6,983	$4,911.00
200 CFM to 249 CFM Heatless Demand Control	8.406	58,924	7,010	$5,064.00
250 CFM to 299 CFM Heatless Demand Control	10.343	72,855	7,044	$4,949.00
300 CFM to 399 CFM Heatless Demand Control	12.338	87,328	7,078	$4,974.00
400 CFM to 499 CFM Heatless Demand Control	15.996	114,323	7,147	$4,994.00
500 CFM to 599 CFM Heatless Demand Control	19.608	141,416	7,212	$5,025.00
600 CFM to 799 CFM Heatless Demand Control	22.976	167,239	7,279	$5,025.00
800 CFM to 999 CFM Heatless Demand Control	29.331	217,106	7,402	$5,042.00
1000 CFM to 1249 CFM Heatless Demand Control	35.091	263,881	7,520	$5,235.00
1250 CFM to 1499 CFM Heatless Demand Control	41.716	319,461	7,658	$5,145.00
1500 CFM to 1999 CFM Heatless Demand Control	47.545	370,136	7,785	$5,169.00
2000 CFM to 2499 CFM Heatless Demand Control	57.309	459,329	8,015	$5,237.00

Table 5.4.2 Heated Desiccant Dryers w/ Purge/Dewpoint Demand Control (Reference 4 & 7)

Heated Desiccant Dryer CFM	kW Savings	kWh Savings	Hours	Incremental Cost
90 CFM to 119 CFM Heated Demand Control	4.497	31,168	6,931	$10,369.00
120 CFM to 159 CFM Heated Demand Control	5.971	41,511	6,952	$10,499.00
160 CFM to 199 CFM Heated Demand Control	7.914	55,261	6,983	$10,672.00
200 CFM to 249 CFM Heated Demand Control	9.802	68,715	7,010	$10,846.00
250 CFM to 299 CFM Heated Demand Control	12.101	85,236	7,044	$11,062.00
300 CFM to 399 CFM Heated Demand Control	14.431	102,144	7,078	$11,279.00
400 CFM to 499 CFM Heated Demand Control	18.761	134,085	7,147	$11,712.00
500 CFM to 599 CFM Heated Demand Control	23.033	166,113	7,212	$12,198.00
600 CFM to 799 CFM Heated Demand Control	27.037	196,804	7,279	$13,976.00
800 CFM to 999 CFM Heated Demand Control	34.606	256,154	7,402	$16,188.00
1000 CFM to 1249 CFM Heated Demand Control	41.561	312,540	7,520	$16,923.00
1250 CFM to 1499 CFM Heated Demand Control	49.623	380,010	7,658	$17,842.00
1500 CFM to 1999 CFM Heated Demand Control	56.782	442,049	7,785	$19,976.00
2000 CFM to 2499 CFM Heated Demand Control	68.987	552,933	8,015	$24,244.00

Table 5.4.3 Blower Purge Desiccant Dryers w/ Purge/Dewpoint Demand Control (Reference 4 & 7)

Blower Purge Desiccant Dryer CFM	kW Savings	kWh Savings	Hours	Incremental Cost
90 CFM to 119 CFM Blower Demand Control	4.750	32,925	6,931	$18,027.00
120 CFM to 159 CFM Blower Demand Control	6.302	43,812	6,952	$18,528.00
160 CFM to 199 CFM Blower Demand Control	8.350	58,309	6,983	$19,194.00
200 CFM to 249 CFM Blower Demand Control	10.339	72,476	7,010	$19,861.00
250 CFM to 299 CFM Blower Demand Control	12.772	89,965	7,044	$20,695.00
300 CFM to 399 CFM Blower Demand Control	15.228	107,780	7,078	$21,528.00
400 CFM to 499 CFM Blower Demand Control	19.798	141,495	7,147	$23,195.00
500 CFM to 599 CFM Blower Demand Control	24.303	175,272	7,212	$24,862.00
600 CFM to 799 CFM Blower Demand Control	28.523	207,619	7,279	$26,529.00
800 CFM to 999 CFM Blower Demand Control	36.483	270,045	7,402	$29,863.00
1000 CFM to 1249 CFM Blower Demand Control	43.798	329,363	7,520	$33,197.00
1250 CFM to 1499 CFM Blower Demand Control	52.261	400,213	7,658	$37,365.00
1500 CFM to 1999 CFM Blower Demand Control	59.741	465,080	7,785	$41,532.00
2000 CFM to 2499 CFM Blower Demand Control	72.394	580,240	8,015	$49,867.00

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(7) Various anonymous retailer and vendor quotes
(14) Compressed Air Best Practices (https://www.airbestpractices.com/system-assessments/air-treatmentn2/desiccant-dryers-ten-lessons-learned)

Changes from Recent Filing:

Added Purge/Dewpoint Controlled Heated Desiccant Dryers & Controlled Blower Purge Desiccant Dryers
kW & kWh Savings updated with recent compressed air study history for all sizes
Incremental Costs updated to current market prices

5.5 Mist Eliminators

Algorithms

$$Customer\ kWh = Quantity \times kWh\ Savings$$

$$Customer\ kW = Quantity \times kW\ Savings$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

$$O\&M\ Savings = Quantity \times Unit\ O\&M\ Savings$$

Variables

kWh Savings	See Table 5.5.1	kWh savings based on Cycling Dryer rated CFM
kW Savings	See Table 5.5.1	kW savings based on Cycling Dryer rated CFM
Hours	See Table 5.5.1	Based on average operating hours from historical participation in compressed air studies.
Lifetime	11	Assumption based on various manufacturer's rated life, also the filter element life for mist eliminators (Ref 12 & 13)
Coincidence Factor	100.0%	Coincidence of energy demand savings to grid peak demand based on Custom Compressed Air project history.
Incremental Cost	See Table 5.5.1	Incremental Cost of energy efficient equipment compared to less-efficient equipment option
O&M Savings	See Table 5.5.1	O&M cost difference of filter replacements over the lifetime.

Customer Inputs	**M&V Verified**	
Quantity of Mist Eliminators	Yes	
CFM of Dryer Mist Eliminators	Yes	

Table 5.5.1: Energy Savings and Costs for Mist Eliminator Filters (Reference 1 & 2)

Filter CFM	kW Savings	kWh Savings	Hours	Incremental Cost	O&M Savings
125 CFM to 249 CFM Mist Eliminator Filter	0.230	1,603	6,973	$5,341	$91
250 CFM to 499 CFM Mist Eliminator Filter	0.453	3,208	7,078	$5,611	$170
500 CFM to 799 CFM Mist Eliminator Filter	0.894	6,505	7,276	$6,149	$327
800 CFM to 1099 CFM Mist Eliminator Filter	1.404	10,517	7,491	$6,795	$515
1100 CFM to 1499 CFM Mist Eliminator Filter	1.895	14,564	7,687	$7,440	$703
1500 CFM to 1899 CFM Mist Eliminator Filter	2.530	20,036	7,919	$8,302	$954
1900 CFM to 2399 CFM Mist Eliminator Filter	3.138	25,484	8,121	$9,163	$1,206
2400 CFM to 2999 CFM Mist Eliminator Filter	3.889	32,389	8,329	$10,239	$1,519
3000 CFM to 4499 CFM Mist Eliminator Filter	4.799	40,901	8,523	$11,531	$1,896
4500 CFM to 5999 CFM Mist Eliminator Filter	7.160	62,724	8,760	$14,760	$2,838

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(7) Various anonymous retailer and vendor quotes
(12) ZEKS Mist Eliminator (http://www.zeks.com/PDF/ZEKS%20Mist%20Eliminator.pdf)
(13) Quincy Mist Eliminator (https://www.quincycompressor.com/products/mist-eliminators)

Changes from Recent Filing:

Added larger sizes up to 5999 CFM
kW & kWh Savings updated with recent compressed air study history for all sizes
Incremental Costs updated to current market prices

5.6 No Air Loss Drain

Algorithms

$$\frac{kW}{SCFM} = \left(\frac{SCFM}{HP}\right)^{-1} \times \left(\frac{kW}{HP}\right) \div Motor\ Efficiency$$

$$Customer\ kW = Quantity \times Average\ SCFM \times \left(\frac{kW}{SCFM}\right)$$

$$Customer\ kWh = Hours\ \times Customer\ kW$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

Variables

Average SCFM	2.739	Based on assumed time open and cycle interval of timed drain being replaced
Motor Efficiency	94.0%	Assumed Average Air Compressor Motor Efficiency
SCFM / HP	4.25	Standard rule of thumb assumption for flow reduction on a typical 100 psig system with variable speed control.
kW / HP	0.746	Standard conversion from HP to kW.
kW / SCFM	0.187	
kW Savings	0.511	Estimated energy savings per No Air Loss Drain from compressed air flow reduction.
Hours	7,410	Average compressed air system operating hours from participation history in program.
kWh Savings	3,790	Based on an average annual operating hours of custom compressed air projects and estimated energy savings from flow reduction.
Coincidence Factor	100.0%	Savings is from flow reduction during all operating hours of the compressed air system, so is assumed to be coincident with the grid peak.
Lifetime	13	Reference 3
Unit Incremental Cost	$323.00	Incremental Cost of energy efficient equipment compared to less-efficient equipment option

Customer Inputs	**M&V Verified**	
Quantity of No Air Loss Drains	Yes	

References:

(3) Historic compressed air product experience
(11) Massachusetts Joint Utilities "Measure Life Study". Energy & Resource Solutions. Table 1-1. 2005. Source for NALD Lifetime

Changes from Recent Filing:

Updated Operating Hours with results from Compressed Air Studies

5.7 VFD Compressor

Algorithms

$$Customer\ kW = Horsepower\ \times Service\ Factor \times\ 0.746\ \times\ \left[\left(\frac{Baseline\ Load}{Motor\ Efficiency}\right) - \left(\frac{Proposed\ Load}{Motor\ Efficiency}\right)\right] \times\ Quantity$$

$$Customer\ kWh = Customer\ kW \times\ Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

Variables

Coincidence Factor	79.7%	Coincidence of energy demand savings to grid peak demand based on Custom Compressed Air project history.
Motor Efficiency	See Table 5.7.1.A	Efficiency of new compressor motor as determined by customer provided Compressor HP (Reference 5)
Baseline Load	87.43%	Average percent loading for new fixed speed compressors
Horsepower	Customer Input	Nominal horsepower of new compressor
Proposed Load	59.79%	Average percent loading for new VFD compressors
Hours	See Table 5.7.1.A	Operating hours of new compressors (Reference 6)
Service Factor	1.15	Service factor of an air compressor motor (Reference 1)
Lifetime	20	Typical assumption for new industrial equipment
Unit Incremental Cost	See Table 5.7.1.B	Incremental cost of efficient measures compared less-efficient option

Customer Inputs	**M&V Verified**	
Compressor HP	Yes	
Compressor Quantity	Yes	

Table 5.7.1: Motor Efficiencies & Operating Hours (Reference 4, 5, & 6)

Compressor HP	Motor Description	Motor Efficiency	Operating Hours
10	10 HP 1800 RPM ODP	91.7%	6,928
15	15 HP 1800 RPM ODP	93.0%	6,945
20	20 HP 1800 RPM ODP	93.0%	6,962
25	25 HP 1800 RPM ODP	93.6%	6,980
30	30 HP 1800 RPM ODP	94.1%	6,997
40	40 HP 1800 RPM ODP	94.1%	7,031
50	50 HP 1800 RPM ODP	94.5%	7,064
75	75 HP 1800 RPM ODP	95.0%	7,147
100	100 HP 1800 RPM ODP	95.4%	7,228
125	125 HP 1800 RPM ODP	95.4%	7,307

Table 5.7.2: Incremental Costs for Efficient Measures (Reference 15)

Measure	Incremental Cost
10 HP VFD Compressor	$3,368.00
15 HP VFD Compressor	$4,155.00
20 HP VFD Compressor	$4,943.00
25 HP VFD Compressor	$5,730.00
30 HP VFD Compressor	$6,517.00
40 HP VFD Compressor	$8,092.00
50 HP VFD Compressor	$9,667.00
75 HP VFD Compressor	$13,604.00
100 HP VFD Compressor	$17,541.00
125 HP VFD Compressor	$21,478.00

References:

(1) Service factor from Compressed Air & Gas Institute (CAGI) standards comparing Nameplate HP to actual BHP @ 100% Full rated pressure and flow

(5) National Electric Manufacturers Association. Motor efficiency standards from Pre-EPAct 2005 and after.
(6) United States Industrial Electric Motor Systems Market Opportunities Assessment, EERE, US DOE, Dec 2002 - Source for operating hours for industrial motors
(7) Various anonymous retailer and vendor quotes
(10) Compressed Air Challenge (Best Practices Guide): source for baseline compressor curves, % efficiency/psi reduction, SCFM per orifice
(15) 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 Volume 2: Commercial and Industrial Measures
(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022

Changes from Recent Filing:

Increasing VSD compressor range with 50, 75, 100, & 125 HP
Updated Operating Hours with results from Compressed Air Studies
Updated Incremental Costs to current market prices

5.8 Demand Side Study

Variables

kWh Savings	0	Demand Side Studies have no direct energy savings claimed, typically.
kW Savings	0.00	Demand Side Studies have no direct energy savings claimed, typically.
Hours	7,410	Average compressed air system operating hours from participation history in program. (Ref. 4)
Lifetime	5	Standard assumption for compressed air study life.
Coincidence Factor	79.7%	Coincidence of energy demand savings to grid peak demand based on Custom Compressed Air project history.
Incremental Cost	$6,627.00	Based on average demand side study cost from historical participation. (Ref. 17)

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(17) Analysis of Compressed Air Demand Study participants 2017 - 2022

Changes from Recent Filing:

Updated Operating Hours with results from Compressed Air Studies

5.9 Pressure Flow Controller

$$Customer\ kW = Operating\ HP \times Savings\ Factor \times Load\ Factor \times \left(\frac{kW}{HP}\right) \div Motor\ Efficiency$$

$$Customer\ kWh = Annual\ Hours\ \times Customer\ kW$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Cost\ per\ HP \times Added\ Gallons$$

Variables

Operating HP	Customer Input	Input for compressed air system rated HP running.
Savings Factor (Ref. 16)	2.5%	Average 5 psi pressure reduction from installing pressure/flow controller with 0.5 %power reduction per decrease in psi.
Load Factor (Ref. 16)	75%	Average load factor of an air compressor related to nominal HP.
Motor Efficiency	94.0%	Assumed Average Air Compressor Motor Efficiency
SCFM / HP	4.25	Standard rule of thumb assumption for flow reduction on a typical 100 psig system with variable speed control.
kW / HP	0.746	Standard conversion from HP to kW.
Annual Hours (Ref. 4)	7,410	Average annual operating hours of a compressed air system (Ref. 4)
Lifetime	15	Standard assumption for new industrial controls.
Coincidence Factor	79.7%	Coincidence Factor from Custom Compressed Air projects
Cost per HP	$27.15	Average cost per operating HP of compressed air system (Ref. 16)

Customer Inputs	**M&V Verified**	
Operating HP	Yes	
PSI Reduction	No	

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(16) MN TRM 4.0: Industrial Compressed Air – Storage Tank

Changes from Recent Filing:

New Product Measure

5.10 Storage Tanks

$$\frac{Gallons}{SCFM} = Added\ Gallons \div \left(\frac{SCFM}{HP} \times Operating\ HP\right)$$

$$Customer\ kW = Operating\ HP \times \frac{Gallons}{SCFM} \times Savings\ Factor \times Percent\ Power \times \left(\frac{kW}{HP}\right) \div Motor\ Efficiency$$

$$Customer\ kWh = Annual\ Hours\ \times Customer\ kW$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Cost\ per\ Gallon \times Added\ Gallons$$

Variables

Added Gallons	Customer Input	Input for gallons of compressed air storage tanks added.
Operating HP	Customer Input	Input for compressed air system rated HP running.
Savings Factor (Ref. 16)	2.2%	Average Savings Factor per increase in Gallons/SCFM between 1 to 10 Gal/SCFM.
Percent Power (Ref. 16)	75.3%	Average Percent Power Draw for 50% Load between 1 to 10 Gal/SCFM.
Motor Efficiency	94.0%	Assumed Average Air Compressor Motor Efficiency
SCFM / HP	4.25	Standard rule of thumb assumption for flow reduction on a typical 100 psig system with variable speed control.
kW / HP	0.746	Standard conversion from HP to kW.
Annual Hours (Ref. 4)	7,410	Average annual operating hours of a compressed air system (Ref. 4)
Lifetime	20	Standard assumption for new industrial equipment.
Coincidence Factor	79.7%	Coincidence Factor from Custom Compressed Air projects
Cost per Gallon	$4.00	Average cost of a new air tank (Ref. 16)

Customer Inputs	**M&V Verified**	
Added Gallons	Yes	
Operating HP	Yes	
Compressor Make & Model	No	

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(16) MN TRM 4.0: Industrial Compressed Air – Storage Tank

Changes from Recent Filing:

New Product Measure

5.11 Compressed Air Leak Fixes

$$Customer\ kW = \#\ of\ Leaks\ Fixed \times SCFM\ per\ Leak \times \left(\frac{kW}{SCFM}\right)$$

$$Customer\ kWh = Hours\ \times Customer\ kW$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Cost\ per\ Leak\ Fix \times \#\ of\ Leaks\ Fixed$$

Variables

# of Leaks Fixed	Customer Input	Input for quantity of leaks identified and fixed in the compressed air system.
SCFM per Leak	1.54	Average leak SCFM flow identified in compressed air studies. (Ref. 4)
kW / SCFM	See Table 5.11.1	System kW power reduction per SCFM flow reduction based on air compressor type (Ref. 15)
Annual Hours	7,410	Average annual operating hours of studied compressed air systems. (Ref. 4)
Lifetime	5	Standard assumption from compressed air study for lifetime of a typical individual compressed air leak fix.
Coincidence Factor	100%	Savings is from flow reduction during all operating hours of the compressed air system, so is assumed to be coincident with the grid peak.
Cost per Leak Fix	$75	Standard assumption for all leak studies.

Customer Inputs	M&V Verified	
# of Leaks Fixed	Yes	
Total Leak SCFM Fixed	No	
Air Pressure	No	

Table 5.11.1: System kW Power Reduction Per SCFM Flow Reduction (Ref. 15)

Air Compressor Type	kW/SCFM
Reciprocating - On/off Control	0.18
Reciprocating - Load/Unload	0.14
Screw - Load/Unload	0.15
Screw - Variable Displacement	0.15
Screw - VFD	0.18

References:

(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(10) Compressed Air Challenge (Best Practices Guide)
(15) 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 Volume 2: Commercial and Industrial Measures

Changes from Recent Filing:

New Product Measure

5.12 High Frequency Battery Chargers

Algorithms

$$Customer\ kWh = Quantity\ \times\ kWh\ Savings$$

$$Customer\ kW = Quantity\ \times kWh\ Savings/(Shift\ Length\ * Workdays)$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

Variables

Minimum Efficiency	92%	Minimum High-Frequency charger efficiency.
Unit Incremental Cost	$872.50	Incremental cost per high frequency battery charger (Ref. 16)
Lifetime	20	Lifetime (Ref. 16)
Workdays	250	Workdays per year, assuming 2 weeks of downtime for a weekday-only operation.

Customer Inputs	**M&V Verified**	
Quantity	Yes	
Shifts per Day	Yes	
Existing Charger Type	No	

Table 5.12.9: Deemed kWh Savings (Reference 15 & 16)

Shifts Per Day	Shift Length (hours)	kWh Savings (Ref. 16)	Coincidence Factor (Ref. 15)
1	8	1,460	0.0
2	16	2,688	0.0
3	24	3,639	1.0

References:

(15) 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 Volume 2: Commercial and Industrial
(16) MN TRM 4.0

Changes from Recent Filing:

New Measure

5.13 Electric Forklifts

Algorithms

$$Customer\ kWh = -Quantity\ \times Capacity\ \times DoD\ \times Charges \div Charging\_eff$$

$$Customer\ kW = Customer\ kWh\ /(Hours)$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

$$Incremental\ Cost = Quantity \times Unit\ Incremental\ Cost$$

$$Propane\ Gallons = Quantity \times Charges\ \times DoD\ \times Capacity\ \times Conversion_{prop} \times Conversion\ \_kWh\ \times \frac{EE\_Lith}{EE_{Propane}}$$

Variables

Unit Incremental Cost	$10,200	Incremental cost per eclectic forklift with lithium-ion battery, compared to propane forklift baseline (Ref. 15,18)
Lifetime	15	Lifetime (Ref. 15)
EE_Propane	20.4%	Energy efficiency of propane forklift. (Ref. 15)
EE_Lith	73.0%	Energy efficiency of lithium Ion battery. (Ref. 15)
DoD	80.0%	Discharge depth for battery (Ref. 15)
Conversion_Prop	10.929	Gallons of Propane per MMBTU
Conversion_kWh	3412/ 1,000,000	MMBTU per kWh
Charges	Table 5.13.1	Quantity of charges per year per forklift, based on number of shifts.
Capacity	Input	Capacity of battery in kWh
Charging_eff	90.0%	Assumed efficiency of battery charger
Hours	Table 5.13.1	Annual charging hours. Assumes 2 weeks of facility downtime with no charges.

Customer Inputs	**M&V Verified**	
Quantity	Yes	Quantity of forklifts
Shifts per Day	Yes	
Battery Capacity	Yes	Capacity in kWh calculated by #cells * V * Ah / 1000

Table 5.13.1: Deemed kWh Savings (Reference 15)

Shifts Per Day	Shift Length (Hours)	Charges (Ref. 15)	Coincidence Factor (Ref. 15)	Hours
1	8	520	0.0	1,976
2	16	1040	0.0	3,952
3	24	1560	1.0	5,928
3 (7 days/week)	24	2184	1.0	8,351

References:

(15) 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 Volume 2: Commercial and Industrial
(18) forklift.epri.com

Changes from Recent Filing:

New Measure

Table 5.6.0 Common Compressed Air Variables for Reference

Average Motor Efficiency	94.0%	Assumed Average Air Compressor Motor Efficiency
System Pressure	100	Typical pressure of compressed air system analyzed that assumptions are based on for various measure usages. (Ref. 10)
SCFM / HP	4.25	Standard rule of thumb assumption for flow reduction on a typical 100 psig system with variable speed control. (Ref. 10)
SCFM / ACFM	0.942	Conversion from Actual to Standard Flow in MN territory
Custom CF	79.7%	Coincidence Factor from Custom Compressed Air projects
kW / HP	0.746	Standard conversion from HP to kW.

References:

(1) Service factor from Compressed Air & Gas Institute (CAGI) standards comparing Nameplate HP to actual BHP @ 100% Full rated pressure and flow
(2) National Energy Efficiency Best Practices Report (http://www.eebestpractices.com)
(3) Historic compressed air product experience
(4) Analysis of 400+ Compressed Air Supply Side Studies between 2015 - 2022
(5) National Electric Manufacturers Association. Motor efficiency standards from Pre-EPAct 2005 and after.
(6) United States Industrial Electric Motor Systems Market Opportunities Assessment. US DOE, Dec 2002, Appendix B2
(7) Various anonymous retailer and vendor quotes
(8) per page iv of "Tetra Tech, Process and Impact Evaluation of the Compressed Air Efficiency Program — Colorado, January 21 2014"
(9) Massachusetts Technical Reference Manual 2013-2015 Program Years
(10) Compressed Air Challenge (Best Practices Guide): source for baseline compressor curves, % efficiency/psi reduction, SCFM per orifice
(11) Massachusetts Joint Utilities "Measure Life Study". Energy & Resource Solutions. Table 1-1. 2005. Source for NALD Lifetime
(12) ZEKS Mist Eliminator (http://www.zeks.com/PDF/ZEKS%20Mist%20Eliminator.pdf)
(13) Quincy Mist Eliminator (https://www.quincycompressor.com/products/mist-eliminators)
(14) Compressed Air Best Practices (https://www.airbestpractices.com/system-assessments/air-treatmentn2/desiccant-dryers-ten-lessons-learned)
(15) 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 Volume 2: Commercial and Industrial Measures
(16) MN TRM 4.0
(17) Analysis of Compressed Air Demand Study participants 2017 - 2022
(18) forklift.epri.com

6.1 VDI

Algorithms

$$Customer\ kWh = \left(Baseline\ Computer\ kW - \left(\frac{VDI\ Wattage}{1000} + VDI\ Server\ kW\right)\right) * Quantity\ *\ Cooling\ kWh\ Factor\ *\ Hours$$

$$Customer\ Coincident\ kW = \left(Baseline\ Computer\ kW - \left(\frac{VDI\ Wattage}{1000} + VDI\ Server\ kW\right)\right) *\ Quantity\ *\ Cooling\ kW\ Factor\ *\ Coincidence\ Factor$$

$$O\&M\ Savings = \left(Baseline\ Computer\ kW - \left(\frac{VDI\ Wattage}{1000} + VDI\ Server\ kW\right)\right) *\ Quantity\ * Hours\ * Heating\ Penalty\ Facotr\ * Gas\ Cost + (O\&M\ Labor\ Savings\ - O\&M\ License\ Cost)\ * Quantity$$

Variables

Baseline Computer kW	0.0213	Aggregated power demand of a baseline desktop computer (References 1-4, 11, 26)
VDI Server kW	0.0040	Average server power used to support a virtualized server (Reference 8)
Cooling kW Factor	1.33	Average annual demand of the cooling system that has to remove the heat gain caused by a desktop computer
Cooling kWh Factor	1.11	Average annual energy consumption of the cooling system that has to remove the heat gain caused by a desktop computer
Hours	8760	Number of hours that a desktop computer is connected to a virtualized server and available to operate
Coincidence Factor	100%	Probability that the calculated Customer kW will coincide with the period of peak generator operation
Heating Penalty Factor	-0.000683	Average annual energy consumption of the heating system that has to compensate for the negative heat gain associated with the more efficient desktop computer (Dth/kWh).
Gas Cost	$5.43	Forecasted natural gas rate for businesses ($/Dth)
O&M Labor Savings	$42.50	Annual labor savings per desktop (Reference 12)
O&M License Cost	$12.00	Annual software license fee per desktop (Reference 12)
NTG	100%	Net to Gross
Lifetime	10	Life of a VDI, "thin client", in years (Reference 9)
Incremental Cost	$117.00	Cost of high efficiency model over baseline model (Reference 6)

Customer Inputs	M&V Verified	
Quantity	Yes	Number of VDI, "thin client", devices installed instead of a desktop PC computer
VDI Wattage	Yes	Rated wattage of the VDI, "thin client", device installed

References:

1. Koomey, J., M. Cramer, M.A. Piette and J. Eto. 1995. "Efficiency Improvements in U.S. Office Equipment: Expected Policy Impacts and Uncertainties." Lawrence Berkeley Laboratory. LBL-37383. December. Table 3.
2. Energy Star Calculator Tool; LBNL 2007 or Energy Star Specification
3. Hours of operation for desktop computers from office desktops/laptops and office monitors from Piette, M. A., M. Cramer, J. Eto and J. Koomey. 1995. "Office Technology Energy Use and Savings Potential in New York." Prepared for the NY State Energy R&D Authority and Con-Ed by LBNL. Lawrence Berkeley Laboratory. LBL-36752. January 1995. p. 4-2
4. LBNL Estimate based on Reference 3
5. Ecova Consulting information from manufacturers
6. Vendor data
7. Baseline desktop PC cost assumed at $600; info from the internet indicates a PC with keyboard averages between $300-$1,000 or $650; assumed the keyboard is $50 of that (Ref 6)
8. Server Wattages from Custom Efficiency program participant; average wattage of 42 models (273W per Server / 68 Virtual Machines per Server). Wattages last confirmed in 2014.
9. 10-year life for thin-client and zero-client based on conversation with MN vendor Nowmicro
10. Not used
11. Ecos Consulting (now Ecova), 2009
12. Various Equipment Vendors
13. Measured Energy Savings and Performance of Power-Managed Personal Computers and Monitors, 1996, Lawrence Berkeley National Laboratory
14. PC and Monitor Night Status: Power Management Enabling and Manual Turn-off, 1998, Lawrence Berkeley National Laboratory
15. ENERGY STAR, 2012
16. Xcel Energy Custom Efficiency projects
17. 2014 Michaels Energy (independent 3rd party) NTG review.
18. Koomey, J., M. Cramer, M.A. Piette and J. Eto. 1995. "Efficiency Improvements in U.S. Office Equipment: Expected Policy Impacts and Uncertainties." Lawrence Berkeley Laboratory. LBL-37383. December. Table 3.
19. Cooling Plant Optimization (http://academic.udayton.edu/kissock/http/EEB/LecturesAndHomework/23-CoolingPlantOptimization/CoolingPlantOptimization.docx)
20. Georgia Tech Student Thesis (http://www-old.me.gatech.edu/energy/students/liuthesis.pdf)

21. Condenser Water Energy Savings (http://web.stanford.edu/group/narratives/classes/08-09/CEE215/ReferenceLibrary/Chillers/York%20Engineering%20Updates/Reduced%20condenser-water%20flow%20rate_energy-saving%20miracle%20or%20mirage.pdf)
22. Server Power Supplies Data Points_PMO.XLS supplied by Ecova on 9/1/14
23. 80 Plus Servers Calculator_Xcel14Aug2014.xlsx file provided by Ecova on 9/1/14
24. Internal adjustment by Xcel energy to distribute power supply cost in a commensurate with wattage served. Values will be reviewed over time as additional information becomes available.
25. Not used
26. Energy Star Office Equipment Calculator, accessed 12/21/15 from: http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/purchase-energy-saving-products
27. Energy Star 5.0 Product Database, downloaded on 12/21/15 from historical archive
28. ECOVA - Sales market share analysis, Feb. 2016.
29. 2013 EPA Study for Energy Usage of Average Computer Sold

Changes from Recent Filing:

1. None

7.1 Custom

Customer may apply for rebate under the Custom Efficiency Program for electric or gas projects not listed under prescriptive rebate programs. Each Custom Efficiency project will be analyzed individually by Xcel Energy. Technical variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on standard engineering methodologies.

Electrical energy savings and electrical demand savings will be calculated based on the project specific details. Each project will undergo an engineering review in accordance with standard engineering practices. The review will be in accordance with the calculation methodologies detailed in the prescriptive programs where applicable.

Variables

Lifetime	Product Life will be evaluated for each project, lifetimes for end use technologies will be in accordance with prescriptive programs where applicable
Coincidence Factor	Coincidence factor will be evaluated for each project.
O&M Savings	Operation and Maintenance Savings will be evaluated for each project.
Energy and Demand Savings	Energy and demand savings will be evaluated for each project.

20.1 Pneumatic to DDC

Algorithms

$Customer\ kWh\ Savings\ = Customer\ kWh\ Cooling\ Savings\ + Customer\ kWh\ Heating\ Savings$

$Customer\ kWh\ Cooling\ Savings = (kWh\ Savings\ per\ square\ foot) * Square\ Feet$

$Customer\ Coincident\ kW = kWh\ Savings * CF$

$O\&M\ Savings = 0$

If electric heat: $Customer\ kWh\ Heating\ Savings = (Therms\ Savings\ per\ square\ foot) * \frac{29.3}{0.8} * Square\ Feet$

If gas heat: $Customer\ Dth = (Therms\ Savings\ per\ square\ foot/10) * Square\ Feet$

$Incremental\ Cost = (Incremental\ Cost\ per\ square\ foot) * Square\ Feet$

Variables

Therms Savings per square foot	See Table 20.1.1	Small office
	See Table 20.1.1	Medium office
	See Table 20.1.1	Large Office
kWh Savings per square foot	See Table 20.1.1	Small office
	See Table 20.1.1	Medium office
	See Table 20.1.1	Large Office
Incremental cost per square foot	$1.10	Average value to be used for all office sizes. (Ref. 5)
Electric heating savings per square foot (kWh)	See Table 20.1.1	Small office
	See Table 20.1.1	Medium office
	See Table 20.1.1	Large Office
Conversion Factor	10	Therms to Decatherms
Conversion Factor	29.3	Conversion from therms per sq. ft. to kWh per sq. ft.
Heating System Efficiency	0.8	Efficiency of heating equipment. (Ref. 3)
Square foot per thermostat	900	sq.ft./thermostat (national average, Ref. 1, page 23)
CF	0	Coincidence Factor
O&M Labor Savings	$0.00	
O&M License Cost	$0.00	
Lifetime	8	Years (Ref. 4)

Customer Inputs	M&V Verified	
Office size	Yes	Small (0-10,000 sq. ft.), Medium (10,001-300,000 sq. ft.), Large (300,001+ sq. ft.)
Square Feet	Yes	Area served by the new thermostats (sq. ft.)
Number of Thermostats (qty.)	Yes	
Thermostat controls equipment providing heating and cooling to the space	Yes	Yes or No
Heating and Cooling setback of at least 8° F	Yes	Yes or No
Heating Fuel	Yes	Natural Gas or Electric
Quantity	Yes	Number of new thermostats

Table 20.1.1 Table of Savings (Ref. 1, Table 6A)

Location	Office Building Size	Model SF	Model Natural Gas Savings (kbtu) with setback heating at 62F	Therm Savings per square foot	Model Electricity Savings (kWh) with setback cooling at 83F	kWh Savings per square foot	Cost per square foot ($/sf)
Minneapolis	Small	5,500	72,946	0.133	4,391	0.798	$1.20
	Medium	53,630	516,123	0.096	13,649	0.255	$1.10
	Large	498,500	4,567,715	0.092	160,618	0.322	$0.90

References:

1. The calculations, cost and tables used to determine Energy and Cost Savings were obtained from the report: Wireless Pneumatic Thermostat Evaluation Ronald Reagan Building and International Trade Center Washington D.C. (https://www.gsa.gov/cdnstatic/GPG_WPT_Report-508.pdf)

2. ComEd prescriptive rebate calculator.

3. State of Minnesota Technical Reference Manual, Version 4.0. Numerous measures where heating system efficiency is referenced.

4. State of Minnesota Technical Reference Manual, Version 4.0. Commercial HVAC - Adjustment of Programmable Thermostats for Small Commercial Buildings

5. 2018 CBECS. Table B1. Summary table: total and means of floorspace, number of workers, and hours of operation, 2018.
Mean square feet per building for Office category: 17,200 square foot per building.

Changes from Recent Filing:

1. This is a new measure being added for 2024-26 filing.

20.2 Guest Room Energy Management

Algorithms

$$Customer\ kWh\ Cooling\ Savings = (Cooling_{Size}/1{,}000) * Quantity\ *\ EFLH_{cool}\ * \left(\frac{1}{Cooling_{Eff}}\right) * GREM_{Savings}$$

$$Customer\ Coincident\ kW = (Cooling_{Size}/1{,}000) * Quantity\ * \left(\frac{1}{Cooling_{Eff}}\right) * GREM_{Savings} * CF$$

If electric heat: $Customer\ kWh\ Heating\ Savings = (Heating_{Size}/3{,}412) * Quantity\ * \left(\frac{1}{Heating_{Eff}}\right) * EFLH_{heat}\ * GREM_{Savings}$

If gas heat: $Customer\ Dth = (Heating_{Size}/1{,}000{,}000) * Quantity\ * \left(\frac{1}{Heating_{Eff}}\right) * EFLH_{heat}\ * GREM_{Savings}$

$$Incremental\ Cost = Quantity * Incremental\ Cost_{per\ unit}$$

Variables

EFLH_cool	See table 20.2.1	Cooling equivalent full load hours
EFLH_heat	See table 20.2.2	Heating equivalent full load hours
Cooling_Eff	See table 20.2.3	Cooling efficiency of the HVAC system in units of EER
Heating_Eff	See table 20.2.4	Heating efficiency of the HVAC system in units of COP
GREM_savings	18.40%	Savings fraction for using GREM controls
CF	0.90	Deemed coincidence factor
Lifetime	15	Life of a new unit, in year
Incremental Cost (per unit)	$260.00	Per unit, from MN TRM. (per room HVAC controller, which is the cost difference between a non-programmable thermostat and a GREM.)

Customer Inputs	M&V Verified	
Quantity Proposed Equipment (Qty.)	Yes	Quantity of HVAC units is usually the same as number of hotel/motel rooms.
Zone	Yes	Zone 1, 2 or 3
Cooling type	Yes	PTAC, PTHP, or chilled water fan coil unit
Cooling size	Yes	Nominal cooling capacity of the cooling system in BTU/hr
Heating type	Yes	PTAC/electric resistance, PTAC/hot water, PTHP, hot water fan coil unit
Heating size	Yes	Nominal heating capacity of the cooling system in BTU/hr

Table 20.2.1 EFLH_Cooling (Ref. 1)

Building Type	Zone 1	Zone 2	Zone 3
Lodging	401	606	754

Table 20.2.2 EFLH_Heating (Ref. 1)

Building Type	Zone 1	Zone 2	Zone 3
Lodging	2361	2126	1934

Table 20.2.3 Cooling System EER (Ref. 1)

PTAC, < 7,000 BTU	11.9
PTAC, 7,000-15,000 BTU	14.0 - (0.300 x Cap/1000)
PTAC, > 15,000 BTU	9.5
PTHP, < 7,000 BTU	11.9
PTHP, 7,000-15,000 BTU	14.0 - (0.300 x Cap/1000)
PTHP, > 15,000 BTU	9.5
Chilled Water Fan Coil Unit	12.5

Table 20.2.4 Heating System COP (Ref. 1)

PTAC, All Sizes	1
PTHP, < 7,000 BTU	3.3
PTHP, 7,000-15,000 BTU	3.7 - (0.052 x Cap/1000)
PTHP, > 15,000 BTU	2.9
Hot Water PTAC or Fan Coil Unit	0.8

References:

1. State of Minnesota Technical Reference Manual, Version 4.0. Commercial HVAC - Guest Room Energy Management Controls.

Changes from Recent Filing:

1. This is a new measure being added for 2024-26 filing.

20.3 Rooftop DCV

Algorithms

$$Customer\ kWh\ Cooling\ Savings = \left(\left(4.5 * CFM_{pre} * \Delta h\right) * \left(EFLH_{cool} * \frac{1}{EER}\right) * \frac{SF_C}{1000} * \ Quantity \right)$$

$$Customer\ Dth\ Savings = \frac{\frac{1.08\ *\ CFM_{pre}}{\eta} *\ HDD65\ *\ Hours}{1{,}000{,}000} *\ SF_H\ *\ Quantity$$

$$Incremental\ Cost = 1.32 * CFM_{pre} * Quantity$$

Variables

CFM_pre	Calculated	Constant outside air flow in CFM.
Δh	See table 20.3.1	Difference in enthalpy (Btu/lbm) between the design day outside air conditions and the return air conditions.
EFLH_cool	See table 20.3.2	Equivalent full load cooling hours based on building type
EER	10.9	Energy efficency ratio of the existing equipment.
HDD65	See table 20.3.1	Heating Degree Days
SF_C	See table 20.3.2	Deemed cooling savings factor based upon building type
SF_H	See table 20.3.2	Deemed heating savings factor based upon building type
η	0.8	Efficiency of heating equipment
Conversion factor	1.08	Conversion factor for flow rate and specific volume of air
Conversion factor	4.5	Conversion factor for BTU, flow rate and specific volume
Conversion factor	1,000,000	Conversion factor for BTU to Dth
Measure Life	15	Life of a new unit, in years
Incremental Cost	See table 20.3.1	$/CFM

Customer Inputs	**M&V Verified**	
Quantity Proposed Equipment (Qty.)	Yes	Quantity of HVAC units is usually the same as number of hotel/motel rooms.
Size (tons)	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	Yes	Zone 1, 2, or 3
CRM_pre (CFM)	Yes	Constant outside airflow in CFM
Hours	Yes	Average hours per day of operation

Table 20.3.1 Enthalpies, heating degree days and incremental costs

Zone	Design Cooling h (Btu/lbm)	Cooling Return h (Btu/lbm)	HDD65 (deg. F - days)	Incremental Cost ($/CFM)
Northern: #1	32.40	28.36	9,833	1.32
Central: #2	35.55	28.36	8,512	1.32
Southern: #3	36.55	28.36	7,651	1.32

Table 20.3.2 Cooling and Heating Savings Factors and EFLH_cool per zone in MN by building type

Building Type	SF_C	SF_H	EFLH		
			Zone 1	Zone 2	Zone 3
Convenience Store	0.34	0.63	647	825	986
Education - Community College/University	0.34	0.63	682	782	785
Education - Primary	0.34	0.63	289	338	408
Education - Secondary	0.34	0.63	484	473	563
Health/Medical - Clinic	0.29	0.34	558	738	865
Health/Medical - Hospital	0.34	0.40	663	1,089	1,298
Lodging	0.15	0.18	401	606	754
Manufacturing	0.29	0.53	347	472	589
Office - Low Rise	0.15	0.28	257	359	446
Office - Mid Rise	0.15	0.28	373	529	651
Office - High Rise	0.15	0.28	669	1,061	1,263
Restaurant	0.34	0.62	347	535	652
Retail - Large Department Store	0.34	0.62	462	588	686
Retail - Strip Mall	0.34	0.62	307	441	574
Warehouse	0.31	0.36	164	343	409
Other/Miscellaneous	0.30	0.51	443	612	729

References:

1. State of Minnesota Technical Reference Manual, Version 4.0. Commercial HVAC - Demand Control Ventilation

Changes from Recent Filing:

1. This measure has been transferred over to the EMS technology file from the HVAC-Cooling technology file for the 2024-26 filing. The savings algorithm from the MN TRM is now being used, instead of the previous un-sourced algorithm.

8.0 Deemed Tables

Table 8.0.1	North MN	Central MN	South MN / Twin Cities
HDD	9,833	8,512	7,651
CDD	140	414	634
HDD_{50}	5,745	4,792	4,255
CDD_{75}	25	99	154
Heating Hours (Single Family)	2,280	2,099	1,932
Heating Hours (Multi-Family)	1,761	1,621	1,492
Cooling Hours (Single Family)	213	379	520
Cooling Hours (Multi-Family)	228	473	616

Table 8.0.2	Twin Cities
LAF	0.0791
ATF	1.08

Table 8.0.3	N_{winter}	N_{summer}
Stories	Twin Cities	Twin Cities
1	11.384	15.379
2	9.016	12.964
3	7.788	11.676

Table 8.0.4	Gas Heating Eff	Elec Heating Eff
ASHP	N/A	1.92
GSHP	N/A	3.3
Electric Resistance	N/A	1
Natural Gas	0.8	N/A

Table 8.0.5	Cooling Eff
AC/ASHP	3.93
GSHP	4.13
Evap/None	0

Table 8.0.6	Weatherstripping Cost
Home Energy Squad	$12.00
Home Energy Savings Program	$32.00
Multifamily Building Efficiency	$30.00
Nonprofit Energy Savings Progr	$33.00

Table 8.0.7	Crawlspace Insulation Cost/ft^2	Rim Joist Insul Cost per ft2	MH Belly Insul Cost per ft2
Home Energy Savings Program	$8.83	$6.30	$7.22

Vendors provide actual cost data

References:

1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
2. 2021 ASHRAE Fundamentals, Chapter 26, Table 1 - Thermal resistance values for building and insulating materials
3. 2021 ASHRAE Fundamentals, Chapter 26, Table 3 - Thermal resistance values of plane air spaces
4. 2021 ASHRAE Fundamentals, Chapter 26, Table 10 - Thermal resistance values for surface films
5. 2021 ASHRAE Fundamentals, Chapter 27, Example 3 - Thermal resistance values for framing studs
6. 2017 ASHRAE Fundamentals, Chapter 16, Equation (41) - Defining equivalent air leakage area
7. 2017 ASHRAE Fundamentals, Chapter 16, Equation (48) - Defining airflow rate from infiltration.
8. 2017 ASHRAE Fundamentals; Chapter 16, Table 4 - Defining stack coefficient C_s
9. 2017 ASHRAE Fundamentals; Chapter 16, Table 6 - Defining basic model wind coefficient, C_w
10. Door leakage estimate taken from Colorado Energy Office website - http://www.coloradoenergy.org/procorner/stuff/window_air_leakage.htm
11. Estimates for air density in Minnesota based on altitude at airport - http://www.engineeringtoolbox.com/air-altitude-density-volume-d_195.html
12. MN TRM v4.0 - Docket No. E,G999/CIP-18-694
13. IL TRM v10.0 - https://www.ilsag.info/technical-reference-manual/il-statewide-technical-reference-manual-version-10-0/
14. DegreeDays.net - HDD_{50} and CDD_{75} values from historic MN weather data
15. Program Vendors
16. Air Sealing without Blower Door Test, WI FoE TRM 2023, pg. 733 - https://assets.focusonenergy.com/production/inline-files/Focus_on_Energy_2023_TRM.pdf

8.1 Attic Insulation

Algorithms

$$Customer\ Dth = \left(\frac{1}{R_{struc}+R_{attic,base}} - \frac{1}{R_{struc}+R_{attic,eff}}\right)\left(\frac{A_{attic}*HDD*24}{Gas\ Heating\ Eff*1{,}000{,}000}\right)$$

$$Cooling\ kWh = \left(\frac{1}{R_{struc}+R_{attic,base}} - \frac{1}{R_{struc}+R_{attic,eff}}\right)\left(\frac{A_{attic}*CDD*24}{Cooling\ Eff*3412}\right)$$

$$Heating\ kWh = \left(\frac{1}{R_{struc}+R_{attic,base}} - \frac{1}{R_{struc}+R_{attic,eff}}\right)\left(\frac{A_{attic}*HDD*24}{Elec\ Heating\ Eff*3412}\right)$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = [Attic\ Insul\ Cost\ per\ (ft^2 * \Delta R)] * A_{attic} * (R_{attic,eff} - R_{attic,base})$$

Variables

R_{struc}	3.93	R-Value of the existing attic structure with no insulation (Reference 2,4,5)
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	20	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65^{o}F base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65^{o}F base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Cooling efficiency determined based on customer's cooling system type

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
$R_{attic,base}$	No	R-Value for baseline attic insulation
$R_{attic,eff}$	Yes	R-Value for upgraded attic insulation
A_{attic}	Yes	ft^2 of attic insulation added
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities
Attic Insul Cost per ($ft^2 \cdot \Delta R$)	No	For Home Energy Savings Program - Cost per ft^2 per delta R of attic insulation provided by participating vendors
Incremental Cost	No	Cost of the attic insulation, provided by the customer for Insulation Rebates and Whole Home Efficiency
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

Update to calculation for R-value of attic structure with no insulation.

8.2 Wall Insulation

Algorithms

$$Customer\ Dth = \left(\frac{1}{R_{wall,base}} - \frac{1}{R_{wall,eff}}\right)\left(\frac{A_{wall}*HDD*24}{Gas\ Heating\ Eff*1{,}000{,}000}\right)$$

$$Cooling\ kWh = \left(\frac{1}{R_{wall,base}} - \frac{1}{R_{wall,eff}}\right)\left(\frac{A_{wall}*CDD*24}{Cooling\ Eff*3412}\right)$$

$$Heating\ kWh = \left(\frac{1}{R_{wall,base}} - \frac{1}{R_{wall,eff}}\right)\left(\frac{A_{wall}*HDD*24}{Elec\ Heating\ Eff*3412}\right)$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = Wall\ Insul\ Cost\ per\ ft^2 * A_{wall}$$

Variables

$R_{wall,base}$	4.3	R-Value for baseline wall insulation, calculated assuming no cavity insulation (Reference 2,3,4,5)
$R_{wall,eff}$	12.6	R-Value for upgraded wall insulation, calculated assuming R-11 cavity insualtion (Reference 2,3,4,5)
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	20	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65^{o}F base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65^{o}F base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Cooling efficiency determined based on customer's cooling system type

Customer Inputs	**M&V Verified**	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
A_{wall}	Yes	ft^2 of wall insulation added
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities
Wall Insul Cost per ft^2	No	For Home Energy Savings Program - Cost per ft^2 of wall insulation provided by participating vendors
Incremental Cost	No	Cost of the wall insulation, provided by the customer for Insulation Rebates and Whole Home Efficiency
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

Update to calculation for R-value of wall structure and effective R-value of upgraded wall insulation.

8.3 Air Sealing

Algorithms

$$Customer\ Dth = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * HDD * 24}{N_{winter} * Gas\ Heating\ Eff * 1{,}000{,}000}$$

$$Cooling\ kWh = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * CDD * 24}{N_{summer} * Cooling\ Eff * 3412}$$

$$Heating\ kWh = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * HDD * 24}{N_{winter} * Elec\ Heating\ Eff * 3412}$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = Air\ Seal\ Cost\ per\ ft^2 * A_{home}$$

Attic Air Sealing without Blower Door Test

$$CFM50_{\mathrm{base}} = \left(\frac{\mathrm{CFM50}}{\mathrm{ft}^2}\right)_{\mathrm{base}} * \mathrm{A}_{\mathrm{attic}}$$

$$CFM50_{\mathrm{eff}} = \left[\left(\frac{\mathrm{CFM50}}{\mathrm{ft}^2}\right)_{\mathrm{base}} * \mathrm{A}_{\mathrm{attic}}\right] * (1 - SF)$$

Variables

Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	10	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65^{o}F base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65^{o}F base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
ATF	See Table 8.0.2	Air transfer factor for converting airflow in ft^3/min to BTU/hr (Reference 12)
N_{winter}	See Table 8.0.3	Conversion factor for relating measured air leakage rate in ft^3/min at reference pressure of 50 Pa to a natural infiltration in ft^3/min (Reference 6,7)
N_{summer}	See Table 8.0.3	Conversion factor for relating measured air leakage rate in ft^3/min at reference pressure of 50 Pa to a natural infiltration in ft^3/min (Reference 6,7)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Heating efficiency determined based on customer's cooling system type
$(CFM50/ft^2)_{base}$	0.310	Calculated base building air leakage through attic space. Assumes baseline of 3.0 ACH50 (Reference 16); used in Low Income Multi-Family Building Efficiency program only
SF	10%	Savings fraction based on conservative estimate of air leakage reduction in multifamily buildings (Reference 16); used in Low Income Multi-Family Building Efficiency program only

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
$CFM50_{base}$	No	Air leakage rate in ft^3/min determined by blower door test
$CFM50_{eff}$	Yes	Air leakage rate in ft^3/min determined by blower door test
A_{home}	Yes	Home's conditioned area in ft^2 above grade
A_{attic}	Yes	Multifamily building's attic area above a conditioned space in ft^2; used in Low Income Multi-Family Building Efficiency program only
House Stories	Yes	Number of stories above grade for the home
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities
Air Seal Cost per ft^2	No	For Home Energy Savings Program - Cost per ft^2 of condtioned home area above grade provided by participating vendors
Incremental Cost	No	Cost of the air sealing, provided by the customer for Insulation Rebates, Whole Home Efficiency, and Low Income Multi-Family Building Efficiency
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

Added option for attic air sealing without blower door test for Low Income Multi-Family Building Efficiency program.

8.4 Weatherstripping

Algorithms

$$CFM50_{base} = \frac{Gap_{base} * Gap\ Length}{LAF}$$

$$CFM50_{eff} = \frac{Gap_{eff} * Gap\ Length}{LAF}$$

$$Customer\ Dth = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * HDD * 24}{N_{winter} * Gas\ Heating\ Eff * 1{,}000{,}000}$$

$$Cooling\ kWh = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * CDD * 24}{N_{summer} * Cooling\ Eff * 3412}$$

$$Heating\ kWh = \frac{(CFM50_{base} - CFM50_{eff}) * ATF * HDD * 24}{N_{winter} * Elec\ Heating\ Eff * 3412}$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

Variables

Gap_{base}	0.391	Effective air leakage area in in^2 per foot of door gap for door without weatherstripping (Reference 6,7,10)
Gap_{eff}	0.128	Effective air leakage area in in^2 per foot of door gap for door with weatherstripping (Reference 6,7,10)
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	10	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65^oF base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65^oF base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
LAF	See Table 8.0.2	Leakage area factor for calculating CFM50 from a gap area (Reference 6)
ATF	See Table 8.0.2	Air transfer factor for converting airflow in ft^3/min to BTU/hr (Reference 12)
N_{winter}	See Table 8.0.3	Conversion factor for relating measured air leakage rate in ft^3/min at reference pressure of 50 Pa to a natural infiltration in ft^3/min (Reference 6,7)
N_{summer}	See Table 8.0.3	Conversion factor for relating measured air leakage rate in ft^3/min at reference pressure of 50 Pa to a natural infiltration in ft^3/min (Reference 6,7)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Heating efficiency determined based on customer's cooling system type
Incremental Cost	See Table 8.0.6	Incremental cost for door weatherstripping

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
Gap Length	Yes	Length of weatherstripping installed in ft
House Stories	Yes	Number of stories above grade for the home
Quantity of Doors Treated	Yes	Number of doors to be treated with weatherstripping
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

1. Weatherstripping added as a measure to Home Energy Savings Program

8.5 Renter Kit Window Film

Algorithms

$$Customer\ Dth = \frac{CFM50 * Correction\ Factor * HDD * ATF * 24}{N_{heat} * Gas\ Heating\ Eff * 1{,}000{,}000}$$

Variables

Incremental Cost	$0.00	Incremental cost for renter kit window film
CFM50	10	Assumed air leakage rate in ft^3/min at 50 Pa maintained pressure
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
Correction Factor	0.7	Correction factor (Reference 12)
N_{heat}	13	Conversion factor for relating measured air leakage rate in ft^3/min at reference pressure of 50 Pa to a natural infiltration in ft^3/min (Reference 12)
Measure Lifetime	1	Deemed lifetime of measure in years, window film applied seasonally for the heating season
HDD	See Table 8.1.0	Heating degree days, 65^oF base (Reference 12)
ATF	See Table 8.2.0	Air transfer factor for converting airflow in ft^3/min to BTU/hr (Reference 12)
Gas Heating Eff	See Table 8.4.0	Heating efficiency determined based on customer's heating system type

Customer Inputs	**M&V Verified**	
N/A		

References:

See *Deemed Tables*

Changes from Recent Filing:

8.6 Crawlspace Wall Insulation

Algorithms

$$Customer\ Dth = \left(\frac{1}{R_{wall,base}} - \frac{1}{R_{wall,eff}}\right)\left(\frac{A_{wall} * HDD_{50} * 24}{Gas\ Heating\ Eff * 1{,}000{,}000}\right)$$

$$Cooling\ kWh = \left(\frac{1}{R_{wall,base,AG}} - \frac{1}{R_{wall,eff,AG}}\right) * \%_{wall,AG} * \left(\frac{A_{wall} * CDD_{75} * 24}{Cooling\ Eff * 3412}\right)$$

$$Heating\ kWh = \left(\frac{1}{R_{wall,base}} - \frac{1}{R_{wall,eff}}\right)\left(\frac{A_{wall} * HDD_{50} * 24}{Elec\ Heating\ Eff * 3412}\right)$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = Wall\ Insul\ Cost\ per\ ft^2 * A_{wall}$$

Variables

$R_{wall,base,AG}$	1.9	R-Value for baseline wall insulation that is above-grade. (Reference 2,3,4,5)
$R_{wall,base}$	2.9	R-Value for baseline wall insulation. (Reference 2,3,4,5,13)
$R_{wall,eff,AG}$	14.9	R-Value for added above-grade wall insulation, including base wall. Calculated assuming R-13 continuous. (Reference 2,3,4,5)
$R_{wall,eff}$	16.7	R-Value for total wall insulation, including below-grade walls. Calculated assuming R-13 continuous. (Reference 2,3,4,5,13)
$\%_{wall,AG}$	50%	Percent of crawlspace wall that is above-grade. Assumed to be 50% of total
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	20	Deemed lifetime of measure in years (Reference 1)
HDD_{50}	See Table 8.0.1	Heating degree days, 50^{o}F base (Reference 13, 14)
CDD_{75}	See Table 8.0.1	Cooling degree days, 75^{o}F base (Reference 13, 14)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
Landlord Paid Utility?	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Cooling efficiency determined based on customer's cooling system type
Wall Insul Cost per ft^2	See Table 8.0.7	Incremental Cost for Crawlspace Insulation/ft^2 (Reference 15)

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
A_{wall}	Yes	ft^2 of wall insulation added
Landlord Paid Utility?	No	Rim Joist Insul Cost per ft2
Wall Insul Cost per ft^2	No	For Home Energy Savings Program - Cost per ft^2 of wall insulation provided by participating vendors
Incremental Cost	No	Cost of the wall insulation, provided by the customer for Insulation Rebates and Whole Home Efficiency
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

None

8.7 Rim Joist Insulation

Algorithms

$$Customer\ Dth = \left(\frac{1}{R_{rim,base}} - \frac{1}{R_{rim,eff}}\right)\left(\frac{A_{rim}*HDD*24}{Gas\ Heating\ Eff*1{,}000{,}000}\right)$$

$$Cooling\ kWh = \left(\frac{1}{R_{rim,base}} - \frac{1}{R_{rim,eff}}\right)\left(\frac{A_{rim}*CDD*24}{Cooling\ Eff*3412}\right)$$

$$Heating\ kWh = \left(\frac{1}{R_{rim,base}} - \frac{1}{R_{rim,eff}}\right)\left(\frac{A_{rim}*HDD*24}{Elec\ Heating\ Eff*3412}\right)$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours + Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = Rim\ Joist\ Insul\ Cost\ per\ ft^2 * A_{rim}$$

Variables

$R_{rim,base}$	7.5	R-Value for baseline rim joist insulation, calculated assuming no cavity insulation (Reference 2,3,4,5)
$R_{rim,eff}$	20.5	R-Value for upgraded wall insulation, calculated assuming R-13 cavity insualtion (Reference 2,3,4,5)
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	20	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65^{o}F base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65^{o}F base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Cooling efficiency determined based on customer's cooling system type
County	See Table 8.0.7	Incremental Cost for Rim Joist Insulation/ft^2 (Reference 15)

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
A_{rim}	Yes	ft^2 of rim insulation added
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities
Wall Insul Cost per ft^2	No	For Home Energy Savings Program - Cost per ft^2 of wall insulation provided by participating vendors
Incremental Cost	No	Cost of the wall insulation, provided by the customer for Insulation Rebates and Whole Home Efficiency
County	No	Rim Joist Insul Cost per ft2
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

None

8.8 Manufactured Home Belly Insulation

Algorithms

$$Customer\ Dth = \left(\frac{1}{R_{Struc}+R_{Belly,base}} - \frac{1}{R_{Struc}+R_{Belly,eff}}\right)\left(\frac{A_{Belly}*HDD*24}{Gas\ Heating\ Eff*1{,}000{,}000}\right)$$

$$Cooling\ kWh = \left(\frac{1}{R_{Struc}+R_{Belly,base}} - \frac{1}{R_{Struc}+R_{Belly,eff}}\right)\left(\frac{A_{Belly}*CDD*24}{Cooling\ Eff*3412}\right)$$

$$Heating\ kWh = \left(\frac{1}{R_{Struc}+R_{Belly,base}} - \frac{1}{R_{Struc}+R_{Belly,eff}}\right)\left(\frac{A_{Belly}*HDD*24}{Elec\ Heating\ Eff*3412}\right)$$

$$Gross\ Annual\ kWh\ Saved\ at\ Customer = Cooling\ kWh + Heating\ kWh$$

$$Customer\ kW\ (Gross\ kW) = \frac{Gross\ Annual\ kWh\ Saved\ at\ Customer}{Cooling\ Hours+Heating\ Hours}$$

$$Customer\ PCkW = \frac{Cooling\ kWh}{Cooling\ Hours}$$

$$Incremental\ Cost = Belly\ Insul\ Cost\ per\ ft^2 * A_{Floor}$$

Variables

R_{Struc}	3.2	R-Value of the existing belly structure with no insulation (References 2,3,5)
Dth to BTU Conversion	1,000,000	1 Dth = 1,000,000 BTU
kWh to BTU Conversion	3,412	1 kWh = 3412 BTU
Measure Lifetime	20	Deemed lifetime of measure in years (Reference 1)
HDD	See Table 8.0.1	Heating degree days, 65oF base (Reference 12)
CDD	See Table 8.0.1	Cooling degree days, 65oF base (Reference 12)
Heating Hours	See Table 8.0.1	Full load heating hours (from Residential HVAC program)
Cooling Hours	See Table 8.0.1	Full load cooling hours (from Residential HVAC program)
Gas Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Elec Heating Eff	See Table 8.0.4	Heating efficiency determined based on customer's heating system type
Cooling Eff	See Table 8.0.5	Cooling efficiency determined based on customer's cooling system type
County	See Table 8.0.7	Location of the home for determining weather zones

Customer Inputs	M&V Verified	
Heating Type	Yes	Heating system type for the residence
Cooling Type	Yes	Cooling system type for the residence
$R_{Belly,base}$	Yes	R-Value for baseline belly insulation
$R_{Belly,eff}$	Yes	R-Value for upgraded belly insulation
A_{Belly}	Yes	ft2 of belly insulation added
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities
Belly Insul Cost per ft2	No	For Home Energy Savings Program - Cost per ft2 of wall insulation provided by participating vendors
Incremental Cost	No	Cost of the belly insulation, provided by the customer for Insulation Rebates and Whole Home Efficiency
County	No	Location of the home for determining weather zones
Building Type	No	Single family or multi-family residence

References:

See *Deemed Tables*

Changes from Recent Filing:

New measure in Home Energy Savings Program targeting Manufactured Homes.

9.1 Holistic

Customer may apply for any prescriptive electric or gas rebate while participating as an enrollee in a holistic program. The values shown on Forecast Summary represent the average project characteristics, as defined by past program participation for a given technology. The technical details for a given technology are defined in the technology's Technical Assumptions.

Variables

Lifetime	Based on individual prescriptive product
Coincidence Factor	Based on individual prescriptive product
O&M Savings	Based on individual prescriptive product
Energy and Demand Savings	Based on individual prescriptive product

10.1 Home Lighting

Algorithms

$$kW\ Savings\ per\ Bulb = (Baseline\ Wattage\ - LED\ Wattage)/1000$$

$$Customer\ kWh = Number\ of\ Bulbs \times kW\ Savings\ per\ Bulb \times Hours$$

$$Customer\ kW = Number\ of\ Bulbs \times kW\ Savings\ per\ Bulb$$

$$Peak\ Coincident\ kW = \ Customer\ kW\ x\ Coincident\ Factor$$

$$Customer\ kWhNightlight\ = Customer\ kWh\ x\ WHFe$$

$$Customer\ kWNightlight\ = Customer\ kW\ x\ WHFd$$

$$Peak\ Coincident\ kWNightlight = \ Customer\ kWNightlight\ x\ Coincident\ Factor$$

$$Baseline\ Wattage = \frac{OutputLumens}{Lumen\ per\ Watt\ Baseline}$$

$$Connected\ Lighting\ Customer\ kWh = Customer\ kWh + (Hours\ x\ SVGe\ x\ LED\ Wattage/1000)$$

$$Holiday\ Lights\ kWh = \frac{Baseline\ Wattage\ - LED\ Wattage}{1000}\ x\ Hours$$

Variables

Number of Bulbs	Vendor Input	Number of bulbs sold.
Baseline Wattage	Tables 10.1.2 - 10.1.7	Baseline wattages are determined using an adjusted ENERGY STAR lumen equivalency rating, adjusted for EISA requirements based on lumen ouptut. Linear lamps based on past participation. [1, 2, 8]
Lumen per Watt Baseline	Tables 10.1.1 and 10.0.8	Lumen per Watt baselines determine baseline wattages if otherwise undefined.
LED Wattage	Manufacturer Provided	Wattage of the LED bulb, provided by each manufacturer.
Output Lumens	Manufacturer Provided	Output Lumens of the LED Bulb, Provided by the Manufacturer
Hours	Table 10.1.12	Annual hours of operation for the bulbs for both residential and non-residential segments. [3, 4, 8]
CF	Table 10.1.10	Probability that peak demand of the bulb will coincide with peak utility system demand. [3, 4, 8]
Lifetime Hours	Table 10.1.13	Lifetime Hours for LEDs.[5]
Measure Life	Table 10.1.11	Measure Life of the average bulb sold, determined by lifetime hours divided by hours of use by segment for all bulbs less Nightlights. The Measure Life for Nightlights is deemed at 8 years.[2]
Incremental Cost of Bulbs	Table 10.1.8 and 10.1.15	Cost difference between baseline and efficient bulb options. [6]
NTG	100%	Net to gross.
Installation Rate	99%	Future savings for bulbs purchased and put in storage and installed in later years. The net present value of the saving for all bulbs purchased is 100% if all bulbs are installed when purchased. Using 100% for business customers.
O&M savings	$0.00	Operation and maintenance savings are assumed to be zero.
WHFe	1.06	Waste heat factor for energy to account for cooling savings from efficient lighting (listed here for a Single Family Home).[2]
WHFd	1.098	Waste heat factor for demand to account for cooling savings from efficient lighting (listed here for a Single Family Home).[2]

Provided by product Vendor:	**M&V Verified**
Number and type of bulbs purchased	Yes

Assumptions:

The baseline bulb costs and the LED bulb costs will be reviewed and updated if needed at least semi-annually.
*GSL Bulbs include: A-Line, 3-way, Decorative ST Shape, PAR20, PAR 30, PAR38, R40, BR30, BR40, ER40, Globe with Diameter between 1.5625 and 5 inches, and any other bulbs that fit within the definition defined by the Department of Energy's 10CFR Part 430 Energy Conservation Program [12]
**GSL Specialty Lamps include: G-Shape lamps thet have a first number symbol less than or equal to 12.5, G-shape lamps with diameter of 5 inches or more, MR-shape lamps that have a first symbol equal to 16 and have a lumen output greater than or equal to 800 lumens, Reflector lamps that have a first number symbol less than 16 and do not have E26/E24, E26d, E26/50x39, E29/28, E29/E53x39, E39, E39d, EP39, or EX39 bases and any other bulbs that fit within the definition defined by the Department of Energy's 10CFR Part 430 Energy Conservation Program [12]

If the formula below for the PAR, MR and MRX Lamp baseline equivalent results in a negative or undefined value, the manufacturer recommendation is used.

Table 10.1.1: GSL Bulbs* [2, 9, 12]

Bulb Type	Lumen per Watt Baseline
GSL Bulbs	45

*GSL Bulbs include: A-Line, 3-way, Decorative ST Shape, PAR20, PAR 30, PAR38, R40, BR30, BR40, ER40, Globe with Diameter between 1.5625 and 5 inches, and any other bulbs that fit within the definition defined by the Department of Energy's 10CFR Part 430 Energy Conservation Program [12]

Table 10.1.2: GSL Specialty Bulbs** [2, 12]

Bulb Type	Minimum Lumens	Maximum Lumens	WattsBase
ESIA exempt Globe	150	349	25
ESIA exempt Globe	350	499	40
ESIA exempt Globe	500	574	60
ESIA exempt Globe	575	649	75
ESIA exempt Globe	650	1000	100
ESIA exempt Non S-Shape Decorative w/ Medium and intermediate bases	160	299	25
ESIA exempt Non S-Shape Decorative w/ Medium and intermediate bases	300	499	40
ESIA exempt Non S-Shape Decorative w/ Medium and intermediate bases	500	800	60
ESIA exempt Non S-Shape Decorative w/ candelabra bases	120	159	15
ESIA exempt Non S-Shape Decorative w/ candelabra bases	160	299	25
ESIA exempt Non S-Shape Decorative w/ candelabra bases	300	499	40
ESIA exempt Non S-Shape Decorative w/ candelabra bases	500	650	60
ESIA exempt S-Shape Decorative	50	75	11
ESIA exempt S-Shape Decorative	100	120	15
ESIA exempt S-Shape Decorative	120	340	25
Reflector lamp with medium screw bases	280	374	35
Reflector lamp with medium screw bases	375	600	50
R20	450	524	40
R20	525	750	45

**GSL Specialty Lamps include: G-Shape lamps thet have a first number symbol less than or equal to 12.5, G-shape lamps with diameter of 5 inches or more, MR-shape lamps that have a first symbol equal to 16 and have a lumen output greater than or equal to 800 lumens, Reflector lamps that have a first number symbol less than 16 and do not have E26/E24, E26d, E26/50x39, E29/28, E29/E53x39, E39, E39d, EP39, or EX39 bases and any other bulbs that fit within the definition defined by the Department of Energy's 10CFR Part 430 Energy Conservation Program [12]

PAR, MR, MRX Bulbs [2, 9]

The following equation is used to determine the baseline wattage for these bulbs, result should be rounded down to the nearest wattage in Table X.

$$Wattsbase = 375.1 - 4.355(D) - \sqrt{227{,}800 - 937.9(D) - 0.9903(D^2) - 1479(BA) - 12.02(D * BA) + 14.69(BA^2) - 16{,}720 * ln(CBCP)}$$

D = Bulb Diameter
BA = Beam Angle
CBCP = Center Beam Candle Power

Table 10.1.3: PAR, MR, MRX Bulbs - Energy Star Permitted Wattages [1, 2, 9]

Diameter	Permitted Wattages
16	20, 35, 40, 45, 50, 60, 75
20	50
30S	40, 45, 50, 60, 75
30L	50, 75
38	40, 45, 50, 55, 60, 65, 75, 85, 90, 100, 120, 150, 250

Table 10.1.4: Fixtures [2]

Fixture Category	WattsBase
Indoor	88.5
Downlight Task, and Under Cabinet	45.2
Outdoor	79.6
Downlight/Retrofit Kits	72.8

Table 10.1.5: T-LEDs [8]

Type	WattsBaseline
TLED	32

Table 10.1.6: Holiday Lights [2]

String Type	WattsBase
Mini	0.4
C7	5
C9	7

Table 10.1.7: Nightlights [2]

Nightlight	WattBase
Standard LED Nightlight	7

Table 10.1.8: Connected Lighting [2]

Lighting Type	Lumen per Watt Baseline	SVGe
LED Smart Bulb	45	0.37

Table 10.1.9: Incremental Costs If Unknown [6, 8]

Bulb Type	Residential	Buisness
A-Lamps 0-1049 lm	$1.45	$7.37
A-Lamps 1490-5000 lm	$1.45	$10.21
3-Way	$1.52	$1.52
BR30 BR40	$1.65	$9.80
R20	$1.65	$24.68
PAR20, PAR30, PAR38	$1.65	$18.09
MR16	$1.65	$12.51
Decorative and Globe	$1.66	$5.03
Indoor Fixture	$26.00	$21.60
Downlight Task, and Under Cabinet Fixture	$18.00	$21.60
Outdoor Fixture	$26.00	$21.60
Downlight Fixture	$13.00	$21.60
LED Linear Lamps - Type A	$13.00	$4.94
LED Linear Lamps - Type B	$13.00	$13.69
LED Linear Lamps - Type C	$13.00	$22.56
Holiday Lights	$10	N/A
LED Nightlight	$3.35	N/A
LED Smart Bulb	$9.74	N/A

Costs are provided by the program implimentor or vendor and are re-evaluated throughout the year to account for the rapidly evolving market.

Table 10.1.10: Coincident Factor [2, 4]

Bulb Type	Residential	Buisness
A-Lamps	12.8%	78%
3-Way	12.8%	78%
GSL Reflectors (PAR20, PAR30, PAR38 R40)	10.9%	78%
GSL Specialty Reflectors (MR16, PAR16 R14 R16)	10.9%	78%
GSL Decorative and Globe	10.9%	78%
GSL Specialty Decorative and Globe	10.9%	78%
Indoor Fixture	11.9%	78%
Downlight Task, and Under Cabinet Fixture	11.9%	78%
Outdoor Fixture	27.3%	78%
Downlight Fixture	11.9%	78%
T-LED	12.8%	78%
Holiday Lights	0.00%	N/A
LED Nightlight	0.00%	N/A
LED Smart Bulb	12.8%	N/A

Table 10.1.11: Measure Life [2, 4]

Bulb Type	Residential	Buisness
A-Lamps	18.37	3.9
3-Way	18.37	3.9
GSL Reflectors (PAR20, PAR30, PAR38 R40)	20	3.9
GSL Specialty Reflectors (MR16, PAR16 R14 R16)	20	3.9
GSL Decorative and Globe	20	4.9
GSL Specialty Decorative and Globe	20	4.9
Indoor Fixture	20	9.2
Downlight Task, and Under Cabinet Fixture	20	8.8
Outdoor Fixture	18.18	8.8
Downlight Fixture	20	9.2
T-LED	20	9.8
Holiday Lights	20	N/A
LED Nightlight	8	N/A
LED Smart Bulb	18.37	N/A

Table 10.1.12: HOU [2, 4]

Bulb Type	Residential	Buisness
A-Lamps	1089	5119
3-Way	1089	5119
GSL Reflectors (PAR20, PAR30, PAR38, R40)	736	5119
GSL Specialty Reflectors (MR16, PAR16, R14, R16)	736	5119
GSL Decorative and Globe	736	5119
GSL Specialty Decorative and Globe	736	5119
Indoor Fixture	926	5119
Downlight Task, and Under Cabinet Fixture	730	5119
Outdoor Fixture	2475	5119
Downlight Fixture	926	5119
T-LED	730	5119
Holiday Lights	210	N/A
LED Nightlight	4380	N/A
LED Smart Bulb	1089	N/A

Table 10.1.13: Lifetime Hours [2]

Bulb Type	Lifetime Hours
A-Lamps	20000
3-Way	20000
GSL Reflectors (PAR20, PAR30, PAR38 R40)	20000
GSL Specialty Reflectors (MR16, PAR16 R14 R16)	20000
GSL Decorative and Globe	25000
GSL Specialty Decorative and Globe	25000
Indoor Fixture	47000
Downlight Task, and Under Cabinet Fixture	45000
Outdoor Fixture	45000
Downlight Fixture	47000
T-LED	50000
Holiday Lights	20000
LED Nightlight	35040
LED Smart Bulb	20000

Table 10.1.14: Buisness/Residential Split [7]

Lighting Type	Residential	Buisness
GSL Bulbs	94%	6%
GSL Specialty Bulbs	94%	6%
Fixtures	94%	6%
T-LED	24%	76%
Holiday Lights	100%	0%
Nightlights	100%	0%
Smart Bulbs	100%	0%

Table 10.1.15: Average Costs [10]

Type	Incremental Cost
A19 Smart LED Bulb	$12.99
BR30 Smart LED Bulb	$17.99
LED Nightlight	$1.40
School Kits 9W A-line	$3.19
School Kits 11W A-line	$4.81
School Kits 13W A-Line	$5.09
School Kits 15W A-Line	$2.79
School Kits 8W Reflector	$2.65
School Kits 6W Globe	$2.65
School Kits 4W-8W-14W 3-WAY LED	$2.65
School Kits 5W Candle LED	$2.65
Squad 9W A-Line	$5.00
Squad 15W A-Line	$5.00
Squad 10W Flood	$5.00
Squad 6W Globe	$5.00
Squad 5W Candelabra	$5.00
Squad 3-WAY 5W-9W-16W	$5.00
Squad A-Line	$5.00
Squad Specialty	$5.00
HESP 6W Canelabra	$4.90
HESP 6W Globe	$4.90
HESP 10W A-Line	$4.80
FEED Qty (4) 9W LED	$3.51
FEED 0.5W Nightlight	$1.40

Costs are provided by the program implimentor or vendor and are re-evaluated throughout the year to account for the rapidly evolving market.

References:

1. The Uniform Methods Project: Residential Lighting Evaluation Protocol, published April 2017. Page 15.
2. State of Illinois Energy Efficiency Technical Reference Manual Final Technical Version 11.0, effective January 1st, 2023. Vol 3, Pages 310-366.
3. Northeast Residential Lighting Hours-of-Use Study, Pages XVI and 37 and 66.
4. MN Lighting Efficiency (Midstream) deemed savings for business hours and CF.
5. Lifetime hours from Slipstream for bulbs sold in MN 2022 used to calculate weighted lifetime for A-Line and Specialty categories.
6. 2022 MN Home Lighting Product Results compiled by Slipstream (program administrator).
7. 2016 CO Home Lighting and Recycling Evaluation by Cadmus, 2016. Pages 35, 72-73.
8. 2022 MN Lighting Efficiency and Cost data for linear lamps from the buisness lighting program
9. State of Minnesota Technical Reference Manual for Energy Conservation, effective January 1st, 2024 Page 27.
10. Contracted price with vendors
11. 2015 U.S. Lighting Market Characterization (pg 116)
12. Department of Energy's 10CFR Part 430 Energy Conservation Program

Changes From Recent Filing:

1. Changed wattage baseline for GSL bulbs to follow the 45 lm/W EISA baseline
2. Broke out A-Line and Specialty categories into GSL, GSL Specialty, and Fixtures
3. Updated HOU, lifetime hours, coincident factors, and incremental costs
4. Added Holiday Lights
5. Added Connected Lighting
6. Updated T-LED baseline wattage
7. Added Nightlights to the Home Lighting program

11.1 DX

Algorithms

$$Customer\,kWh = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right) \times Qty$$

$$Customer\,kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$Customer\,PC\,kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$ ($IEER_{Baseline}$)	See Table 1.A	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
$EER_{Baseline}$	See Table 1.A	EER of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	15	Life of a new unit, in years

Customer Inputs	M&V Verified	
$SEER_{Eff}$ ($IEER_{Eff}$)	Yes	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
EER_{Eff}	Yes	EER of high efficiency equipment that the customer will install.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for Equipment Baseline Efficiencies, Incremental costs, Coincidence Factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies

Changes from Recent Filing:

11.2 WSHP

Algorithms

$$Customer\,kWh = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right) \times Qty$$

$$Customer\,kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$Customer\,PC\,kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$EER = SEER \times 0.90$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$ ($IEER_{Baseline}$)	See Table 1.A	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
$EER_{Baseline}$	See Table 1.A	EER of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	15	Life of a new unit, in years

Customer Inputs	M&V Verified	
$SEER_{Eff}$ ($IEER_{Eff}$)	Yes	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency
EER_{Eff}	Yes	EER of high efficiency equipment that the customer will install.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies

Changes from Recent Filing:

11.3 PTAC

Algorithms

$$Customer\,kWh = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right) \times Qty$$

$$Customer\,kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$Customer\,PC\,kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$EER = SEER \times 0.85$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$ ($IEER_{Baseline}$)	See Table 1.A	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
$EER_{Baseline}$	See Table 1.A	EER of standard equipment, based upon the minimum acceptable efficiency defined by IECC 2018
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	15	Life of a new unit, in years

Customer Inputs	M&V Verified	
$SEER_{Eff}$ ($IEER_{Eff}$)	Yes	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
EER_{Eff}	Yes	EER of high efficiency equipment that the customer will install.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies

Changes from Recent Filing:

11.4 Scroll-Screw Chiller

Algorithms

$$Customer\ kWh = Size \times EFLH \times \left(IPLV_{Baseline} - IPLV_{Eff}\right) \times Qty$$

$$Customer\ kW = Size \times \left(FLV_{Baseline} - FLV_{Eff}\right) \times Qty$$

$$Customer\ PCkW = CF \times Size \times \left(FLV_{Baseline} - FLV_{Eff}\right) \times Qty$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$FLV_{Baseline}$	See Table 1.B	Full load cooling efficiency in kW/ton of standard equipment, based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010 for a given chiller type and size. NOTE: For non-centrifugal chillers, FLV_Baseline is the value in ASHRAE 90.1-2010. For centrifugal chillers, condenser water temperature, chilled water temperature, and condenser flow rate are used in the formula given in algorithms in order to convert the efficiency values at standard ARI conditions to the customer's actual operating conditions.
$IPLV_{Baseline}$	See Table 1.B	Integrated Part Load Value in kW/ton (representing the average efficiency over a range of loaded states) based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010 for a given chiller type and size. NOTE: For non-centrifugal chillers, IPLV_Baseline is the value in ASHRAE 90.1-2010. For centrifugal chillers, condenser water temperature, chilled water temperature, and condenser flow rate are used in the formula given in algorithms in order to convert the efficiency values at standard ARI conditions to the customer's actual operating conditions.
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	20	Life of a new unit, in years

Customer Inputs	M&V Verified	
FLV_{Eff}	Yes	Full Load Value cooling efficiency in kW/ton, representing the efficiency at design conditions for the customer's operating conditions.
$IPLV_{Eff}$	Yes	Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of high efficiency equipment at the customer's operating conditions.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies

Changes from Recent Filing:

11.5 Centrifugal Chillers

Algorithms

$$Customer\ kWh = Size \times EFLH \times (IPLV_{AHRI\_Adj} - IPLV_{Eff}) \times Qty$$

$$Customer\ kW = Size \times (FLV_{AHRI\_Adj} - FLV_{Eff}) \times Qty$$

$$Customer\ PCkW = CF \times Size \times (FLV_{AHRI\_Adj} - FLV_{Eff}) \times Qty$$

$$IPLV_{AHRI\_Adj} = IPLV_{AHRI} \div K_{adj}$$

$$FLV_{AHRI\_Adj} = FLV_{AHRI} \div K_{adj}$$

$$K_{adj} = A \times B$$

$$A = 0.00000014592 \times (Lift)^4 - 0.0000346496 \times (Lift)^3 + 0.00314196 \times (Lift)^2 - 0.147199 \times (Lift) + 3.9302$$

$$B = 0.0015 \times LvgEvap + 0.934$$

$$Lift = LvgCond - LvgEvap$$

$$Incremental\ Cost = Size \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
FLV_{AHRI}	See Table 1.B	Minimum acceptable FLV for centrifugal chillers at the AHRI Standard 550/590 rated condition of 85 °F condensing water temperature, 44 °F chilled water temperature, and 3 gpm/ton.
$IPLV_{AHRI}$	See Table 1.B	Minimum acceptable FLV for centrifugal chillers at the AHRI Standard 550/590 rated condition of 85 °F condensing water temperature, 44 °F chilled water temperature, and 3 gpm/ton.
CF	90%	Coincidence Factor.
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 3.1)
Lifetime	20	Life of a new unit, in years

Customer Inputs	M&V Verified	
FLV_{Eff}	Yes	Full Load Value cooling efficiency in kW/ton, representing the efficiency at AHRI Standard 550/590 rated condition of 85 °F condensing water temperature, 44 °F chilled water temperature, and 3 gpm/ton conditions.
$IPLV_{Eff}$	Yes	Integrated Part Load Value (representing the weighted average efficiency over a range of loaded states per AHRI standard 550/590) cooling efficiency in kW/ton of high efficiency equipment at the customer's operating conditions.
LvgEvap	Yes	The full load water temperature leaving the evaporator, in °F.
LvgCond	Yes	The full load water temperature leaving the condenser, in °F.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 3.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2015 for Equipment Baseline Efficiencies

Changes from Recent Filing:

11.6 Air-Cooled Chillers

Algorithms

Customer $kWh = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right) \times Qty$

Customer kW $= Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$

Customer PC kW $= CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$

$EER = SEER \times 0.85$

$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$ ($IEER_{Baseline}$)	See Table 1.B	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment determined per AHRI 550/590 procedures, based upon the minimum acceptable efficiency defined by local building/energy code.
$EER_{Baseline}$	See Table 1.B	EER of equipment determined by AHRI 550/590 at standard test conditions, based upon the minimum acceptable efficiency defined by local building/energy code.
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	20	Life of a new unit, in years

Customer Inputs	M&V Verified	
$SEER_{Eff}$ ($IEER_{Eff}$)	Yes	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
EER_{Eff}	Yes	EER of high efficiency equipment that the customer will install.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies
6. AHRI Standard 550/590 Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle

Changes from Recent Filing:

11.7 Chiller VFD Retrofit

Algorithms

Customer $kWh = Size \times EFLH \times (IPLV_{VFDBaseline} - IPLV_{VFDEff}) \times Qty$

Customer kW $= Size \times (FLV_{VFDBaseline} - FLV_{VFDEff}) \times Qty$

$Customer\ PCkW = CF \times Size \times (FLV_{VFDBaseline} - FLV_{VFDEff}) \times Qty$

$IPLV_{VFDEff} = IPLV_{VFDBaseline} \times (1 - IPLV\ VFD\ Efficiency\ Factor)$

$FLV_{VFDEff} = FLV_{VFDBaseline} \times (1 + FLV\ VFD\ Efficiency\ Factor)$

$Incremental\ Cost = Size \times Incremental\ Cost\ per\ Ton$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$IPLV\ VFD\ Efficiency\ Factor$	22%	Deemed Improvement in Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of existing chiller after VFD retrofit. Ref: 4
FL$V\ VFD\ Efficiency\ Factor$	3%	Deemed Improvement in Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of existing chiller after VFD retrofit. Ref: 6
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	15	Life Time in years, equal to the value used in the Motors and Drives program for

Customer Inputs	M&V Verified	
Chiller Full Load efficiency ($FLV_{VFDBaseline}$)	Yes	Full Load Value cooling efficiency in kW/ton, representing the efficiency of existing chiller without a VFD at 100% load.
Chiller Part Load efficiency ($IPLV_{VFDBaseline}$)	Yes	Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of existing chiller without a VFD.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts,minimum qualifying efficiencies
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2020 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies
6. U.S. Dept. of Energy: https://www.energy.gov/sites/default/files/2014/04/f15/motor_tip_sheet11.pdf

Changes from Recent Filing:

11.8 MN ERV

Algorithms

$$Cooling\ Electrical\ Energy\ Savings\ (Customer\ kWh) = ERV\ Base\ Cool\ Load \times \left(\frac{EER\_Baseline}{Equipment\ EER}\right) \times \left(\frac{EFLH\ Cooling}{EFLH\ Cooling\ Baseline}\right) \times \left(\frac{OA\ CFM}{OA\ CFM\ Baseline}\right) \times \frac{ERV\ Total\ Cooling\ Effectiveness}{ERV\ Total\ Cooling\ Eff\ Baseline} \times Equipment\ Qty$$

$$(Customer\ kW\ Savings) = \left(Enthalpy\ ATF \times OA\ CFM\ through\ ERV \times \frac{(Des\ OA\ Enthalpy - RA\ Enthalpy)}{12{,}000} \times ERV\ Total\ Effectiveness\ Cooling \times \left(\frac{12}{Equipment\ EER}\right) \times Equipment\ Qty\right) - Fan\ Penalty$$

$$Fan\ Penalty = \left(\frac{0.746}{Fan\ Motor\ Efficiency} \times \frac{(OA\ CFM \times ERV\ Pressure\ Drop)}{(6356 \times Base\ Motor\ Efficiency)} \times Air\ Path\ Quantity\right) \times Equipment\ Qty$$

$$Customer\ Dth = ERV\ Base\ Heat\ Load \times \left(\frac{OA\ CFM}{OA\ CFM\ Baseline}\right) \times \left(\frac{ERV\ Heating\ Effectiveness}{ERV\ Heating\ Eff\ Baseline}\right) \times Equipment\ Qty$$

$$Customer\ PC\ kW = Customer\ KW\ Savings \times Coincidence\ Factor$$

Variables

Fan Motor Efficiency	70.5	(%)
Base Motor Efficiency	85.5	(%)
Air Path Quantity	2	The number of air paths that have a pressure drop penalty (Return & Supply)
EFLH Cooling	Table 1.B	(Hours)
ERV Base Cool Load	5619 kWh	comes from internal bin analysis verified by 3rd party reviewer and includes the fan penalty
EER_Baseline	19.21	(EER)
OA CFM Baseline	11,193	(CFM) OA CFM through ERV
ERV Total Cooling Eff Baseline	73.49	(%)
EFLH Cooling Baseline	1,298	(Hours)
ERV Heating Eff Baseline	72.01	(%)
RA Enthalpy	Table 11.8.1	
Des OA Enthalpy	Table 11.8.1	
Enthalpy ATF	Table 11.8.1	
ERV Base Heat Load	19,893	(therms) Modeled heating savings per unit equipment
Coincidence Factor	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Measure Life	15	Life of a new unit, in years

Customer Inputs	M&V Verified	
ERV Total Cooling Effectiveness	Yes	(%)
ERV Effectiveness Sensible Heating	Yes	(%)
OA CFM	Yes	(CFM) OA CFM through ERV
ERV Pressure Drop	No	(in wg) Pressure drop for each air stream
Equipment EER	Yes	(EER)
Cooling Part Load Efficiency	No	(KW/Ton)
Market Segment	Yes	
Heating Efficiency	Yes	(%)
Equipment Qty	Yes	

Table 11.8.1

	Zone 1	Zone 2	Zone 3
RA Enthalpy	28.36	28.36	28.36
Des OSA Enthalpy	32.55	35.55	36.55
Enthalpy ATF	4.5	4.5	4.5

Incremental Capital Costs

Cost per CFM installed	$6.00	Total Cost for heating and cooling components
Cooling Cost per CFM	$1.22	Assumed 20% of incremental capital cost dedicated to cooling
Heating Cost per CFM	$4.78	Assumed 80% of incremental capital cost dedicated to heating

References:

1. NYSERDA (New York State Energy Research and Development Authority); NY Energy $mart Programs Deemed Savings Database - Source for coincidence factor
2. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
3. 2013-2015 MN Cooling Program Participation Data, used for developing incremental costs and forecasts
4. Minnesota Technical Reference Manual, v1.3
5. California DEER Ex Ante Measure Cost Study (http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-
6. Provided by a mechanical contracting firm in 2010 and inflation-adjusted to 2017 dollars using average inflation rate
7. NEEP Incremental Cost Study, Phases 2 and 3,Navigant. May 2014. Incremental Cost Study Phase Three Final Report. Prepared for NEEP
8. Incremental costs for MSHPs were determined from the NEEP Incremental Cost Study Phase 2 Report
9. MSHP equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-life-report-
10. Values derived from 2014-2015 Xcel Cooling Program participants.

11.9 Mini-Split Heat Pump

Algorithms

$$Cooling\ Electrical\ Energy\ Savings\ (kWh)\ = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right)$$

$$Heating\ Electrical\ Energy\ Savings\ (kWh) = \frac{MSHP_{Size_{Heating}}}{1000} \times MSHP\_EFLHH \times \left(\frac{1}{HSPF_{Baseline}} - \frac{1}{HSPF\_Eff}\right)$$

$$Customer\ kWh = Cooling\ Electrical\ Energy\ Savings + Heating\ Electrical\ Energy\ Savings$$

$$Customer\ kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right)$$

$$Customer\ PC\ kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right)$$

$$Incremental\ Cost = Size \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
MSHP_EFLHH	849	Mini-Split Heat Pump Equivalent Full Load Hours Heating: The equivalent number of hours that MSHP equipment would be running at full load over the course of the year for heating. From Heating Efficiency Program.
$SEER_{Baseline}$	See Table 1.A	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by the current building code.
$EER_{Baseline}$	See Table 1.A	EER of standard equipment, based upon the minimum acceptable efficiency defined by the current building code. If unavailable, EER_Baseline is calculated from SEER_Eff using a polynomial conversion.
$HSPF_{Baseline}$	See Table 11.9.1	Heating Seasonal Performance Factor (HSPF) of baseline equipment. Existing electric resistance heat will serve as the baseline for the Nonprofit Energy Savings Program only.
CF	90%	Coincidence Factor
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 3.1)
Measure Life[2]	18	Life of a new unit, in years

Customer Inputs	M&V Verified	
Cooling capacity (BTU/h)	Yes	(Btu/h) Size - Cooling capacity of equipment at standard ARI test conditions
Cooling efficiency (SEER)	Yes	SEER_Eff - Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
Cooling efficiency (EER)	No	EER_Eff - Full-load efficiency of efficient equipment. If unavailable, value is calculated from SEER_Eff using a polynomial conversion.
Heating capacity (BTU/h)	Yes	(Btu/h) MSHP_Size_Heating - Heating capacity of Mini Split Heat Pump at 17 F outdoor air temperature, in BTU/h
Heating efficiency (HSPF)	Yes	HSPF_Eff - Heating Seasonal Performance Factor (HSPF) of High Efficiency equipment that the customer will install.
MSHP Cost ($)	No	Cost for total proposed MSHP equipment. For Nonprofit Energy Savings Program (NESP) only, where full cost of equipment serves as the measure incremental cost.
Climate zone	No	
Building type	Yes	
Equipment quantity	Yes	
Primary use, cooling or heating (MSHP)	No	

Table 11.9.1

Equipment Type	$HSPF_{Baseline}$
Mini-Split Heat Pump (MSHP)*	8.200
Electric Resistance (ER)**	3.412

* Based upon the minimum Federal standard for efficiency as manufactured

** Assuming 1.0 COP for electric resistance heaters

References:

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

1. Incremental costs for MSHPs were determined from the NEEP Incremental Cost Study Phase 2 Report
2. MSHP equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-life-report-residential-and-commercialindustrial-lighting-and-hvac-measures
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies
- No heating demand (kW) saving are claimed for MSHP during winter, only summer cooling demand (kW) savings are claimed.
It is assumed that NO supplemental heating source is used.
For new Mini-Split Heat Pumps (MSHP) it is assumed that the MSHP is being installed in either new construction or to supplement an existing heating and cooling system. The MSHP rebate is intended to incent customers to install a high efficiency MSHP rather than the code level baseline unit.

Changes from Recent Filing:

11.10 Minisplit AC

Algorithms

$$Customer\ kWh\ = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right)$$

$$Customer\ kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right)$$

$$Customer\ PC\ kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right)$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$	See Table 1.A	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by the current building code.
$EER_{Baseline}$	See Table 1.A	EER of standard equipment, based upon the minimum acceptable efficiency defined by the current building code. If unavailable, EER_Baseline is calculated from SEER_Eff using a polynomial conversion.
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Costs Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Measure Life[2]	15	Life of a new unit, in years

Customer Inputs	M&V Verified	
Cooling capacity (BTU/h)	Yes	(Btu/h) Size - Cooling capacity of equipment at standard ARI test conditions
Cooling efficiency (SEER)	Yes	SEER_Eff - Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
Cooling efficiency (EER)	No	EER_Eff - Full-load efficiency of efficient equipment. If unavailable, value is calculated from SEER_Eff using a polynomial conversion.
Climate zone	No	
Building type	Yes	
Equipment quantity	Yes	
Primary use, cooling or heating (MSHP)	No	

References:

1. Incremental costs were determined from the NEEP Incremental Cost Study Phase 2 Report
2. Equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-
3. IECC 2018 for Equipment Baseline Efficiencies
4. For new Mini-Split Air Conditioners (MSAC) it is assumed that the MSAC is being installed in either new construction or to supplement an existing

Changes from Recent Filing:

11.11 CRAC Units

Algorithms

$$Customer\ kWh_{No\ Economizer} = Size\ *\ EFLH\ *\ \left(\frac{12}{3.412 * SCOP_{Baseline}} - \frac{12}{3.412 * SCOP_{Eff}}\right) * Quantity$$

$$Customer\ Coincident\ kW_{No\ Economizer} = CF\ *\ Size\ *\ \left(\frac{12}{3.412 * SCOP_{Baseline}} - \frac{12}{3.412 * SCOP_{Eff}}\right) * Quantity$$

$$Customer\ kWh_{With\ Economizer} = \begin{pmatrix} Size\ *\ Hours_{Not\ Economizing}\ *\ \left(\frac{12}{3.412 * SCOP_{Baseline}} - \frac{12}{3.412 * SCOP_{Eff}}\right) + \\ Economizer\ Size\ *\ Hours_{Economizing}\ *\ \left(\frac{12}{3.412 * SCOP_{Adj\ Baseline}} - \frac{12}{3.412 * SCOP_{Economizer\ Eff}}\right) \end{pmatrix} * Quantity$$

$$Customer\ Coincident\ kW_{With\ Economizer} = CF\ *\ Size\ *\ \left(\frac{12}{3.412 * SCOP_{Baseline}} - \frac{12}{3.412 * SCOP_{Eff}}\right) * Quantity$$

$$Incremental\ Cost = SCOP\ \times Incremental\ Cost\ \$/SCOP$$

Variables

EFLH	8760	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$Hours_{Not\ Economizing}$	See Table 11.11.1	Number of hours that cooling is provided by compressors
$Hours_{Economizing}$	See Table 11.11.1	Number of hours that cooling is provided by economization
$SCOP_{Baseline}$	See Table 11.11.2	The minimum acceptable SCOP, as defined by the DOE, for a specific size and type of equipment (Reference 2)
$SCOP_{Adj\ Baseline}$	See Table 11.11.2	The minimum acceptable SCOP during economizer operation, which is defined by adjusting the DOE minimum acceptable SCOP to align with Test D of the rating standard (Reference 1).
Coincidence Factor	100%	Probability that the calculated Customer kW will coincide with the period of peak generator operation
Lifetime	20	Life of a new CRAC unit, in years
Incremental Cost	See Table 11.11.2	Incremental cost incurred for purchasing a CRAC unit that is more efficient than the DOE minimum requirement (Reference 3)

Customer Inputs	**M&V Verified**	
Size	Yes	The rated equipment sensible capacity in tons, based on the actual indoor operating conditions of the data center (RAT and RH) and the outdoor conditions specified in the rating standard (Reference 1). The maximum eligible unit size is 759,999 Btu/h (63.3 tons).
$SCOP_{Eff}$	Yes	The rated SCOP of the equipment that the customer will install, based on the actual indoor operating conditions of the data center (RAT and RH) and the outdoor conditions specified in the rating standard (Reference 1).
Economizer Size	Yes	The rated equipment sensible capacity during economization in tons, based on the actual indoor operating conditions of the data center (RAT and RH) and the outdoor conditions specified in Optional Test D of the rating standard (Reference 1). The maximum eligible unit size is 759,999 Btu/h (63.3 tons).
$SCOP_{Economizer\ Eff}$	Yes	The SCOP of the equipment that the customer will install, based on the actual indoor operating conditions of the data center (RAT and RH) and the outdoor conditions specified in Test D of the rating standard (Reference 1).
Quantity	Yes	Number of more efficient CRAC units that the customer installed

Table 11.11.1

Equipment Type	**$Hours_{Economizing}$**	**$Hours_{Not\ Economizing}$**
CRAC, Air-Cooled with Economizer	3,047	5,713
CRAC, Water-Cooled with Economizer	2,180	6,580
CRAC, Glycol-Cooled with Economizer	2,321	6,439

Table 11.11.2

Equipment Type	**Net Sensible Cooling Capacity (Btu/h)**		**SCOP_Standard**		**SCOP_Standard_Adj**		**Incremental Cost $/SCOP**
	Lower Limit ≥	**Upper Limit <**	**Downflow Units**	**Upflow Units**	**Downflow Units**	**Upflow Units**	
CRAC, Air-Cooled	1	65,000	2.20	2.09	N/A	N/A	$7,181.33
	65,000	240,000	2.10	1.99	N/A	N/A	$7,715.73
	240,000	760,000	1.90	1.79	N/A	N/A	$11,110.13
CRAC, Air-Cooled with Economizer	1	65,000	2.20	2.09	6.58	6.25	$12,152.77
	65,000	240,000	2.10	1.99	6.28	5.95	$13,057.12
	240,000	760,000	1.90	1.79	5.67	5.36	$18,801.37
CRAC, Water-Cooled	1	65,000	2.60	2.49	N/A	N/A	$18,628.16
	65,000	240,000	2.50	2.39	N/A	N/A	$32,837.67
	240,000	760,000	2.40	2.29	N/A	N/A	$62,303.50
CRAC, Water-Cooled with Economizer	1	65,000	2.55	2.44	4.86	4.65	$19,714.89
	65,000	240,000	2.45	2.34	4.67	4.46	$34,751.50
	240,000	760,000	2.35	2.24	4.48	4.27	$65,931.00
CRAC, Glycol-Cooled	1	65,000	2.50	2.39	N/A	N/A	$18,575.38
	65,000	240,000	2.15	2.04	N/A	N/A	$32,791.17
	240,000	760,000	2.10	1.99	N/A	N/A	$62,303.50

CRAC, Glycol-Cooled with Economizer	1	65,000	2.45	2.34	4.65	4.44	$19,656.86
	65,000	240,000	2.10	1.99	3.99	3.78	$34,700.33
	240,000	760,000	2.05	1.94	3.89	3.68	$65,931.00

References:

1. ASHRAE 127-2007
2. CFR Title 10, Volume 3, Chapter II, Subchapter D, Part 431, Subpart F
3. Chapter 3 of the Technical Support Document for the DOE CRAC efficiency final rule making, https://www.regulations.gov/document?D=EERE-2011-BT-STD-0029-0039

Changes from Recent Filing:

1. New prescriptive measure

Assumptions:

1. The DOE standard does not apply to CRAH units, horizontal flow units, or ceiling-mounted units; therefore, these units are excluded from this prescriptive rebate.
2. The equipment type of CRAC, Air-Cooled with Economizer is not in the DOE standard, but are included in the prescriptive rebate since these are in the market and have a large market share.
3. Minimum SCOP requirements for CRAC, Air-Cooled with Economizer are assumed to be the same as CRAC, Air-Cooled, because market research showed that these types of unit's don't have additional coils for economization. Therefore, no reduction in minimum SCOP is needed to account for the additional flow resistance through the unit.
4. Proposed SCOP ratings must be based on the same outdoor operating conditions used in the rating standard (Reference 1), i.e. air-cooled units are rated at the same OAT, water-cooled units are rated at the same entering and leaving water temperatures, and glycol-cooled units are rated at the same entering and leaving glycol temperatures.
5. Proposed SCOP ratings must be based on actual indoor operating conditions in the data center, i.e. RAT and RH. Credits or penalties for operating the data center above or below the RAT rating condition of 75F and RH rating condition of 45% are part of the savings for this prescriptive rebate. For Glycol Cooled CRAC units, credits or penalties for operating with a propylene glycol solution above or below the rating condition of 40% are also part of the savings for this prescriptive rebate.
6. Credit for being able to run CRAC fans at reduced speeds is not given in the prescriptive savings, because speed controls are standard on all units with EC fans, i.e. new CRAC units. Since units with EC fans have the necessary controls to reduce speed below 100%, the fan speed in the baseline for a new CRAC unit would be the same as the fan speed in the new, proposed CRAC unit.
7. The rated size for units in economization is required since most Water-Cooled and Glycol-Cooled CRAC units have a separate coil for economization, and this coil typically has a different cooling capacity than the evaporator coil. For Air-Cooled units with Economizer, the rated size in economization is likely the same as non-economization, since these units only have one coil for economization and refrigerant evaporation.
8. Economization hours are based on the OA conditions outlined in rating Test D of the rating standard (Reference 1), and an assumed approach temperature of 15 °F for cooling towers and dry coolers.
9. The efficiency curves used for adjusting the minimum SCOP values for economization are from past M&V projects or previous TAs. The efficiency curves are used to find the difference in efficiency at the outdoor operating conditions in Test A and Test D of the rating standard (Reference 1). This difference is then applied to the DOE minimum SCOP values to obtain the minimum SCOP values for economizer operation.
10. CRAC cost from taken from the DOE's data is only for downflow units (Reference 3), but it is assumed that the incremental cost calculated from this data would be the same for upflow units.
11. The DOE's cost data shows negative incremental cost as efficiency improves for smaller Water-Cooled and Glycol-Cooled CRAC units (Reference 3). The DOE mentioned that the negative values were likely due to an insufficient amount of data and the result did not make sense. Therefore, this was corrected here by using ratios of the known, positive incremental cost to correct the DOE's negative incremental cost.
12. The incremental cost for CRAC, Air-Cooled with Economizer is based on a cost multiplier calculated from past Xcel Energy projects. The DOE's cost multiplier was not used, since it did not account for the additional labor and components associated with a CRAC, Air-Cooled with Economizer. The DOE value only accounted for an additional coil, but air-cooled units with economizers don't have additional coils. These units usually have additional mechanical components (e.g. pumps), and these components require more labor beyond connecting a second coil that is housed within the same CRAC enclosure.

11.12 Plate & Frame HX

Algorithms

$$Customer\ kWh = \left(A \times T_{WB\ Onset}{}^{2} + B \times T_{Balance}{}^{2} + C \times T_{WB\ Onset} \times T_{Balance} + D \times T_{WB\ Onset} + E \times T_{Balance} + F\right) \times \left(\frac{Cooling\ Hrs\ No\ Econ}{G\_EFLH}\right) \times \left(\frac{IPLV_{Eff}}{IPLV_{Baseline}}\right) \times \left(\frac{PF\ Tons\ Offset}{100}\right)$$

$$Customer\ kW = \frac{PF\ Tons\ Offset}{IPLV_{Baseline}}$$

Customer PC kW $= CF \times Customer\ kW$

$$PF\ Tons\ Offset = \left(\frac{Load_{onset}}{(T_{DB\ Design} - T_{Balance})}\right) \times T_{WB\ to\ MCDB} + \left(Load_{onset} - \left(\frac{Load_{onset}}{(T_{DB\ Design} - T_{Balance})}\right) \times T_{DB\ Design}\right)$$

$$Incremental\ Cost = PF\ Tons\ Offset \times Incremental\ Cost\ per\ Ton$$

Variables

$IPLV_{Baseline}$	0.570	Baseline Chiller IPLV (kW/ton)
$T_{DB\ Design}$	92	Design dry-bulb temperature for cooling (°F)
$T_{WB\ to\ MCDB}$	30.505	Mean Coincident Dry Bulb Temperature (as determined from binned TMY3 data for the location) corresponding to the Onset Wet Bulb Temperature provided by the customer
A	3.254	Coefficient from regression
B	0	Coefficient from regression
C	0	Coefficient from regression
D	5958.821	Coefficient from regression
E	0	Coefficient from regression
F	-47208.137	Coefficient from regression
G_EFLH	8760	Coefficient from regression
Coincidence Factor (CF)	0%	Coincidence Factor, the probability that peak demand of the equipment will coincide
Cooling Hrs No Econ	8760	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
Incremental Cost	See Table 11.12.1	Incremental cost incurred for purchasing a plate and frame heat exchanger for free cooling
Lifetime	20	Measure life is taken at 20 years for all cooling equipment. (Reference 1) (years)

Customer Inputs	M&V Verified	
$IPLV_{Eff}$	Yes	Efficient Chiller IPLV (kW/ton)
$T_{WB\ Onset}$	No	Wet Bulb Temperature at which waterside economizer is activated (°F)
$Capacity_{HX}$	Yes	Cooling capacity of plate and frame heat exchanger (tons)
$T_{balance}$	No	Building Balance Point Temperature, the outside air dry bulb temperature at which there is no cooling load. Customer input for all segments except Industrial and Data Center (20°F default); Not used for Industrial and Data Centers since Load (OADB) = Load (°F)
$Load_{onset}$	No	Cooling load at onset wet-bulb temperature ($T_{WB\ Onset}$) (tons)
County	Yes	County where project is located
Market segment	Yes	Project facility type

Table 11.12.1 - Incremental Capital Costs

HEx Tons ("PF Tons Offset")	Incremental Cost $/ton
65	$646
80	$830
120	$736

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. Data from historic Xcel Energy Custom Efficiency cooling tower projects

Assumptions:

No airside economizers are in operation
Heat exchanger is installed in parallel with the chiller and additional cooling towers are not required

Description

Prescriptive rebates will be offered for installation of plate & frame heat exchangers on existing chiller systems to allow cooling towers to provide "free cooling" in lieu of chiller operation. Eligible systems will NOT have air-side economizers installed.

11.13 Commercial AC Switch

Algorithms

$$Customer\ kWh = (Baseline_{kW} - Proposed_{kW}) \times Eq.Hours$$

$$Customer\ Coincident\ kW = Eq.Baseline\_Efficiency \times I\_Equipment\_Tons \times Eq.Coincidence\_Factor$$

$$Customer\ kW = Eq.Baseline\_Efficiency \times I\_Equipment\_Tons$$

Variables

I_Equipment_Tons	Customer Input	AC unit tons.
Eq.Baseline_Efficiency_Single	1.091	Single stage AC unit efficiency in kW/ton.
Eq.Baseline_Efficiency_Multi	1.091	Multi stage AC unit efficiency in kW/ton.
Eq.Hours_Single	0.250	Full Load Hours of Operation for a single-stage smart switch.
Eq.Hours_Multi	0.209	Full Load Hours of Operation for a multi-stage smart switch.
Eq.Coincidence_Factor_Single	0.180	Single Stage Coincidence Factor. Percentage of the kW savings that occur during the annual
Eq.Coincidence_Factor_Multi	0.151	Mutli-Stage Coincidence Factor. Percentage of the kW savings that occur during the annual
Life_BusSS	15	Length of time the switch will be operational.
NTG	1.000	Net-to-Gross factor for Saver's Switch will be 100% as customers would not have the ability to

Customer Inputs	M&V Verified	
AC unit tons	Yes	
Air conditioner single-stage or multi-stage	Yes	
Stage 1 and stage 2 tons (Multi-stage units only)	Yes	

References:

1. Updated PC kW & kWh savings per unit per event for smart switches. As a result other values such as coincidence factor and hours also updated.
2. Updated algorithms to match current practices.

Changes from Recent Filing:

None

11.14 DX ACCU

Algorithms

$$Customer\,kWh = Size \times EFLH \times \left(\frac{12}{SEER_{Baseline}} - \frac{12}{SEER_{Eff}}\right) \times Qty$$

$$Customer\,kW = Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$Customer\,PC\,kW = CF \times Size \times \left(\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}}\right) \times Qty$$

$$EER = SEER \times 0.85$$

$$Incremental\ Cost = Size\ \times Incremental\ Cost\ per\ Ton$$

Variables

Minimum Qualifying Tons	11.3	Per MN TRM, incremental cost and equipment efficiency baselines apply to all DX ACCUs > 11.3 tons.[3]
EFLH	See Table 1.C	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
$SEER_{Baseline}$ ($IEER_{Baseline}$)	14.2	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the deemed baseline efficiency in MN TRM Version 4.0.
$EER_{Baseline}$	10.7	EER of standard equipment, based upon the deemed baseline efficiency in MN TRM Version 4.0.
CF	90%	Coincidence Factor. (Ref: Minnesota Technical Reference Manual Version 4.0)
Incremental Cost Per Ton	See Table 1.D	Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)
Lifetime	20	Life of a new unit, in years[1]

Customer Inputs	M&V Verified	
$SEER_{Eff}$ ($IEER_{Eff}$)	Yes	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
EER_{Eff}	Yes	EER of high efficiency equipment that the customer will install.
Size	Yes	The equipment capacity in tons.
Building Type (Facility Type)	Yes	
Zone	No	
Quantity Proposed Equipment (Qty)	Yes	

References:

1. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
2. 2017-2019 MN Cooling Program Participation Data, used for forecasts, minimum qualifying efficiency
3. Minnesota Technical Reference Manual Version 4.0 for incremental costs, coincidence factor
4. Values derived from 2017-2019 Xcel Cooling Program participants.
5. Minnesota Energy Code 2020 for Equipment Baseline Efficiencies

Changes from Recent Filing:

Table 1.A Deemed Baseline Efficiency - Split Systems & Single Packages

Equipment	Efficiency	(Minnesota Energy Code 2020 - Tables C403.2.3 (1), C403.2.3(2), C403.2.3(3))		For Units Manufactured after 2023	
		SEER/IEER	EER	SEER2/IEER	EER2
DX Units < 5.4 tons	Baseline Efficiency	13.0	11.1	13.4	11.4
DX Units 5.4 - 11.3 tons	Baseline Efficiency	12.6	11.0	14.6	11.0
DX Units 11.4 - 19.9 tons	Baseline Efficiency	12.2	10.8	14.0	10.8
DX Units 20 - 63.3 tons	Baseline Efficiency	11.4	9.8	13.0	9.8
DX Units ≥ 63.3 tons	Baseline Efficiency	11.0	9.5	12.3	9.5
Water-Source Heat Pumps	Baseline Efficiency	14.4	13.0	-	-
Mini-Split Heat Pump (air-cooled, cooling mode) & Minisplit AC	Baseline Efficiency	14.0	8.35	14.3	8.4
PTAC	Baseline Efficiency	13.9	11.8	-	-

Table 1.B Deemed Baseline Efficiency -Water Chilling Packages

Equipment	Efficiency	Table C403.2.3(7), Minnesota Energy Code 2015			
		SEER/IEER	EER	FLV (kW/ton)	IPLV (kW/ton)
Scroll/Screw chiller < 75 tons	Baseline Efficiency			0.750	0.600
Scroll/Screw chiller 75 - 150 tons	Baseline Efficiency			0.720	0.560
Scroll/Screw chiller 150 - 300 tons	Baseline Efficiency			0.660	0.540
Scroll/Screw chiller ≥ 300 tons	Baseline Efficiency			0.610	0.520
Scroll/Screw chiller 300 - 600 tons	Baseline Efficiency			0.610	0.520
Scroll/Screw chiller ≥ 600 tons	Baseline Efficiency			0.560	0.500
Centrifugal Chillers < 150 tons	Baseline Efficiency at AHRI Conditions			0.610	0.550
Centrifugal Chillers 150 - 300 tons	Baseline Efficiency at AHRI Conditions			0.610	0.550
Centrifugal Chillers 300 - 400 tons	Baseline Efficiency at AHRI Conditions			0.560	0.520
Centrifugal Chillers 300 - 600 tons	Baseline Efficiency at AHRI Conditions				
Centrifugal Chillers 400 - 600 tons	Baseline Efficiency at AHRI Conditions			0.560	0.500
Centrifugal Chillers ≥ 600 tons	Baseline Efficiency at AHRI Conditions			0.560	0.500
Air-Cooled Chillers < 150 tons	Baseline Efficiency	13.700	10.100		
Air-Cooled Chillers ≥ 150 tons	Baseline Efficiency	14.000	10.100		

Notes:

* Bold values indicates direct sourcing to ASHRAE 90.1-2010, otherwise estimated by multiplying SEER or dividing EER by the following:
+ 0.85 for DX Units < 5.4 tons and PTAC's
+ 0.90 for WSHP's
+ 0.60 for Mini-Splits for the purposes of this illustration. A 3rd degree polynomial curve fit, derived from the AHRI database, will be used for actual savings calculations
* High Efficiency SEER/IEER and EER values are supplied by Customer.
* ARI rated efficiency is converted to Standard efficiency as per ASHRAE 90.1-2010
* Values for Centrifugal Chillers assumed to be at ARI rating conditions of 85 °F condensing temperature, 44 °F chilled water temperature, and 3 gpm/ton chilled water flow. Reference ASHRAE 90.1-2010
* Values for PTAC units are based on 3/4 ton new construction units. Reference ASHRAE 90.1-2010

Table 1.C Equivalent Full Load Hours by Building Type (Ref: Minnesota TRM Version 4.0)

Building Type	Zone 1 EFLH	Zone 2 EFLH	Zone 3 EFLH
Convenience Store	647	825	986
Education - Community College/University	682	782	785
Education - Primary	289	338	408
Education - Secondary	484	473	563
Health/Medical - Clinic	558	738	865
Health/Medical - Hospital	663	1089	1298
Lodging	401	606	754
Manufacturing	347	472	589
Office-Low Rise (< 25,000 ft^2, 1 - 2 stories)	257	359	446
Office-Mid Rise (25,000 - 250,000 ft^2, 3 - 8 stories)	373	529	651
Office-High Rise (> 250,000 ft^2, > 8 stories)	669	1061	1263
Restaurant	347	535	652
Retail - Large Department Store	462	588	686
Retail - Strip Mall	307	441	574
Warehouse	164	343	409
Data Center	8,760	8,760	8,760
Process Load	5,840	5,840	5,840

NOTE: Zone 1 (Northern MN), Zone 2 (Central), and Zone 3 (Southern MN, Twin Cities)

Table 1.D Incremental Costs Per Ton (Ref: Minnesota Technical Reference Manual Version 4.0)

Equipment	Incremental Cost per Ton ($ per ton)
DX Air-Cooled Condensing Units > 11.3 tons	100
DX Units < 5.4 tons	165
DX Units 5.4 - 11.3 tons	150
DX Units 11.4 - 19.9 tons	140
DX Units 20 - 63.3 tons	125
DX Units ≥ 63.3 tons	110
Water-Source Heat Pumps	150
PTAC	250
Scroll/Screw chiller < 75 tons	130
Scroll/Screw chiller 75 - 150 tons	90
Scroll/Screw chiller 150 - 300 tons	90
Scroll/Screw chiller ≥ 300 tons	40
Centrifugal Chillers < 150 tons	130
Centrifugal Chillers 150 - 300 tons	85
Centrifugal Chillers 300 - 600 tons	85
Centrifugal Chillers ≥ 600 tons	40
Air-Cooled Chillers < 150 tons	110
Air-Cooled Chillers ≥ 150 tons	110
Chiller VFD Retrofit	72
Mini-Split Heat Pump	293
Mini-Split Air Conditioner	246

Table 2.A Bin Hours and Weather Conditions

OADB (°F)	Hours	Humidity Ratio (lb_m/lb_m)	Enthalpy (BTU/lb_m)	MCWB (°F)
104	0	0.00000	0.00	0.00
102	0	0.00000	0.00	0.00
100	0	0.00000	0.00	0.00
98	3	0.01641	41.84	77.74
96	4	0.01604	40.85	76.73
94	17	0.01602	40.20	76.01
92	15	0.01503	38.56	74.25
90	32	0.01541	38.48	74.15
88	47	0.01455	37.04	72.52
86	31	0.01420	36.28	71.79
84	76	0.01421	35.89	71.40
82	120	0.01302	34.12	69.40
80	146	0.01271	33.27	68.36
78	172	0.01200	32.03	66.87
76	327	0.01167	31.03	65.57
74	261	0.01096	29.63	63.78
72	272	0.01127	29.50	63.61
70	265	0.01025	27.90	61.44
68	148	0.01023	27.50	60.84
66	299	0.00969	26.54	59.50
64	272	0.00934	25.69	58.24
62	241	0.00796	23.69	55.25
60	216	0.00749	22.68	53.62
58	299	0.00680	21.35	51.38
56	214	0.00635	20.24	49.46
54	222	0.00582	19.17	47.49
52	211	0.00564	18.49	46.20
50	117	0.00517	17.61	44.49
48	221	0.00528	17.38	44.02
46	222	0.00499	16.58	42.46
44	207	0.00445	15.50	40.21
42	265	0.00434	14.89	38.90
40	334	0.00394	13.87	36.64
38	216	0.00340	12.66	33.77
36	221	0.00315	11.93	31.98
34	294	0.00309	11.36	30.61
32	167	0.00278	10.68	28.96
30	266	0.00256	10.06	27.47
28	240	0.00225	9.25	25.40
26	237	0.00194	8.45	23.27
24	241	0.00182	7.85	21.69
22	305	0.00156	6.97	19.22
20	226	0.00135	6.12	16.79
18	179	0.00122	5.51	15.00
16	159	0.00109	4.89	13.13
14	52	0.00100	4.43	11.68
12	91	0.00092	3.98	10.26
10	71	0.00089	3.49	8.71
8	75	0.00076	2.81	6.52
6	57	0.00070	2.33	4.92
4	70	0.00062	1.63	2.54
2	40	0.00049	0.87	-0.09
0	45	0.00044	0.34	-1.95
-2	45	0.00037	-0.24	-4.01
-4	33	0.00037	-0.57	-5.20
-6	37	0.00034	-0.92	-6.46
-8	31	0.00030	-1.49	-8.58
-10	36	0.00027	-1.95	-10.28
-12	12	0.00025	-2.51	-12.37
-14	22	0.00023	-3.17	-14.87
-16	8	0.00020	-3.64	-16.68
-18	3	0.00017	-4.29	-19.19
-20	1	0.00016	-4.85	-21.38
-22	2	0.00015	-5.12	-22.42
-24	2	0.00015	-5.49	-23.88

Table 2.B Bin Hours WB and Mean Coincident Dry Bulb Temps

MCDB (°F)	WB (°F)	Hours
88.5	82	2
90.2	80	27
86.9	78	53
83.9	76	73
81.4	74	96
78.7	72	169
77.7	70	197
75.1	68	255
73.6	66	360
70.9	64	367
70.0	62	296
67.6	60	338
65.8	58	254
62.9	56	250
60.8	54	261
57.9	52	260
55.1	50	296
53.4	48	263
50.2	46	246
48.2	44	278
46.2	42	260
43.4	40	271
41.7	38	273
39.0	36	209
36.0	34	301
34.4	32	251
32.4	30	272
30.8	28	297
28.3	26	219
26.3	24	299
24.0	22	239
21.9	20	195
19.8	18	227
17.8	16	218
15.7	14	155
13.6	12	103
11.1	10	104
8.8	8	61
7.0	6	75
4.8	4	46
2.6	2	45
0.5	0	46
-1.5	-2	39
-3.6	-4	63
-5.4	-6	35
-8.0	-8	43
-9.7	-10	28
-12.4	-12	13
-14.6	-14	16
-16.1	-16	8
-18.6	-18	3
-20.9	-20	1
-22.4	-22	3
-24.0	-24	1

12.1 Water Heater

Algorithms

$$
\begin{aligned}
&Customer\ Dth \\
&= (Quantity \times \frac{BTUH_{Input}}{Quantity * BTUH_{Input} + Other\ WH\ BTUH} \times Density \times Cp \times Volume\ Daily\ SqFt\ Usage \times Days\ Year \times (Sq\ Ft\ Served)/1000 \\
&\times (Tsetpoint - Tsupply) \times \left(\frac{1}{EffStandard} - \frac{1}{EffHigh}\right) + Quantity \times Gallons_{Storage} \times \left(\frac{SL_{Base}}{EffStandard} - \frac{SL_{New}}{EffHigh}\right))/1000000
\end{aligned}
$$

Variables

density	8.33	Density of water, lbs/gal
C_p	1	Specific heat of water, Btu / lb - F
Volume_Daily_SqFt_Usage	See Table 12.1.1	Average daily hot water consumption [gallons / 1,000 ft2 / day].
Days_Year	See Table 12.1.1	Applicable days per year of building operation
T_setpoint	140	Water heater setpoint, deg F (Ref 27).
T_supply	58	Supply temperature of city water to water heater, deg F (Ref 27).
Eff_Rating_Standard	See Table 12.2.0	Efficiency Rating of standard replacement water heater, Thermal Efficiency
SL_base	13.21	Standby Losses for baseline storage water heater, BTUH per gallon of storage (Ref 26)
SL_new	8.9	Standby Losses for efficient water heater, BTUH per gallon of storage (Ref 26)
Incremental Cost	See Table 12.1.2	Incremental cost of efficient water heater over standard water heater.
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
SqFt_Served	Yes	Number of Square feet served by water heater in thousands of square feet, site specific.
Eff_Rating_High	Yes	Efficiency Rating of high efficiency replacement water heater, Thermal Efficiency
Building type	Yes	Facility type from picklist
Gallons Storage	Yes	Size of storage tank in gallons, 0 if tankless
BTUH input	Yes	BTUH of proposed water heater
Other Water Heater BTUH Input	Yes	BTUH input of other water heaters not being replaced

Table 12.1.1 Annual Hot Water Use Data (Ref 29 and 31)

Building Type	Applicable Days/Year	Gallons / 1,000 ft2 / day
Small Office	250	2.3
Large Office	250	2.3
Fast Food Restaurant	365	549.2
Sit-Down Restaurant	365	816.0
Retail	365	2.0
Grocery	365	2.2
Warehouse	250	1.0
Elementary School	200	5.7
Jr. High/High School/College	200	17.1
Health	365	342.0
Motel	365	100.0
Hotel	365	30.8
Other Commercial	250	0.7
Industrial	Site Specific	Site Specific

Table 12.1.2.a: Incremental Cost per Nameplate Input BTUH for Storage Water Heater per 100 Gallons of Storage (Ref 30)

	$/BTUH
Fast Food Restaurant	$0.0326
Sit-Down Restaurant	$0.0056
Elementary School	$0.0056
Junior High School	$0.0085
Motel	$0.0056
Apartment Building	$0.0340
Fitness Center	$0.0085
Other	$0.0144

Table 12.1.2.b: Incremental Cost per Nameplate Input BTUH for Tankless Water Heater

	$/BTUH
Fast Food Restaurant	$0.0105
Sit-Down Restaurant	$0.0044
Elementary School	$0.0044
Junior High School	-$0.0049
Motel	-$0.0080
Apartment Building	$0.0105
Fitness Center	$0.0037
Other	$0.0029

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2. Centerpoint TRM
3. International Energy Conservation Code (IECC) 2015 Table C403.2.3 (4)
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6. 2015 Minnesota Energy Code Table C403.2.3(5) pg C-44
7. Cost data from online review on 8/5/15 of products available at Younits.com, ecomfort.com, hvacdistribution.com, grainger.com, simplyplumbing.com, homedepot.com, h-mac.com, ingramswaterandair.com, and zoro.com
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42. MN custom rebates and conversations with Distributors (Tim Stoklosa, Clean Energy Designs in Lakewood CO)
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46. Wisconsin Focus on Energy 2019 TRM
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48. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs version 3.0 Jan 10 2019
49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.2 Boiler

Algorithms

$$Customer\ Dth = Input\ Capacity \times Alt \times (\frac{Effh}{Effb} - 1) \times EFLH$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude effects. No adjustment for near sea-level altitude.
EFFb	See Table 12.2.0	Efficiency of Baseline equipment
EFFh	See Table 12.2.2	Rated efficiency used for non-condensingg boilers. Deemed efficiency used for condensing boilers.
EFLH	See Table 12.3.0	Based on Bin Analysis assuming 30% oversizing for boiler plant. See "Forecast Boiler Op Hours " tab.
Conversion Factor	1000000	Conversion from BTU to Dth
Incremental Cost	See Table 12.2.1	Incremental cost of efficient boiler or furnace over standard equipment.
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Input Capacity	Yes	Rated input BTUH nameplate data for the new boiler, furnace, unit heater, or water heater.
Rated Efficiency	Yes	Rated efficiency of purchased boiler, provided by customer.
Use	Yes	Use of boiler: space heating, domestic water, or both.

Table 12.2.1.a Hot water boiler costs (Ref 23)

Input Capacity Range	High Efficient - Condensing
0 - 0.499 MMBTUH	$4,600
0.5 - 0.999 MMBTUH	$11,200
1 - 1.999 MMBTUH	$15,000
2 - 3.999 MMBTUH	$26,500
4 - 5.999 MMBTUH	$53,000
6 - 7.999 MMBTUH	$79,500
8 -9.999 MMBTUH	$106,000

Table 12.2.1b Incremental Hot water boiler costs (Ref 48)

Boiler Type	Input Capacity Range	Incremental Cost $/kBtuh
Steam	<0.3 MMBTUH	$3.30
	0.3 - 2.5 MMBTUH	$1.44
	>2.5 MMBTUH	$1.02
Non-Condensing	<0.3 MMBTUH	$5.88
	0.3 - 2.5 MMBTUH	$4.97
	>2.5 MMBTUH	$2.50
Condensing	<0.3 MMBTUH	$9.14
	0.3 - 2.5 MMBTUH	$9.12
	>2.5 MMBTUH	$7.25

Table 12.2.2 Boiler Efficiency (Ref 25 and 47)

Boiler Type	EFFh
Condensing	90%
Non-Condensing	Customer Input Rated Efficiency

References:

1. 2020 Minnesota Energy Code - Chapter 7676.1100 Subpart 3D, 4A
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3. International Energy Conservation Code (IECC) 2015 Table C403.2.3 (4)
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45. Source BTU for electricity based on MN DOC No. G008/CIP-00-864.07 Reply Comments of May 23, 2003 which states a Source BTU comparison must be made using an assumed heat rate of 7500 BTU/Generator kWh , based on typical Heat Rate for Combined-Cycle Natural Gas-fired Plant.
46. Wisconsin Focus on Energy 2019 TRM
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49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

Removed 5% adjustment factor for condensing boilers and deemed proposed efficiency at 90%
EFLH for space heating adjusted to reflect the MN TRM
Baseline Efficiency for Steam Boilers lowered from 80% tro 79%

12.3 Furnace

Algorithms

$$Customer\ Dth = Input\ Capacity \times Alt \times (\frac{Effh}{Effb} - 1) \times EFLH/1000000$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude
EFFb	See Table 12.2.0	Efficiency of Baseline equipment
EFLH	See Table 12.3.0	
Conversion Factor	1000000	Conversion from BTU to Dth
Incremental Cost	See Table 12.3.1	Incremental cost of efficient boiler or furnace over standard equipment.
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Input Capacity	Yes	Rated input BTUH nameplate data for the new boiler, furnace, unit heater, or water heater.
EFFh	Yes	Efficiency of purchased boiler, provided by customer. See Table 1 for minimum qualifying efficiency for higher efficiency equipment.
Use	Yes	Use of boiler: space heating, domestic water, or both.

Table 12.3.1 (Ref 2)	Standard Unit Cost	High Efficient Unit	Incremental Cost
New Energy Star Furnace => 90% AFUE, < 92% AFUE	$1,866.40	$3,120.70	$1,254.30
New Energy Star Furnace => 92% AFUE, < 94% AFUE	$1,866.40	$3,208.29	$1,341.89
New Energy Star Furnace => 94% AFUE, < 96% AFUE	$1,866.40	$3,295.88	$1,429.48
New Energy Star Furnace => 94% AFUE	$1,866.40	$3,383.47	$1,517.07

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51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.4 Unit Heater

Algorithms

$$Unit\ Heater\ Savings\ (Dth) = Input\ Capacity \times Alt \times (\frac{EFFh}{EFFb} - 1) \times EFLH\_UH \times (Oversize\ Factor_{heat}) \div 1000000$$

$$Infrared\ Heater\ Savings\ (Dth) = Dth\ Base\ Infrared - Dth\ Eff\ Radiant$$

$$Dth\ Base\ Infrared = \left(\frac{Infrared\ Input\ Capacity \times Alt}{Infrared\ Size\ Factor}\right) \times Oversize\ Factor_{heat} \times EFLH_{UH} \times \left(\frac{1\ Dth}{1000000\ BTU}\right) - Dth_{fan}$$

$$Dth\ Eff\ Infrared = Infrared\ Input\ Capacity \times Alt \times Oversize\ Factor\_heat \times EFLH\_UH \times (\frac{1Dth}{1000000\ BTU})$$

$$EFLH_{UH} = \frac{HDD_a \times T_{indoor}{}^2 - HDD_b \times T_{indoor} + HDD_c}{T_{indoor} - T_{design}}$$

$$FLH = \frac{HDD_a \times T_{indoor}{}^2 + HDD_b \times T_{indoor} + HDD_c}{T_{indoor} - T_{offset}} \times 24 \times \%conditioned$$

$$Dth_{fan} = Fan\_kW \times 3412 \times FLH \div 1000000$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude effects.
HP/BTUh	0.000002968	Average axial/propeller/centrifugal fan power (rated) per BTU/h of heating output. Taken from manufacturer data for 38 unit heaters from Trane and Sterling; Applies to Infrared Heaters only
Oversize Factor_heat	0.9	Factor to account for design oversize commonly found on unit heater installations. Reference 1
T_design	See Table 12.4.1	Winter Design temperature for the given location. Reference 2.
LF	0.77	Design load factor of fan motor, MN TRM 4.0 reference.
EFFb	80%	Thermal efficiency of the baseline, non-power-vented, code-compliant unit heater. Reference 3.
EFFh	See Table 12.2.0	Thermal efficiency of the new, efficient unit heater
Heat_eff_infrared	80%	Thermal efficiency of the new, infrared heater. = 0.80, same as baseline because the infrared heaters do not have specific combustion efficiency improvements over the baseline unit heater, their savings are all from infrared (radiation) heat transfer versus convection. Also, Ref 5 uses this value.
Infrared Size Factor	0.85	Factor to account for the fact that infrared heaters should be designed smaller than an equivalent standard unit heater due to infrared (radiation) heat transfer being more effective at producing thermal comfort. This also accounts for the lower room temperature afforded by infrared heaters. = 0.85 (Ref 4)
HDD_a	See Table 12.4.1	Polynomial Constants used in calculating HDD based on TMY3 weather data and design indoor temperature. HDD is proportional to the indoor temperature based on the formula HDD = a * Tin^2 + b * Tin + c
HDD_b	See Table 12.4.1	Polynomial Constants used in calculating HDD based on TMY3 weather data and design indoor
HDD_c	See Table 12.4.1	Polynomial Constants used in calculating HDD based on TMY3 weather data and design indoor temperature. HDD is proportional to the indoor temperature based on the formula HDD = a * Tin^2 + b * Tin + c
T-Offset	See Table 12.4.1	Difference between the maximum heating degree day and the indoor design temperature.
Mtr_eff	29.60%	Average efficiency of 6 unit heater fans, calculated by taking the manufacturer-provided (Reznor, Sterling, and Trane) current draw to calculate power consumption and working backwards with the rated motor power and an assumed load factor of 0.8 to compute the efficiency for each fan and then taking the average of all of the fans. = 0.296 and includes both axial and centrifugal fans.
Conversion Factor	0.746	Conversion factor from HP to kW
Conversion Factor	1000	Conversion factor from kBTU/h to BTU/h
Conversion Factor	3412	Conversion factor from kW to BTU/h
Measure Life	See Table 12.1.0	Refer to table for measure life.
Incremental Cost	Table 10	Incremental cost of efficient unit heater over standard power vented unit heater.

Customer Inputs	M&V Verified	
Input capacity	Yes	Rated Input Capacity of the new non-infrared heater in BTU/h
Infrared Input Capacity	Yes	Rated Input Capacity of the new infrared heater in BTU/h
%conditioned	Yes	Percentage of the time during heating season the space is heated
T_indoor	Yes	Space temperature set point of space being heated

Table 12.4.1 HDD Estimation Constants and Site Weather Data (Ref 10)

Climate Zone	HDD_a	HDD_b	HDD_c	T_design	T-Offset
Minnesota	2.51	(54.61)	679.14	(16.00)	(12.40)

Table 12.4.2 Unit Heater and Radiant Heater Costs (Ref 7)

	$/kBTUh (output)	Incremental Cost
Baseline Unit Heater	$8.42	N/A
Power-vented Unit Heater (83%)	$10.04	$1.62
Condensing Unit Heater (90%)	$18.47	$10.05
Infrared Heater (uses input kBTU/h)	$9.45	$1.03

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Changes from Recent Filing:

12.5 Boiler Tune Up

Algorithms

$$Customer\ Dth = Input\ Capacity \times Alt \times (\frac{Effh}{Effb} - 1) \times EFLH$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude
Effb	See Table 12.2.0	Efficiency of Baseline equipment.
Effh	See Table 12.2.0	Efficiency of Boiler after the tune-up
EFLH	See Table 12.3.0	Based on Bin Analysis assuming 30% oversizing for boiler plant. (Ref 28)
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Input Capacity	Yes	Rated input BTUH nameplate data for the boiler
Use	Yes	Use of boiler: space heating, domestic water, or both.
Cost	Yes	Cost of boiler tuneup

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49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

EFLH for space heating adjusted to reflect the MN TRM

12.6 Steam Traps

Algorithms

$$Customer\ (Dth) = LeakRate \times Leak\ Hours \times \frac{BTU\ Per\ Pound}{EFFb} / 1000000$$

Variables

	5	Leakage rate for low pressure steam traps in pounds of steam per hour.(Reference 20)
Leak_Rate	11	Leakage rate for high pressure steam traps in pounds of steam per hour.(Reference 20)
Leak_Hours	See Table 12.6.1	Annual hours boiler lines are pressurized, based on customer-provided system type.
Effb	See Table 12.2.0	Efficiency of steam boiler
	1064	Loss in btu/lb for Steam traps in Low Pressure Applications: 1164 BTU per pound for lost to atmosphere, 964 BTU per pound lost to condensate. Assume 50/50 mix = 1064 BTU per pound. (Reference 20)
BTU_Per_Pound	1081	Loss in btu/lb for Steam traps in High Pressure Applications: 1181 BTU per pound for lost to atmosphere, 981 BTU per pound lost to condensate. Assume 50/50 mix = 1081 BTU per pound. (Reference 20)
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Incremental Cost	No	Cost of replacing or repairing steam traps, per trap, provided by the customer.
Steam Pressure	Yes	Steam pressure, low or high.
Use	Yes	Use of steam system: space heating, domestic water, or both.

Table 12.6.1 Annual Leak Hours - Steam Traps (Ref 28)

Use	Hours
Space Heating	5,037
Domestic Water Heating	8,760
Space and Domestic Water Heating	8,760

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28. MN Bin Temp Bin Hrs are taken from the "Thermal Environmental Engineering, Third Edition, Thomas H. Kuehn, James W. Ramsey and James L. Threlkeld, Pages 717-718, Table B.5" to determine full load equivalent hours (FLEH) in Minnesota area. See Forecast furnace operating hours for calculation

29. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant.
30. Baseline and Energy Efficient equipment costs provided by vendors
31. Minnesota DER Deemed Values
32. Bradford White RightSpec® commercial water heater sizing software
33. Bosch tankless water heater sizing software
34. Commercial Buildings Energy Consumption Study (CBECS), 2006
35. 2008 DEER Effective Useful Life Summary October 1st 2008
36. 2007 ASHRAE HVAC Applications Handbook Chapter 36, page 36.3, Table 4
37. 2006 IECC
38. "Electricity Savings from Variable-Speed Furnaces in Cold Climates" Pigg, Scott and Talerico, Tom. ACEEE Summer Study Proceedings 2004 (http://aceee.org/files/proceedings/2004/data/papers/SS04_Panel1_Paper23.pdf)
39. U.S. Department of Energy, Preliminary Analysis Report, 2012
40. http://www.grainger.com
41. Wisconsin Focus on Energy, ECM Furnace Fan Impact Evaluation Report,
42. MN custom rebates and conversations with Distributors (Tim Stoklosa, Clean Energy Designs in Lakewood CO)
43. Illinois 2017 TRM ; http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-
44. St Paul 2015 Water Rate Schedule - http://mn-stpaul.civicplus.com/DocumentView.asp?DID=3493 (From 2017-2019 MN Energy Efficient Showerhead
45. Source BTU for electricity based on MN DOC No. G008/CIP-00-864.07 Reply Comments of May 23, 2003 which states a Source BTU comparison must be made using an assumed heat rate of 7500 BTU/Generator kWh , based on typical Heat Rate for Combined-Cycle Natural Gas-fired Plant.
46. Wisconsin Focus on Energy 2019 TRM
47. Historical program participation
48. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs version 3.0 Jan 10 2019
49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.7 Pipe Insulation

Algorithms

$Customer\ (Dth) = LFT \times Hrs \times (BTU\ Per\ Foot\ U - BTU\ Per\ Foot\ I) \times Existing/EFFb/1{,}000{,}000$

$Customer\ (kWh) = LFT \times Hrs \times (BTU\ Per\ Foot\ U - BTU\ Per\ Foot\ I) \times Existing/EFFb/3{,}412$

$Customer\ (kW) = Customer\ (kWh)\ /Hrs$

$Customer\ (PCkW) = Customer\ (kW)\ \times CF$

$BTU\ Per\ Foot = Coef0 + (Coef1 \times DeltaT) + (Coef2 \times DeltaT^2) + (Coef3 \times DeltaT^3)$

$DeltaT = Tfluid - Tambient$

Variables

Hrs	See Table 12.7.1	= The operating hours for the boiler system.
T ambient	70	= Average temperature of the space surrounding the pipe for conditioned spaces.
	46	= Average temperature of the space surrounding the pipe for outside domestic hot water, full year average based on average TMY3 temperatures for Minnesota. (Ref 10)
	35	= Average temperature of the space surrounding the pipe for outside space heating (average excluding June-September) based on average TMY3 temperatures for Minnesota. (Ref 10)
Existing		= Pipe insulation savings multiplier to determine credit if existing deteriorated insulation is being replaced.
	1	= Multiplier of 1 if no existing insulation is present.
	0.25	= Pipe insulation savings multiplier of 0.25 if existing insulation is being replaced.
Effb	See Table 12.2.0	= Efficiency of boiler or water heater serving the pipes being insulated.
CF	See Table 12.1.8	= Coincidence factor over summer hours.
Conversion Factor	1,000,000	= Conversion factor from BTU to Dth.
Conversion Factor	3,412	= Conversion factor from BTU to kWh.
Measure Life	See Table 12.1.0	Refer to table 15 for measure life.

Customer Inputs	M&V Verified	
LFT	Yes	Linear feet of insulation installed, provided by the customer.
T fluid	Yes	Average temperature of the fluid in the pipe receiving insulation in degrees F

Table 12.7.1 Hours for Pipe Insulation (Ref 28)

Use of Pipe	Location	Pipe Insulation	Explanation
Domestic Hot Water	Inside	4,828	Hours when outside temp is above building balance point. Heat loss from pipe is wasted.
Domestic Hot Water	Outside	8,760	Domestic hot water available year round, outside temp is always less than 120 F.
Space Heating	Inside	1,888	Hours when boiler is running but outdoor temp is above building balance point
Space Heating	Outside	5,037	Hours that boiler is running

Table 12.1.8 Coincidence Factors for Electric Heating

Use of Pipe	Location	CF
Domestic Hot Water	Inside	100%
Domestic Hot Water	Outside	100%
Space Heating	Inside	0%
Space Heating	Outside	0%

Table 12.1.9 Multi-Family Building Efficiency Costs

Pipe Size	Cost Per 6' Materials
0.5" - 2"	$15.00
3" - 5"	$25.00

Table 12.7.2 Deemed Insulation Polynomial Equation Coefficients and Incremental Costs

Pipe Nominal Diameter (inches)	Insulation Thickness (Inches)	Heat Loss (BTU/Hr) at Specified Temperature Difference					Polynomial Coefficients				Cost Per Foot	Cost Per 3' Materials
		5	70	135	200	265	Coef0	Coef1	Coef2	Coef3	Total	(Ref 28)
0.50	-	1.73000	35.90	81.40	136.0	201.0	-0.516993	0.432767	0.001310573	-2.82203E-07	$ -	$ -
0.50	0.5	0.64500	10.10	21.20	34.4	50.0	-0.020555	0.132796	0.000150494	2.291E-07	$ 6.18	$ 6.18
0.50	1	0.46300	7.07	14.80	23.9	34.6	-0.005068	0.093144	0.000102935	1.44743E-07	$ 7.47	$ 7.47
0.50	1.5	0.37900	5.75	12.00	19.4	28.0	0.003985	0.075186	8.91729E-05	9.74056E-08	$ 14.18	$ 14.18
0.50	2	0.33700	5.10	10.60	17.1	24.7	0.000608	0.0674	6.8221E-05	1.1015E-07	$ 22.02	$ 22.02
0.50	2.5	0.29500	4.45	9.28	14.9	21.6	-0.007478	0.059744	4.96359E-05	1.22895E-07	$ 26.02	$ 26.02
0.50	3	0.27800	4.18	8.72	14.0	20.3	-0.006306	0.056116	4.66467E-05	1.15916E-07	$ 31.44	$ 31.44
0.50	3.5	0.26400	3.97	8.28	13.3	19.2	-0.00185	0.052724	5.22687E-05	8.37506E-08	$ 36.87	$ 36.87
0.50	4	0.25300	3.80	7.92	12.7	18.4	-0.006045	0.051106	4.13115E-05	1.05295E-07	$ 42.29	$ 42.29
0.50	4.5	0.24200	3.64	7.59	12.2	17.6	-0.000564	0.0482	4.96014E-05	7.22E-08	$ 47.71	$ 47.71
0.50	5	0.23500	3.53	7.34	11.8	17.1	-0.003366	0.047319	3.88419E-05	9.86193E-08	$ 53.14	$ 53.14
0.50	5.5	0.23400	3.51	7.31	11.8	17.0	0.005221	0.045902	5.38618E-05	5.64406E-08	$ 58.56	$ 58.56
0.50	6	0.22700	3.41	7.10	11.4	16.5	-0.00354	0.045662	3.91228E-05	8.89091E-08	$ 63.98	$ 63.98
0.75	-	2.09000	43.40	98.50	165.0	245.0	-0.641016	0.525694	0.001536569	-8.79988E-08	$ -	$ -
0.75	0.5	0.75300	11.80	24.90	40.4	58.7	-0.023963	0.154265	0.000194013	2.26673E-07	$ 7.00	$ 7.00
0.75	1	0.55600	8.51	17.80	28.8	41.8	-0.007622	0.11237	0.000117924	2.01487E-07	$ 8.17	$ 8.17
0.75	1.5	0.43900	6.66	13.90	22.4	32.5	-0.008499	0.088807	8.10579E-05	1.76301E-07	$ 14.24	$ 14.24
0.75	2	0.38300	5.80	12.10	19.5	28.2	-0.00261	0.076776	7.83555E-05	1.26536E-07	$ 22.77	$ 22.77
0.75	2.5	0.32900	4.97	10.40	16.7	24.1	-0.004048	0.065833	6.97763E-05	9.43711E-08	$ 26.39	$ 26.39
0.75	3	0.30800	4.64	9.66	15.5	22.5	-0.009462	0.062664	4.6068E-05	1.43226E-07	$ 31.73	$ 31.73
0.75	3.5	0.29100	4.38	9.12	14.7	21.2	0.002693	0.057658	6.2664E-05	8.16265E-08	$ 37.07	$ 37.07
0.75	4	0.27700	4.17	8.69	14.0	20.2	0.001543	0.054974	5.90396E-05	7.98058E-08	$ 42.40	$ 42.40
0.75	4.5	0.26600	3.99	8.32	13.4	19.3	0.003691	0.052372	5.99558E-05	6.4937E-08	$ 47.74	$ 47.74
0.75	5	0.25600	3.85	8.02	12.9	18.6	0.000586	0.050883	5.32258E-05	7.40404E-08	$ 53.08	$ 53.08
0.75	5.5	0.25300	3.80	7.92	12.7	18.4	-0.006045	0.051106	4.13115E-05	1.05295E-07	$ 58.42	$ 58.42
0.75	6	0.24500	3.68	7.67	12.3	17.8	-0.004914	0.049356	4.19306E-05	9.55849E-08	$ 63.76	$ 63.76
1.00	-	2.52000	52.60	120.00	201.0	297.0	-0.728366	0.624724	0.002067703	-7.0399E-07	$ -	$ -
1.00	0.5	0.88700	13.90	29.40	47.8	69.5	-0.022272	0.180671	0.000242842	2.467E-07	$ 7.22	$ 7.22
1.00	1	0.57800	8.83	18.50	29.8	43.2	-0.015207	0.11731	0.000117809	2.06949E-07	$ 8.77	$ 8.77
1.00	1.5	0.47600	7.22	15.10	24.3	35.2	-0.009419	0.096052	9.35275E-05	1.71142E-07	$ 15.25	$ 15.25
1.00	2	0.41300	6.24	13.00	21.0	30.3	0.00523	0.08179	9.32915E-05	1.11364E-07	$ 24.21	$ 24.21
1.00	2.5	0.37300	5.63	11.70	18.9	27.3	0.003819	0.07415	7.78159E-05	1.17433E-07	$ 28.23	$ 28.23
1.00	3	0.34500	5.21	10.90	17.5	25.2	-0.002011	0.068713	7.74465E-05	8.34471E-08	$ 33.97	$ 33.97
1.00	3.5	0.32400	4.88	10.20	16.4	23.6	0.001685	0.064073	7.52741E-05	7.16128E-08	$ 39.72	$ 39.72
1.00	4	0.30700	4.63	9.64	15.5	22.4	-0.002918	0.061613	5.81228E-05	1.07116E-07	$ 45.46	$ 45.46
1.00	4.5	0.29200	4.40	9.16	14.7	21.3	-0.0072	0.059166	4.73061E-05	1.23805E-07	$ 51.21	$ 51.21
1.00	5	0.26800	4.02	8.37	13.5	19.4	0.00719	0.052386	6.46778E-05	5.21924E-08	$ 56.95	$ 56.95
1.00	5.5	0.27500	4.13	8.61	13.8	20.0	-0.007332	0.055629	4.39788E-05	1.16826E-07	$ 62.70	$ 62.70
1.00	6	0.26600	4.00	8.33	13.4	19.3	0.001648	0.052738	5.69907E-05	7.10059E-08	$ 68.44	$ 68.44
1.00	6.5	0.25800	3.88	8.08	13.0	18.8	-0.00152	0.051607	4.87015E-05	9.16401E-08	$ 74.19	$ 74.19
1.00	7	0.25100	3.78	7.87	12.7	18.3	0.004048	0.04953	5.68509E-05	6.34198E-08	$ 79.93	$ 79.93
1.00	7.5	0.24500	3.69	7.67	12.3	17.8	-0.005652	0.049631	3.93036E-05	1.01654E-07	$ 85.68	$ 85.68
1.00	8	0.24000	3.60	7.50	12.1	17.4	0.006196	0.046928	5.77671E-05	4.85511E-08	$ 91.42	$ 91.42
1.00	8.5	0.23500	3.53	7.35	11.8	17.1	-0.004671	0.047411	3.85038E-05	9.86193E-08	$ 97.17	$ 97.17
1.00	9	0.23000	3.46	7.20	11.6	16.7	0.003091	0.04544	5.10371E-05	5.76544E-08	$ 102.91	$ 102.91
1.00	9.5	0.22600	3.40	7.07	11.4	16.4	0.004309	0.044519	5.15157E-05	5.27993E-08	$ 108.66	$ 108.66
1.00	10	0.22200	3.34	6.95	11.2	16.1	0.004222	0.04369	5.16562E-05	4.79442E-08	$ 114.40	$ 114.40
1.25	-	3.11000	64.80	147.00	248.0	368.0	-0.818941	0.767967	0.002475005	-4.58201E-07	$ -	$ -
1.25	0.5	1.01000	15.80	33.40	54.2	78.8	-0.031514	0.206375	0.000264133	3.0041E-07	$ 7.71	$ 7.71
1.25	1	0.73700	11.30	23.70	38.4	55.6	-0.001419	0.147521	0.000181817	2.01183E-07	$ 9.48	$ 9.48
1.25	1.5	0.53100	8.05	16.80	27.1	39.2	-0.002577	0.106352	0.000111172	1.7266E-07	$ 16.60	$ 16.60
1.25	2	0.48900	7.41	15.50	24.9	36.0	-0.009713	0.098536	9.81917E-05	1.61129E-07	$ 25.56	$ 25.56
1.25	2.5	0.43300	6.55	13.70	22.0	31.8	-0.008124	0.087123	8.65811E-05	1.41708E-07	$ 30.01	$ 30.01
1.25	3	0.39700	5.98	12.50	20.1	29.0	-0.001062	0.078961	8.58034E-05	1.1015E-07	$ 36.07	$ 36.07
1.25	3.5	0.36900	5.56	11.60	18.7	26.9	0.006159	0.072611	8.88153E-05	7.61645E-08	$ 42.14	$ 42.14
1.25	4	0.34700	5.23	10.90	17.5	25.3	-0.005579	0.069832	6.35978E-05	1.25322E-07	$ 48.21	$ 48.21
1.25	4.5	0.32800	4.94	10.30	16.5	23.9	-0.009947	0.066556	5.29215E-05	1.37157E-07	$ 54.27	$ 54.27
1.25	5	0.31400	4.72	9.83	15.8	22.8	-0.000839	0.062614	6.21848E-05	9.89228E-08	$ 60.34	$ 60.34
1.25	5.5	0.30300	4.55	9.47	15.2	22.0	-0.005033	0.060996	5.12276E-05	1.20467E-07	$ 66.41	$ 66.41
1.25	6	0.29200	4.39	9.14	14.7	21.2	0.000448	0.058091	5.95175E-05	8.73919E-08	$ 72.47	$ 72.47
1.50	-	3.50000	73.10	167.00	280.0	416.0	-1.089467	0.878264	0.002727811	-3.94477E-07	$ -	$ -
1.50	0.5	1.18000	18.70	39.40	64.1	93.2	-0.041433	0.243931	0.00030924	3.70202E-07	$ 8.88	$ 8.88
1.50	1	0.74800	11.50	24.00	38.8	56.2	-0.011669	0.151853	0.000158962	2.58534E-07	$ 10.23	$ 10.23
1.50	1.5	0.59900	9.11	19.00	30.7	44.4	-0.000572	0.11995	0.000129735	1.88439E-07	$ 17.36	$ 17.36
1.50	2	0.47800	7.23	15.10	24.3	35.1	-0.00365	0.09566	0.000100122	1.4626E-07	$ 26.68	$ 26.68
1.50	2.5	0.43400	6.54	13.60	22.0	31.7	0.011069	0.085292	0.000101654	1.04992E-07	$ 30.92	$ 30.92
1.50	3	0.40100	6.04	12.60	20.3	29.3	0.001635	0.079607	8.63392E-05	1.15005E-07	$ 36.97	$ 36.97
1.50	3.5	0.37500	5.65	11.80	19.0	27.4	0.00153	0.074346	8.34742E-05	9.86193E-08	$ 43.03	$ 43.03
1.50	4	0.35300	5.31	11.10	17.8	25.7	-0.00517	0.070674	6.97919E-05	1.11364E-07	$ 49.08	$ 49.08
1.50	4.5	0.33700	5.06	10.50	17.0	24.5	0.010881	0.065988	7.70382E-05	8.58747E-08	$ 55.13	$ 55.13
1.50	5	0.32300	4.85	10.10	16.3	23.5	0.005817	0.063578	7.23994E-05	8.4054E-08	$ 61.19	$ 61.19
1.50	5.5	0.32100	4.82	10.00	16.1	23.3	-0.001187	0.064326	5.53879E-05	1.27143E-07	$ 67.24	$ 67.24
1.50	6	0.30900	4.64	9.68	15.6	22.5	0.003362	0.060986	6.84368E-05	8.22333E-08	$ 73.29	$ 73.29
2.00	-	4.30000	90.00	205.00	346.0	514.0	-1.168942	1.063995	0.003504974	-6.97921E-07	$ -	$ -
2.00	0.5	1.43000	22.70	48.00	78.1	114.0	-0.071199	0.297778	0.0003583	5.37096E-07	$ 9.48	$ 9.48
2.00	1	0.87700	13.40	28.20	45.5	66.0	-0.018897	0.176817	0.000198555	2.80079E-07	$ 11.07	$ 11.07
2.00	1.5	0.68300	10.40	21.70	35.0	50.6	-0.005821	0.13737	0.000144615	2.17569E-07	$ 19.13	$ 19.13
2.00	2	0.58000	8.79	18.30	29.6	42.7	0.008894	0.114918	0.000134157	1.51722E-07	$ 28.12	$ 28.12
2.00	2.5	0.51600	7.80	16.30	26.2	37.8	-0.004204	0.103155	0.000110122	1.46867E-07	$ 32.95	$ 32.95
2.00	3	0.47000	7.09	14.80	23.8	34.4	-0.004547	0.094123	9.37057E-05	1.54756E-07	$ 39.34	$ 39.34
2.00	3.5	0.43600	6.56	13.70	22.0	31.8	-0.00555	0.087324	8.44242E-05	1.46867E-07	$ 45.74	$ 45.74
2.00	4	0.40500	6.10	12.70	20.4	29.5	-0.005698	0.081471	7.28949E-05	1.50205E-07	$ 52.14	$ 52.14
2.00	4.5	0.38400	5.78	12.00	19.4	28.0	0.007291	0.075889	8.20756E-05	1.14095E-07	$ 58.54	$ 58.54
2.00	5	0.36600	5.51	11.50	18.5	26.7	-0.000472	0.072833	7.6901E-05	1.07419E-07	$ 64.94	$ 64.94
2.00	5.5	0.35600	5.35	11.10	17.9	25.9	0.00092	0.0711	6.48261E-05	1.34729E-07	$ 71.33	$ 71.33
2.00	6	0.34900	5.25	10.90	17.6	25.4	0.005184	0.069115	7.26374E-05	1.06509E-07	$ 77.73	$ 77.73
2.50	-	5.12000	107.00	244.00	412.0	612.0	-1.364233	1.261116	0.00422519	-9.46746E-07	$ -	$ -
2.50	0.5	1.65000	26.20	55.40	90.0	131.0	-0.078113	0.342733	0.00043244	5.31027E-07	$ 9.94	$ 9.94
2.50	1	1.01000	15.50	32.40	52.4	75.9	-0.012111	0.204127	0.000223103	3.30754E-07	$ 12.60	$ 12.60
2.50	1.5	0.70300	10.70	22.30	35.9	51.9	-0.011117	0.142115	0.000138841	2.41845E-07	$ 20.55	$ 20.55
2.50	2	0.61000	9.24	19.30	31.0	44.9	-0.015685	0.123575	0.000111288	2.33652E-07	$ 30.28	$ 30.28
2.50	2.5	0.54700	8.26	17.20	27.8	40.1	0.008995	0.108095	0.000125032	1.43529E-07	$ 35.59	$ 35.59
2.50	3	0.50100	7.56	15.80	25.4	36.6	-0.000838	0.099633	0.000111516	1.27143E-07	$ 42.48	$ 42.48
2.50	3.5	0.46200	6.96	14.50	23.3	33.7	-0.006183	0.09286	8.46622E-05	1.69322E-07	$ 49.38	$ 49.38
2.50	4	0.43400	6.54	13.60	21.9	31.6	0.001039	0.086511	8.76741E-05	1.35336E-07	$ 56.28	$ 56.28
2.50	4.5	0.41200	6.20	12.90	20.8	30.0	0.004369	0.081621	8.79719E-05	1.17736E-07	$ 63.17	$ 63.17
2.50	5	0.38900	5.85	12.20	19.6	28.3	-0.002698	0.077698	7.67599E-05	1.24716E-07	$ 70.07	$ 70.07
2.50	5.5	0.39000	5.86	12.20	19.6	28.4	-0.006631	0.078567	6.53814E-05	1.60825E-07	$ 76.97	$ 76.97
2.50	6	0.36100	5.42	11.30	18.2	26.2	0.005262	0.071074	8.23987E-05	8.46609E-08	$ 83.86	$ 83.86
3.00	-	6.12000	128.00	292.00	493.0	734.0	-1.71306	1.518859	0.004913792	-6.43301E-07	$ -	$ -
3.00	0.5	1.97000	31.30	66.30	108.0	157.0	-0.06235	0.404796	0.000578041	4.94614E-07	$ 11.11	$ 11.11
3.00	1	1.18000	18.20	38.10	61.5	89.2	-0.035458	0.241338	0.000245777	4.30891E-07	$ 13.47	$ 13.47
3.00	1.5	0.90300	13.80	28.80	46.4	67.2	-0.02065	0.183546	0.000176359	3.32878E-07	$ 21.50	$ 21.50
3.00	2	0.75600	11.50	23.90	38.6	55.8	-0.001248	0.151944	0.000153453	2.56107E-07	$ 32.08	$ 32.08

3.00	2.5	0.66100	10.00	20.90	33.6	48.6	-0.010803	0.132954	0.000131023	2.24245E-07	$	37.28	$	37.28
3.00	3	0.59500	8.98	18.70	30.1	43.6	-0.007822	0.119808	0.000107338	2.32135E-07	$	44.37	$	44.37
3.00	3.5	0.53900	8.13	16.90	27.3	39.4	0.007359	0.106833	0.000115989	1.58094E-07	$	51.46	$	51.46
3.00	4	0.50200	7.56	15.80	25.4	36.6	0.000266	0.099608	0.000111673	1.2684E-07	$	58.56	$	58.56
3.00	4.5	0.47300	7.12	14.80	23.9	34.5	0.006581	0.093656	0.000100275	1.41708E-07	$	65.65	$	65.65
3.00	5	0.44200	6.65	13.90	22.3	32.2	-0.00588	0.088441	8.79914E-05	1.38977E-07	$	72.75	$	72.75
3.00	5.5	0.42300	6.36	13.30	21.3	30.8	-0.010249	0.085165	7.73152E-05	1.50812E-07	$	79.84	$	79.84
3.00	6	0.40600	6.10	12.70	20.4	29.5	-0.004594	0.081447	7.30516E-05	1.49901E-07	$	86.93	$	86.93
3.50	-	6.92000	145.00	331.00	559.0	832.0	-1.930431	1.716468	0.005630873	-8.86057E-07	$	-	$	-
3.50	0.5	2.18000	34.60	73.30	119.0	174.0	-0.142304	0.45737	0.000510683	9.16401E-07	$	13.37	$	13.37
3.50	1.0	1.11000	17.00	35.70	57.6	83.4	-0.020429	0.223916	0.000255225	3.30754E-07	$	14.60	$	14.60
3.50	1.5	0.89900	13.70	28.50	46.0	66.6	-0.010054	0.181792	0.000174042	3.34092E-07	$	23.58	$	23.58
3.50	2.0	0.76700	11.60	24.30	39.1	56.5	-0.007137	0.153222	0.000167467	2.22425E-07	$	34.83	$	34.83
3.50	2.5	0.67900	10.30	21.40	34.5	49.9	-0.005255	0.136835	0.000128317	2.49128E-07	$	39.94	$	39.94
3.50	3.0	0.60900	9.19	19.20	30.9	44.6	-0.001479	0.121294	0.000131484	1.73267E-07	$	47.27	$	47.27
3.50	3.5	0.56200	8.47	17.70	28.4	41.0	-0.007918	0.112611	0.000112466	1.75391E-07	$	54.61	$	54.61
3.50	4.0	0.52400	7.90	16.50	26.5	38.3	-0.007364	0.105116	0.000102467	1.74784E-07	$	61.94	$	61.94
3.50	4.5	0.52600	7.92	16.50	26.6	38.4	0.003398	0.104399	0.000111507	1.5597E-07	$	69.28	$	69.28
3.50	5.0	0.48800	7.34	15.30	24.6	35.6	-0.005339	0.097847	9.01541E-05	1.79639E-07	$	76.62	$	76.62
3.50	5.5	0.46500	6.99	14.60	23.4	33.9	-0.012406	0.093925	7.89421E-05	1.86618E-07	$	83.95	$	83.95
3.50	6.0	0.44400	6.68	13.90	22.4	32.3	0.004144	0.087999	9.44041E-05	1.26233E-07	$	91.29	$	91.29
4.00	-	7.72000	162.00	369.00	624.0	929.0	-2.117593	1.917129	0.006241966	-8.25368E-07	$	-	$	-
4.00	0.5	2.32000	36.70	77.80	126.0	184.0	-0.156914	0.48603	0.000540165	9.34608E-07	$	14.12	$	14.12
4.00	1.0	1.42000	21.90	45.80	74.1	107.0	-0.008295	0.286132	0.000349321	3.58064E-07	$	17.83	$	17.83
4.00	1.5	1.09000	16.60	34.70	55.9	80.9	-0.018592	0.220043	0.000224585	3.67167E-07	$	24.48	$	24.48
4.00	2.0	0.90100	13.70	28.50	46.0	66.6	-0.007846	0.181743	0.000174355	3.33485E-07	$	37.48	$	37.48
4.00	2.5	0.78100	11.80	24.70	39.7	57.5	-0.015664	0.157192	0.000151844	2.78865E-07	$	42.66	$	42.66
4.00	3.0	0.68800	10.40	21.70	34.9	50.4	-0.006032	0.137848	0.000140326	2.16052E-07	$	50.33	$	50.33
4.00	3.5	0.62800	9.48	19.80	31.8	46.0	-0.01144	0.126406	0.000119272	2.22121E-07	$	58.01	$	58.01
4.00	4.0	0.58200	8.77	18.30	29.4	42.5	-0.007483	0.116756	0.000111764	1.99666E-07	$	65.68	$	65.68
4.00	4.5	0.53700	8.09	16.90	27.1	39.2	-0.011957	0.108218	9.82229E-05	1.95115E-07	$	73.35	$	73.35
4.00	5.0	0.50800	7.64	15.90	25.6	37.0	-0.000605	0.101373	9.83601E-05	1.7357E-07	$	81.03	$	81.03
4.00	5.5	0.48400	7.29	15.20	24.4	35.3	-0.008775	0.097475	8.69914E-05	1.80853E-07	$	88.70	$	88.70
4.00	6.0	0.46300	6.96	14.50	23.3	33.7	-0.005079	0.092836	8.48189E-05	1.69018E-07	$	96.37	$	96.37
4.50	-	8.52000	178.00	408.00	689.0	1027.0	-2.404449	2.105609	0.00699286	-1.06812E-06	$	-	$	-
4.50	0.5	2.55000	40.30	85.30	139.0	202.0	-0.058585	0.520385	0.000748911	6.2206E-07	$	15.84	$	15.84
4.50	1.0	1.33000	20.30	42.50	64.7	99.3	-0.574813	0.339228	-0.000598459	2.78258E-06	$	18.42	$	18.42
4.50	1.5	1.06000	16.10	33.60	54.3	78.5	0.002668	0.211536	0.00023601	3.15582E-07	$	25.56	$	25.56
4.50	2.0	0.89700	13.60	28.40	45.8	66.2	-0.003291	0.17938	0.000193236	2.7401E-07	$	40.36	$	40.36
4.50	2.5	0.77800	11.80	24.60	39.5	57.1	-0.017387	0.157553	0.000144611	2.79775E-07	$	45.22	$	45.22
4.50	3.0	0.70300	10.60	22.10	35.6	51.5	-0.003424	0.140576	0.000138841	2.41845E-07	$	53.29	$	53.29
4.50	3.5	0.64500	9.73	20.30	32.6	47.2	-0.013336	0.130155	0.000115563	2.47307E-07	$	61.36	$	61.36
4.50	4.0	0.59000	8.89	18.50	29.8	43.1	-0.002088	0.118048	0.000112836	2.09376E-07	$	69.43	$	69.43
4.50	4.5	0.59100	8.90	18.60	29.9	43.1	-0.000444	0.117376	0.000129873	1.54453E-07	$	77.50	$	77.50
4.50	5.0	0.55500	8.36	17.40	28.0	40.5	-0.004195	0.111274	0.000103397	2.0179E-07	$	85.57	$	85.57
4.50	5.5	0.52800	7.95	16.60	26.6	38.5	-0.013959	0.106706	9.16497E-05	2.03914E-07	$	93.64	$	93.64
4.50	6.0	0.50300	7.56	15.80	25.3	36.6	-0.01296	0.10142	8.89414E-05	1.87225E-07	$	101.71	$	101.71
5.00	-	9.49000	199.00	454.00	768.0	1145.0	-2.639989	2.35783	0.007642948	-7.55576E-07	$	-	$	-
5.00	0.5	2.90000	46.00	97.40	158.0	231.0	-0.196291	0.609342	0.000662657	1.24412E-06	$	17.71	$	17.71
5.00	1	1.76000	27.20	57.00	92.2	134.0	-0.053033	0.360287	0.000369179	6.79715E-07	$	20.14	$	20.14
5.00	1.5	1.32000	20.10	42.10	68.0	98.5	-0.011602	0.26479	0.00029262	4.18753E-07	$	27.40	$	27.40
5.00	2	1.08000	16.40	34.20	55.1	79.7	-0.012659	0.217498	0.000216256	3.70202E-07	$	42.88	$	42.88
5.00	2.5	0.90700	13.70	28.70	46.2	66.8	-0.007264	0.180986	0.000196493	2.70976E-07	$	47.73	$	47.73
5.00	3	0.80600	12.20	25.40	40.9	59.2	-0.01008	0.16244	0.000150235	3.01623E-07	$	56.00	$	56.00
5.00	3.5	0.73100	11.00	23.00	37.1	53.5	0.00946	0.143922	0.000172879	1.7266E-07	$	64.28	$	64.28
5.00	4	0.66100	9.97	20.80	33.5	48.3	0.003032	0.131199	0.000146122	1.75694E-07	$	72.56	$	72.56
5.00	4.5	0.61700	9.29	19.40	31.2	45.0	-0.000339	0.122637	0.000132737	1.70839E-07	$	80.83	$	80.83
5.00	5	0.58100	8.74	18.20	29.3	42.3	0.000948	0.115643	0.000117798	1.81763E-07	$	89.11	$	89.11
5.00	5.5	0.55200	8.31	17.30	27.9	40.2	0.007803	0.109042	0.00012328	1.42012E-07	$	97.39	$	97.39
5.00	6	0.52700	7.92	16.50	26.6	38.4	0.004502	0.104374	0.000111663	1.55667E-07	$	105.66	$	105.66
6.00	-	11.20000	234.00	535.00	905.0	1350.0	-3.089098	2.769051	0.009072892	-9.71021E-07	$	-	$	-
6.00	0.5	3.53000	56.30	119.00	194.0	283.0	-0.157084	0.734636	0.000932785	1.23502E-06	$	19.84	$	19.84
6.00	1	2.09000	32.20	67.70	109.0	159.0	-0.121711	0.433384	0.000363801	1.0044E-06	$	21.37	$	21.37
6.00	1.5	1.54000	23.50	49.20	79.4	115.0	-0.022132	0.310347	0.000333273	5.03717E-07	$	28.93	$	28.93
6.00	2	1.22000	18.50	38.70	62.3	90.2	-0.020106	0.245576	0.000246973	4.18753E-07	$	44.19	$	44.19
6.00	2.5	1.04000	15.80	32.90	53.1	76.7	-0.000478	0.208297	0.000221042	3.21651E-07	$	48.74	$	48.74
6.00	3	0.92000	13.90	29.00	46.7	67.5	-0.005275	0.184051	0.000187932	2.97375E-07	$	56.80	$	56.80
6.00	3.5	0.81000	12.20	25.50	41.0	59.3	-0.008685	0.162037	0.00016146	2.70065E-07	$	64.86	$	64.86
6.00	4	0.74500	11.20	23.40	37.7	54.4	0.005232	0.147275	0.000166165	1.98756E-07	$	72.92	$	72.92
6.00	4.5	0.69200	10.40	21.70	35.0	50.5	0.008415	0.136532	0.000154933	1.84494E-07	$	80.98	$	80.98
6.00	5	0.64500	9.70	20.20	32.5	47.0	-0.003801	0.129017	0.000121754	2.291E-07	$	89.04	$	89.04
6.00	5.5	0.61600	9.27	19.30	31.1	44.9	0.003055	0.122417	0.000127236	1.89349E-07	$	97.10	$	97.10
6.00	6	0.58600	8.82	18.40	29.6	42.7	0.000252	0.116509	0.000123835	1.68108E-07	$	105.16	$	105.16
7.00	-	12.70000	267.00	611.00	1034.0	1542.0	-3.557321	3.151329	0.010491384	-1.42619E-06	$	-	$	-
7.00	0.5	4.01000	64.00	136.00	221.0	322.0	-0.221966	0.83504	0.001116074	1.21074E-06	$	39.14	$	39.14
7.00	1	2.43000	37.60	79.00	128.0	185.0	-0.014919	0.488496	0.000649086	5.37096E-07	$	43.13	$	43.13
7.00	1.5	1.68000	25.60	53.60	86.5	125.0	-0.009361	0.336258	0.000389024	4.61235E-07	$	47.13	$	47.13
7.00	2	1.36000	20.70	43.20	69.6	101.0	-0.033502	0.27642	0.000247584	5.58337E-07	$	51.12	$	51.12
7.00	2.5	1.16000	17.60	36.60	59.1	85.4	0.001981	0.232222	0.000240172	3.76271E-07	$	55.11	$	55.11
7.00	3	0.98900	15.00	31.20	50.2	72.6	-0.015148	0.199941	0.000182163	3.67471E-07	$	59.11	$	59.11
7.00	3.5	0.89400	13.50	28.10	45.3	65.5	-0.001621	0.17882	0.000177095	3.05265E-07	$	63.10	$	63.10
7.00	4	0.82000	12.40	25.80	41.5	59.9	-0.005709	0.164557	0.000161337	2.67031E-07	$	67.10	$	67.10
7.00	4.5	0.76000	11.40	23.90	38.4	55.5	-0.005212	0.150916	0.000161298	2.24549E-07	$	71.09	$	71.09
7.00	5	0.71100	10.70	22.30	35.9	51.9	-0.002284	0.141919	0.000140094	2.39417E-07	$	75.08	$	75.08
7.00	5.5	0.67400	10.20	21.20	34.0	49.2	-0.018844	0.137237	0.000108482	2.80989E-07	$	79.08	$	79.08
7.00	6	0.63900	9.62	20.00	32.3	46.6	0.010121	0.126339	0.000138448	1.8237E-07	$	83.07	$	83.07
8.00	-	14.30000	300.00	687.00	1163.0	1734.0	-3.915141	3.531163	0.011925548	-1.9117E-06	$	-	$	-
8.00	0.5	4.56000	72.80	155.00	252.0	367.0	-0.236558	0.945864	0.001334781	1.22591E-06	$	44.73	$	44.73
8.00	1	2.60000	40.20	84.50	137.0	198.0	-0.006214	0.521115	0.000708629	5.46199E-07	$	49.29	$	49.29
8.00	1.5	1.86000	28.40	59.40	95.9	139.0	-0.029207	0.375704	0.000389921	6.4937E-07	$	53.86	$	53.86
8.00	2	1.50000	22.80	47.70	76.9	111.0	-0.005123	0.299572	0.000345731	3.94477E-07	$	58.42	$	58.42
8.00	2.5	1.23000	18.60	38.90	62.6	90.5	-0.012458	0.246252	0.000257448	3.85374E-07	$	62.99	$	62.99
8.00	3	1.08000	16.40	34.20	55.1	79.6	-0.008359	0.21688	0.000225164	3.39857E-07	$	67.55	$	67.55
8.00	3.5	0.97700	14.80	30.80	49.5	71.6	-0.018743	0.197758	0.000175211	3.71112E-07	$	72.12	$	72.12
8.00	4	0.89400	13.50	28.10	45.3	65.4	0.002678	0.178202	0.000186003	2.7492E-07	$	76.68	$	76.68
8.00	4.5	0.82700	12.50	26.00	41.8	60.4	-0.009973	0.166542	0.000153526	2.95251E-07	$	81.24	$	81.24
8.00	5	0.77200	11.60	24.20	39.0	56.3	0.005703	0.152787	0.00016656	2.20907E-07	$	85.81	$	85.81
8.00	5.5	0.73100	11.00	22.90	36.9	53.3	0.00245	0.145445	0.0001483	2.33349E-07	$	90.37	$	90.37
8.00	6	0.69300	10.40	21.70	35.0	50.5	0.009519	0.136508	0.00015509	1.84191E-07	$	94.94	$	94.94
9.00	-	15.90000	333.00	762.00	1291.0	1926.0	-4.285745	3.920228	0.01316464	-1.79032E-06	$	-	$	-
9.00	0.5	4.69000	74.60	158.00	257.0	375.0	-0.244902	0.97719	0.001212621	1.67198E-06	$	50.32	$	50.32
9.00	1	2.85000	44.00	92.40	150.0	217.0	0.004233	0.57031	0.000765362	6.52405E-07	$	55.46	$	55.46
9.00	1.5	2.04000	31.20	65.20	105.0	152.0	-0.049049	0.414479	0.000411236	7.16128E-07	$	60.59	$	60.59
9.00	2	1.57000	23.80	49.70	80.2	116.0	-0.004768	0.313917	0.000336283	4.94614E-07	$	65.73	$	65.73
9.00	2.5	1.34000	20.30	42.40	68.3	98.7	-0.009048	0.268265	0.00028392	4.12684E-07	$	70.86	$	70.86
9.00	3	1.18000	17.80	37.20	59.9	86.6	-0.005964	0.235436	0.000246687	3.70202E-07	$	76.00	$	76.00
9.00	3.5	1.06000	16.00	33.40	53.8	77.7	-0.001102	0.211198	0.000225866	3.15582E-07	$	81.13	$	81.13
9.00	4	0.96800	14.60	30.50	49.0	70.8	-0.012016	0.193978	0.000193308	3.13154E-07	$	86.27	$	86.27
9.00	4.5	0.89300	13.50	28.10	45.2	65.2	-0.004157	0.178826	0.000180774	2.75224E-07	$	91.40	$	91.40

9.00	5	0.83300	12.50	26.20	42.1	60.8	-0.00366	0.165185	0.000180735	2.32742E-07	$ 96.53	$ 96.53
9.00	5.5	0.78800	11.90	24.70	39.8	57.4	0.003312	0.157316	0.000158468	2.46397E-07	$ 101.67	$ 101.67
9.00	6	0.75100	11.30	23.60	37.9	54.7	-0.005867	0.149885	0.000153125	2.2728E-07	$ 106.80	$ 106.80
10.00	-	17.70000	370.00	847.00	1435.0	2142.0	-4.77502	4.360196	0.014570323	-1.72963E-06	$ -	$ -
10.00	0.5	5.68000	91.00	193.00	315.0	459.0	-0.23064	1.177517	0.001668431	1.61432E-06	$ 55.91	$ 55.91
10.00	1	3.35000	51.90	109.00	177.0	257.0	-0.044119	0.678251	0.000823688	1.04688E-06	$ 61.62	$ 61.62
10.00	1.5	2.18000	33.30	69.60	112.0	163.0	-0.093601	0.448405	0.000355017	1.03778E-06	$ 67.32	$ 67.32
10.00	2	1.76000	26.80	56.00	90.2	131.0	-0.050609	0.358344	0.00031755	7.40404E-07	$ 73.03	$ 73.03
10.00	2.5	1.49000	22.60	47.30	76.2	110.0	-0.006509	0.297339	0.000339092	3.97512E-07	$ 78.73	$ 78.73
10.00	3	1.31000	19.80	41.30	66.5	96.1	-0.007849	0.262194	0.000267384	4.21787E-07	$ 84.44	$ 84.44
10.00	3.5	1.17000	17.70	36.90	59.4	85.8	-0.007722	0.234429	0.000238358	3.73236E-07	$ 90.14	$ 90.14
10.00	4	1.06000	16.10	33.50	53.9	77.9	-0.015804	0.214259	0.000201287	3.76271E-07	$ 95.85	$ 95.85
10.00	4.5	0.97800	14.70	30.70	49.5	71.5	0.007093	0.193453	0.000213927	2.79775E-07	$ 101.56	$ 101.56
10.00	5	0.91000	13.70	28.60	46.0	66.4	-0.002362	0.1812	0.000190201	2.70065E-07	$ 107.26	$ 107.26
10.00	5.5	0.85900	12.90	27.00	43.4	62.7	-0.004292	0.170721	0.000180973	2.55196E-07	$ 112.97	$ 112.97
10.00	6	0.81000	12.20	25.40	40.9	59.0	0.002934	0.161107	0.000168678	2.39721E-07	$ 118.67	$ 118.67
12.00	-	20.80000	435.00	997.00	1691.0	2524.0	-5.466829	5.100921	0.017473698	-2.67031E-06	$ -	$ -
12.00	0.5	6.02000	95.60	203.00	330.0	480.0	-0.253355	1.241315	0.001737707	1.57184E-06	$ 67.10	$ 67.10
12.00	1	3.51000	54.10	114.00	184.0	267.0	-0.109287	0.713735	0.000813128	1.11971E-06	$ 73.94	$ 73.94
12.00	1.5	2.53000	38.60	80.80	130.0	189.0	-0.098636	0.517972	0.000442636	1.11364E-06	$ 80.79	$ 80.79
12.00	2	2.04000	30.90	64.70	104.0	151.0	-0.061953	0.413848	0.00036715	8.37506E-07	$ 87.63	$ 87.63
12.00	2.5	1.72000	26.10	54.40	87.7	127.0	-0.020548	0.346655	0.00033339	6.31164E-07	$ 94.48	$ 94.48
12.00	3	1.50000	22.70	47.30	76.3	110.0	0.011479	0.298008	0.000337278	3.94477E-07	$ 101.33	$ 101.33
12.00	3.5	1.34000	20.20	42.10	67.9	98.1	0.005965	0.266414	0.000282229	4.12684E-07	$ 108.17	$ 108.17
12.00	4	1.21000	18.30	38.20	61.4	88.7	-0.015604	0.243013	0.00024248	3.91443E-07	$ 115.02	$ 115.02
12.00	4.5	1.11000	16.80	34.90	56.2	81.2	-0.007286	0.223224	0.000210358	3.91443E-07	$ 121.87	$ 121.87
12.00	5	1.03000	15.50	32.40	52.1	75.3	-0.007224	0.205439	0.000211022	3.24685E-07	$ 128.71	$ 128.71
12.00	5.5	0.97200	14.60	30.50	49.1	70.9	0.00243	0.192662	0.000207915	2.81596E-07	$ 135.56	$ 135.56
12.00	6	0.91400	13.80	28.70	46.1	66.6	-0.012648	0.184164	0.000166249	3.2954E-07	$ 142.41	$ 142.41

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51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.8 Demand Control Ventilation

Algorithms

$$Customer\ kW = Total\ Exaust\ Fan\ HP \times ESF$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Dth = Total\ Exhaust\ Fan\ HP \times GSF$$

Variables

ESF	0.9054	Demand Controlled Ventilation Electric Savings Factor, kW per name plate HP. (Ref 49)
GSF	42.3224	Demand Controlled Ventilation Gas Savings Factor =42.3224 Dth per name plate hp. (Ref 49)

Customer Inputs	M&V Verified	
Model Name	Yes	
Model Number	Yes	
Quantity	Yes	
Size	Yes	
Total Exhaust Fan hp	Yes	Total nameplate HP of exhaust fans with DCV installed.

Table 12.8.1 Ref (53, 54)	Incremental Cost Per Name Plate HP	Measure Life (yrs)	Coincidence Factor (CF)	O&M Savings - energy Per Name Plate HP	Hours
Demand Controlled Ventilation	$ 2,451.55	20	49.46%	$0	3307

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49. Custom DCV Projects, 2010-2011

50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".

51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.9 Destratification Fans

Algorithms

$$Customer\ (Dth) = \left(U\ roof \times (Area\ Destrat \times deltaT\ C) + U\ wall \times \sqrt{\frac{Area\ Destrat}{\%\ of\ Space\ Area}} \times 4 \times \%\ of\ Space\ Area \times Ceilingheight \times Destrat\ Height \times deltaT\ C \right) \times HeatingHours \times \frac{\frac{\frac{HrsPerDay}{24}}{HeatEff}}{1000000} + Destrat\ Fan\ kWh \times (\frac{3412}{HeatEff} - Source\ BTU\ Factor)/1000000$$

Variables

HeatingHours	6242	Heating hours in season with outdoor air temperatures below 65F. (Ref 48)
% of Space Area	80%	Engineering assumption of destratified area/total area of the space
deltaT_C	10	Difference between ceiling air temperature (deg F) and floor temperature in stratified space. Ref (48)
Destrat_Height	0.25	Assumption that the top 25% of the wall height will experience the same stratified deltaT as the ceiling.
U_roof	0.08	Average heat transfer coefficient for the roof (BTU/h*ft^2*F). (Ref 48)
U_walls	0.115	Average heat transfer coefficient for the walls (BTU/h*ft^2*F) assuming equal distribution between newer and older buildings. (Ref 43)
Heat_Eff	80%	Assumed efficiency of heating equipment.
Conversion Factor	1,000,000	Conversion factor from BTU to Dth.
Destrat_Fan_kW	0.588	kW per fan, based on typical 1 HP motor with 65% load factor.
Source_BTU_Factor	7500	Source BTU per kWh, used to account for cross-fuel penalty of this measure. (Ref 45)
Measure Life	See Table 12.1.0	Refer to table 15 for measure life.

Customer Inputs	M&V Verified	
HrsPerDay	Yes	Hours per day of destratification fan operation.
Qty	Yes	Quantity of destratification fans installed.
Ceiling Height	Yes	Height of ceiling in space being destratified, in feet.
Area_Destrat	Yes	Total area being destratified, in square feet.
Cost	No	Total cost for equipment and installation of destratification fans.

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49. Custom DCV Projects, 2010-2011

50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".

51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.10 Boiler Controls

Algorithms

$$Customer\ Dth = Input\ Capacity \times Alt \times (1 - \frac{EFFb}{Effh}) \times EFLH$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude effects. No adjustment for near sea-level altitude.
Effb	See Table 12.2.0	Efficiency of Baseline equipment.
Effh	See Table 12.2.0	Efficiency of equipment after controls implemented
EFLH	See Table 12.3.0	Based on Bin Analysis assuming 30% oversizing for boiler plant. (Ref 28)
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Input Capacity	Yes	Rated input BTUH nameplate data for the boiler
Use	Yes	Use of boiler: space heating, domestic water, or both.
Cost	Yes	Cost of boiler tuneup

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51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

New linkageless boiler controls measure

12.11 Dual Fuel RTU

Algorithms

$$Cooling\ kWh = EFLH_c \times Size \times (\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}})$$

$$Cooling\ kW = Size \times (\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}})$$

$$Cooling\ PCkW = CF \times Size \times (\frac{12}{EER_{Baseline}} - \frac{12}{EER_{Eff}})$$

EER = SEER × 0.85

Incremental Cost = Size × Incremental Cost per Ton

$$Heating\ dTh = Input\ Capacity \times Alt \times (\frac{EFLH_{hb}}{Effb} - \frac{EFLH_{hh}}{Effh} -) \times 1000000$$

Variables

$EFLH_c$	See Table 12.11.0	Equivalent Full Load Hours, Cooling. The equivalent number of hours that the equipmen will run in cooling mode over the course of the year.
$EER_{Baseline}$	See Table 12.11.0	EER of standard equpment based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010.
CF	0.90	Coincidence factor
Incremental Cost per Ton	See Table 12.11.0	Incremental cost per ton
Alt	1.00	Altitude adjustment factor to adjust the sea level manufacturer's rated input for altitude
EFF_b	See Table 12.11.1	Efficiency of baseline equipment
$EFLH_{hb}$	See Table 12.1.1	Equivalent Full Load Hours, Heating, baseline. The equivalent number of hours that the baseline equipment will run in heating mode over the course of the year
$EFLH_{hh}$	See Table 12.1.1	Equivalent Full Load Hours, Heating, efficient. The equivalent number of hours that the high efficient equipment will run in heating mode over the course of the year
Conversion Factor	1000000	Conversion from BTU to dTh
Lifetime	20	Life of a new unit, in years

Customer Inputs	M&V Verified	
Size	Yes	The equipment capacity in tons.
EER_{EFF}	Yes	EER of high efficiency equipment that the customer will install.
Input Capacity	Yes	Rated input BTUH nameplate data for high efficiency equipment that the customer will install
EFF_h	Yes	Efficiency of purchased high efficiency equipment that the customer will install.

Table 12.11.0	EFLHc [52]	$EER_{Baseline}$	Incremental Cost per Ton
DX Units < 5.4 tons	610	11.05	$1,679.12
DX Units 5.4 - 11.3 tons	1,252	11.00	$855.60
DX Units 11.4 - 19.9 tons	1,596	10.80	$1,424.71
DX Units 20 - 63.3 tons	1,208	9.80	$1,272.06
DX Units ≥ 63.3 tons	1,878	9.50	$1,119.41

Table 12.11.1	EFF_b	$EFLH_b$	$EFLH_{hh}$
DX Units < 5.4 tons	0.78	849.45	715.60
DX Units 5.4 - 11.3 tons	0.78	849.45	715.60
DX Units 11.4 - 19.9 tons	0.78	849.45	715.60
DX Units 20 - 63.3 tons	0.78	849.45	715.60
DX Units ≥ 63.3 tons	0.78	849.45	715.60

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51. 2011 Tetratech Program Evaluation
52. From 2017-2019 DX RTU program participation data

Changes from Recent Filing:

12.12 HPWH - Electric Baseline

Algorithms

$$Customer\ kWh = Energy_{HeatWater} * \left(\frac{1}{UEF_{baseline}} - \frac{1}{UEF_{efficient}}\right) * \frac{ESAF}{CF_1}$$

$$PC\ kW = Customer\ kWh/8760$$

$$Customer\ Dth = -1 * Energy_{HeatWater} * \frac{1}{UEF_{efficient}} * \frac{GIF}{CF_2}$$

$$Energy\_HeatWater = C_p * density * gallons/Volume\_Daily\_SqFt\_Usage * SqFt\_Served * Days\_Year * (T_{set} - T_{supply})$$

$$UEF_{efficient} = (0.7 * COP_{HP} + 0.3) * (1 - Fraction_{Loss})$$

Variables

density	8.33	Density of water, lbs/gal
C_p	1.00	Specific heat of water, Btu / lb - F
Volume_Daily_SqFt_Usage	See Table 12.12.1	Average daily hot water consumption [gallons / 1,000 ft2 / day].
Days_Year	See Table 12.12.1	Applicable days per year of building operation
T_setpoint	140	Water heater setpoint, deg F (Ref 27).
T_supply	58	Supply temperature of city water to water heater, deg F (Ref 27).
UEF_baseline	See Table 12.12.2	Uniform Energy Factor of baseline water heater.
Incremental Cost per MBH capacity	$52	Incremental cost of efficient water heater over code min.
ESAF	0.862, 0	0.864 if space is heated electrically, 0 if gas heat, uses balance temperature based bin analysis
GIF	0.089	Gas Impact Factor. Customer Dth assessed as O&M penalty
CF_1	3412	Btu/kWh
CF_2	1,000,000	Btu/Dth
Measure Life	10 Years	TRM 4.0 pg. 504 (Ref 48)

Customer Inputs	M&V Verified	
Qty	Yes	Quantity of new equipment for rebate determination
SqFt_Served	Yes	Number of Square feet served by water heater in thousands of square feet, site specific.
UEF_efficient	Yes	Uniform Energy Factor of new water heater
COP_HP	Yes	Efficient Unit COP in heat pump mode, if UEF rating is not available
Building type	Yes	Facility type from picklist
BTUH capacity	Yes	BTUH of proposed water heater
Draw Type	No	Draw pattern should be provided with UEF: Very Small, Low, Medium, High. Medium default if no entry
Space Heat Type	Yes	Electric or Gas

Table 12.12.1 Annual Hot Water Use Data (Ref 29 and 31)

Building Type	Applicable Days/Year	Gallons / 1,000 ft2 / day	Eligible?
Small Office	250	2.3	Yes
Large Office	250	2.3	Yes
Fast Food Restaurant	365	549.2	Yes
Sit-Down Restaurant	365	816.0	Yes
Retail	365	2.0	Yes
Grocery	365	2.2	Yes
Warehouse	250	1.0	Yes
Elementary School	200	5.7	Yes
Jr. High/High School/College	200	17.1	Yes
Health	365	342.0	No
Motel	365	100.0	No
Hotel	365	30.8	Yes
Other Commercial	250	0.7	Yes

Table 12.12.2: Baseline Efficiencies

Storage Volume	Draw Pattern	Baseline UEF
20 to 50 gallons	Very Small	0.8808 – (0.0008 × Gal)
	Low	0.9254 – (0.0003 × Gal)
	Medium	0.9307 – (0.0002 × Gal)
	High	0.9349 – (0.0001 × Gal)
50 to 120* gallons	Very Small	1.9236 – (0.0011 × Gal)
	Low	2.0440 – (0.0011 × Gal)
	Medium	2.1171 – (0.0011 × Gal)
	High	2.2418 – (0.0011 × Gal)
*Baseline Efficiency Structure extended to 120 gallons from 100 listed in TRM		

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49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.13 Process Steam Traps

Algorithms

$$Customer\ (Dth) = LeakRate \times Leak\ Hours \times \frac{BTU\ Per\ Pound}{EFFb} / 1000000$$

Variables

	13.8	Leakage rate for low pressure: psig < 15 (Reference 28)
	6.5	Leakage rate for medium pressure: 15 ≤ psig < 30 (Reference 28)
	23.4	Leakage rate for medium pressure: 30 ≤ psig < 75 (Reference 28)
	43.8	Leakage rate for high pressure: 75 ≤ psig < 125 (Reference 28)
	60.9	Leakage rate for high pressure: 125 ≤ psig < 175 (Reference 28)
	82.1	Leakage rate for high pressure: 175 ≤ psig < 250 (Reference 28)
Leak_Rate	105.2	Leakage rate for high pressure: 250 ≤ psig < 300 (Reference 28)
Leak_Hours	8282	Annual hours boiler lines are pressurized (Reference 28)
Effb	See Table 12.2.0	Efficiency of steam boiler
	1044	Loss in btu/lb for Steam traps in Low Pressure Industrial Applications: 1137 BTU per pound for lost to atmosphere, 951 BTU per pound lost to condensate. Assume 50/50 mix = 1044 BTU per pound. (Reference 28)
	1042.5	Loss in btu/lb for Steam traps in medium pressure: 15 ≤ psig < 30 Industrial Applications: 1141 BTU per pound for lost to atmosphere, 944 BTU per pound lost to condensate. Assume 50/50 mix = 1042.5 BTU per pound. (Reference 28)
	1036	Loss in btu/lb for Steam traps in medium pressure: 30 ≤ psig < 75 Industrial Applications: 1157 BTU per pound for lost to atmosphere, 915 BTU per pound lost to condensate. Assume 50/50 mix = 1036 BTU per pound. (Reference 28)
	1023.5	Loss in btu/lb for Steam traps in high pressure: 75 ≤ psig < 125 Industrial Applications: 1167 BTU per pound for lost to atmosphere, 880 BTU per pound lost to condensate. Assume 50/50 mix = 1023.5 BTU per pound. (Reference 28)
	1016	Loss in btu/lb for Steam traps in high pressure: 125 ≤ psig < 175 Industrial Applications: 1173 BTU per pound for lost to atmosphere, 859 BTU per pound lost to condensate. Assume 50/50 mix = 1016 BTU per pound. (Reference 28)
	1007	Loss in btu/lb for Steam traps in high pressure: 175 ≤ psig < 250 Industrial Applications: 1177 BTU per pound for lost to atmosphere, 837 BTU per pound lost to condensate. Assume 50/50 mix = 1044 BTU per pound. (Reference 28)
BTU_Per_Pound	999	Loss in btu/lb for Steam traps in high pressure: 250 ≤ psig < 300 Industrial Applications: 1182 BTU per pound for lost to atmosphere, 816 BTU per pound lost to condensate. Assume 50/50 mix = 1044 BTU per pound. (Reference 28)
Measure Life	See Table 12.1.0	

Customer Inputs	M&V Verified	
Incremental Cost	No	Cost of replacing or repairing steam traps, per trap, provided by the customer.
Steam Pressure	Yes	Steam pressure; seven possible ranges of steam pressure.
Use	Yes	Process only.

Table 12.13.1 Deemed Measure Cost (Ref 28)

Use	Cost per Trap
Low pressure: psig < 15	$77
Medium pressure: 15 ≤ psig < 30	$180
Medium pressure: 30 ≤ psig < 75	$223
High pressure: 75 ≤ psig < 125	$276
High pressure: 125 ≤ psig < 175	$322
High pressure: 175 ≤ psig < 250	$370
High pressure: 250 ≤ psig < 300	$418

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51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.14 HPWH - Gas Baseline

Algorithms

$$Customer\ kWh = -1 * Energy_{HeatWater} * \left(\frac{1}{UEF_{efficient}}\right) * \frac{ESAF}{CF_1}$$
$$PC\ kW = Customer\ kWh/8760$$
$$Energy\_HeatWater = C_p * density * gallons/Volume\_Daily\_SqFt\_Usage * SqFt\_Served * Days\_Year * (T_{set} - T_{supply})$$
$$Customer\ Dth = \left(Energy_{HeatWater} + SL_{base} * Hours_{Average} * Qty * Gallons_{Storage}\right) * \left(\frac{1}{Eff_{baseline}}\right) * \frac{(1 - GIF)}{CF_2}$$
$$UEF_{efficient} = (0.7 * COP_{HP} + 0.3) * (1 - Fraction_{Loss})$$

Variables

density	8.33	Density of water, lbs/gal
C_p	1.00	Specific heat of water, Btu / lb - F
Volume_Daily_SqFt_Usage	See Table 12.12.1	Average daily hot water consumption [gallons / 1,000 ft2 / day].
Days_Year	See Table 12.12.1	Applicable days per year of building operation
T_setpoint	140	Water heater setpoint, deg F (Ref 27).
T_supply	58	Supply temperature of city water to water heater, deg F (Ref 27).
Eff_baseline	See Table 12.2.0	Uniform Energy Factor of baseline water heater.
Incremental Cost per MBH capacity	$52	Incremental cost of efficient water heater over standard water heater.
ESAF	0.862, 0	0.864 if space is heated electrically, 0 if gas heat, uses balance temperature based bin analysis
GIF	0.089	Gas Impact Factor
SL_base	13.21	Standby Losses for baseline storage water heater, BTUH per gallon of storage (Ref 26)
Hours Average	3600	Based on WH participation history
Fraction_Loss	0.074	Deemed loss fraction based on GWH past participation and GWH deemed BTUH loss rate
CF_1	3412	Btu/kWh
CF_2	1,000,000	Btu/Dth
Measure Life	10 Years	TRM 4.0 pg. 504 (Ref 48)

Customer Inputs	**M&V Verified**	
Qty	Yes	Quantity of New Equipment for losses and rebate determination
SqFt_Served	Yes	Number of Square feet served by water heater in thousands of square feet, site specific.
UEF_efficient	Yes	Uniform Energy Factor of new water heater
COP_HP	Yes	Efficient Unit COP in heat pump mode, if UEF rating is not available
Building type	Yes	Facility type from picklist
Gallons Storage	Yes	Size of storage tank in gallons
BTUH capacity	Yes	BTUH of proposed water heater

Table 12.12.1 Annual Hot Water Use Data (Ref 29 and 31)

Building Type	Applicable Days/Year	Gallons / 1,000 ft2 / day	Eligible?
Small Office	250	2.3	Yes
Large Office	250	2.3	Yes
Fast Food Restaurant	365	549.2	Yes
Sit-Down Restaurant	365	816.0	Yes
Retail	365	2.0	Yes
Grocery	365	2.2	Yes
Warehouse	250	1.0	Yes
Elementary School	200	5.7	Yes
Jr. High/High School/College	200	17.1	Yes
Health	365	342.0	No
Motel	365	100.0	No
Hotel	365	30.8	Yes
Other Commercial	250	0.7	Yes

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49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation

Changes from Recent Filing:

12.15 Process Boiler

Algorithms

$$Customer\ Dth = \frac{Input\ Capacity}{Conversion\ Factor} \times Alt \times \left(\frac{Effh}{Effb} - 1\right) \times HOU \times Utilization\ Factor$$

$$HOU = 8760$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude effects. No adjustment for near sea-level altitude.
EFFb	See Table 12.2.0	Efficiency of Baseline equipment
EFFh	See Table 12.2.2	Rated Efficiency provided by customer.
HOU	8760	Hours of Use following IL TRM. Load factor and oversize factor accomplished by blended utilization factor.
Conversion Factor	1000000	Conversion from BTU to Dth
Default Utilization Factor	41.9%	Utilization Factor from Illinois TRM 8.0 Vol 2, 4.43 Process Boiler Tune-up. (Ref 53)
Incremental Cost	See Table 12.1.2c	Incremental cost of efficient boiler or furnace over standard equipment.
Measure Life	20 Years	Consistent for all Process Boiler sizes. Reference deemend table 12.1.0

Customer Inputs	M&V Verified	
Input Capacity	Yes	Rated input BTUH nameplate data for the new boiler, furnace, unit heater, or water heater.
Rated Efficiency	Yes	Rated efficiency of purchased boiler, provided by customer.
Utilization Factor	Yes	Use customer input, or default 41.9% if customer input is not available

Table 12.1.2c Incremental process boiler costs (Ref 48)

Boiler Type	Input Capacity Range	Incremental Cost $/kBtuh
Steam	>2.5 MMBTUH	$1.02
Non-Condensing	>2.5 MMBTUH	$2.50
Condensing	>2.5 MMBTUH	$7.25

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44. St Paul 2015 Water Rate Schedule - http://mn-stpaul.civicplus.com/DocumentView.asp?DID=3493 (From 2017-2019 MN Energy Efficient Showerhead Tech Assumptions)
45. Source BTU for electricity based on MN DOC No. G008/CIP-00-864.07 Reply Comments of May 23, 2003 which states a Source BTU comparison must be made using an assumed heat rate of 7500 BTU/Generator kWh , based on typical Heat Rate for Combined-Cycle Natural Gas-fired Plant.
46. Wisconsin Focus on Energy 2019 TRM
47. Historical program participation
48. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs version 3.0 Jan 10 2019
49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation
52. Minnesota TRM. Version 3.3. <http://mn.gov/commerce-stat/pdfs/trm-version-3.3.pdf
53. Illinois Technical Reference Manual (2019-2020) <https://www.ilsag.info/technical-reference-manual/il_trm_version_8/>

Changes from Recent Filing:

Removed 5% adjustment factor for condensing boilers and deemed proposed efficiency at 90%
EFLH for space heating adjusted to reflect the MN TRM
Baseline Efficiency for Steam Boilers lowered from 80% to 79%

12.16 Process Boiler Tune Up

Algorithms

$$Customer\ Dth = \frac{Input\ Capacity}{Conversion\ Factor} \times Alt \times \left(\frac{Effh}{Effb} - 1\right) \times HOU \times Utilization\ Factor$$

$$HOU = 8760$$

$$Percent\ Savings = \left(\frac{Effh}{Effb} - 1\right) \times 100$$

Variables

Alt	1	Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude
Effb	Use Percent Savings	Quantities not deemed individually, use percent savings term
Effh	Use Percent Savings	Quantities not deemed individually, use percent savings term
Percent Savings	2.20%	Per MN TRM 4.0, Table 2. Modification Savings, pg. 360 (Ref 48)
Conversion Factor	1,000,000	Conversion from BTU to Dth
Default Utilization Factor	41.9%	Utilization Factor from Illinois TRM 8.0 Vol 2, 4.43 Process Boiler Tune-up. (Ref 52)
HOU	8760	Hours of Use, scaled by blended utlization factor.
Measure Life	See Table 12.1.0	2 years for Process Boiler Tune Up

Customer Inputs	**M&V Verified**	
Input Capacity	Yes	Rated input BTUH nameplate data for the boiler
Use	Yes	Use of boiler: space heating, domestic water, or both.
Utilization Factor	Yes	Use customer input, or default 41.9% if customer input is not available
Cost	Yes	Cost of boiler tuneup

References:

1. 2020 Minnesota Energy Code - Chapter 7676.1100 Subpart 3D, 4A
2. Centerpoint TRM
3. International Energy Conservation Code (IECC) 2015 Table C403.2.3 (4)
4. ASHRAE HVAC Systems and Equipment 2008 pg 15.1
5. Whole Building Design Guide for US Army. Tech Note 14: Overhead Radiant Heating <https://www.wbdg.org/ccb/ARMYCOE/COETN/technote14.pdf>

6. 2015 Minnesota Energy Code Table C403.2.3(5) pg C-44
7. Cost data from online review on 8/5/15 of products available at Younits.com, ecomfort.com, hvacdistribution.com, grainger.com, simplyplumbing.com,
8. Nicor Gas Energy Efficiency Plan 2011-2014. Revised Plan Filed Pursuant to Order Docket 10-0562, May 27, 2011
9. Sachs, Harvey M., Unit Heaters Deserve Attention for Commercial Programs, ACEEE, April 2003
10. TMY3 Weather data from Department of Energy
11. International Energy Conservation Code (IECC) 2012

12. 2% efficiency improvement for boiler tune up based on Michaels Energy literature review. Sources included (but not limited to):
 12A. Illinois Technical Reference Manual (2015-2016)
 12B. Michigan Energy Measures Database (MEMD) accessed at <http://www.michigan.gov/mpsc/0,4639,7-159-52495_55129---,00.html>
 12C. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
13. 3% efficiency improvement for boiler outdoor air reset based on Michaels Energy literature review. Sources included (but not limited to):
 13A. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
 13B. NEEP Mid-Atlantic TRM. V5. >http://www.neep.org/sites/default/files/resources/Mid-Atlantic_TRM_V5_FINAL_5-26-2015.pdf>
14. 1% efficiency improvement for stack dampers based on Michaels Energy literature review. Sources included (but not limited to):

 14A. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
 14B. Illinois Technical Reference Manual (2015-2016)
 14C. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>

15. 3% efficiency improvement for modulating boiler controls based on Michaels Energy literature review. Sources included (but not limited to):
 15A. Illinois Technical Reference Manual (2015-2016)
 15B. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>

16. 2% efficiency improvement for O2 trim control based on Michaels Energy literature review. Sources included (but not limited to):
 16A. Illinois Technical Reference Manual (2015-2016)
 16B. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>
17. 80% boiler efficiency assumed based on minimum boiler efficiency from IECC 2015.

18. California DEER Database, 2014 (value used is for remaining useful life of commercial high efficiency furnaces)
19. AHRI Directory of Certified Product Performance; average of Standby Loss in BTUH per gallon of storage calculated for units with 80% or less thermal
20. Leakage data from Energy Management Handbook, by Wayne Turner
21. Measure life from the Federal Energy Management Program (FEMP).
22. The average baseline and high efficiency costs are based on the California DEER database.
23. Cost information supplied by Engineered Products

24. Material costs taken from zoro.com for fiberglass pipe insulation (February 2016)

25. Commercial Condensing Boiler Optimization. Center for Energy and Environment. Prepared for Minnesota Department of Commerse, Division of Energy Resources. 2015.
26. AHRI Directory of Certified Product Performance; average of Standby Loss in BTUH per gallon of storage calculated for units with 80% or less thermal

27. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant.
28. MN Bin Temp Bin Hrs are taken from the "Thermal Environmental Engineering, Third Edition, Thomas H. Kuehn, James W. Ramsey and James L.
29. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant.
30. Baseline and Energy Efficient equipment costs provided by vendors
31. Minnesota DER Deemed Values
32. Bradford White RightSpec® commercial water heater sizing software
33. Bosch tankless water heater sizing software
34. Commercial Buildings Energy Consumption Study (CBECS), 2006
35. 2008 DEER Effective Useful Life Summary October 1st 2008
36. 2007 ASHRAE HVAC Applications Handbook Chapter 36, page 36.3, Table 4

37. 2006 IECC
38. "Electricity Savings from Variable-Speed Furnaces in Cold Climates" Pigg, Scott and Talerico, Tom. ACEEE Summer Study Proceedings 2004
39. U.S. Department of Energy, Preliminary Analysis Report, 2012
40. http://www.grainger.com
41. Wisconsin Focus on Energy, ECM Furnace Fan Impact Evaluation Report,
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43. Illinois 2017 TRM ; http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-

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45. Source BTU for electricity based on MN DOC No. G008/CIP-00-864.07 Reply Comments of May 23, 2003 which states a Source BTU comparison must be
46. Wisconsin Focus on Energy 2019 TRM
47. Historical program participation
48. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs version 4.0, active 1/1/2024
49. Custom DCV Projects, 2010-2011
50. MN Lighting Efficiency Tech Assumption , Tab "Forcast Market Segment".
51. 2011 Tetratech Program Evaluation
52. Illinois Technical Reference Manual (2019-2020)
<https://www.ilsag.info/technical-reference-manual/il_trm_version_8/>

Changes from Recent Filing:

EFLH for space heating adjusted to reflect the MN TRM

12.17 Programmable Thermostats

Algorithms

$$Customer\ Dth = Baseline\ Dth\ \times SF_{Heat}$$

$$Customer\ kWh_{Heating} = \ Heating\ kW\ \ \times SF_{Heat} \times\ Heating\ Hours$$

$$Customer\ kWh_{Cooling} = Cooling\ kW\ Annual\ \times SF_{Cool} \times Cooling\ Hours$$

$$Customer\ kWh = Customer\ kWh_{Heating} + Customer\ kWh_{Cooling}$$

$$Customer\ kW\ = Cooling\ kW \times SF_{Cool}$$

$$Customer\ Coincident\ kW\ = Customer\ kW \times CF$$

Variables

SF_{Heat}	3.0%	Heating runtime reduction for commercial and industrial programmable thermostats (Reference 1)
SF_{Cool}	1.3%	Cooling runtime reduction for commercial and industrial programmable thermostats (Reference 1)
Cooling_kW	6.426	Average kW for cooling at full load
Cooling_kW_Annual	5.653	Average kW for cooling using seasonal efficiency
Cooling Hours	654	Annual cooling hours
Heating kW	5.339	Average kW for electric heating
Heating Hours	1,662	Annual heating hours
Baseline Dth	128.0	Baseline heating load per thermostat in Dth
CF	0%	Coincidence factor for programmable thermostats (Reference 3)
Measure Life	8	Measure life for programmable thermostat (Reference 3)
Incremental Cost	See Table 12.17.1	Incremental cost of programmable thermostat

Table 12.17.1 Deemed Incremental Costs

Program	Cost per Thermostat
Multi-Family Building Efficiency - MN	$35.00
Low Income Multi-Family Building Efficiency - MN	$35.00
Nonprofit Energy Savings Program - MN	$35.00

References:

1. Commercial and Industrial Programmable Thermostats, Navigant Energy, June 16, 2015
2. Xcel Energy, October 2019. Commercial Smart Thermostat Demand Response Study
3. Minnesota Technical Resource Manual ver 4.0

Changes from Recent Filing:

New Product

Table 12.1.0 Measure Lives

Hot Water Boilers (Non Condensing)	Product Life (yrs)	Source of Information
Hot Water Boiler - Non-condensing 175 MBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 500 MBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 1MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 2 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 4 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 6 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 8, MMBTUH	20	Reference 3
Hot Water Boilers (Condensing)		
Hot Water Boiler - Condensing 175 MBTUH	20	Reference 3
Hot Water Boiler - Condensing 500 MBTUH	20	Reference 3
Hot Water Boiler - Condensing 1 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 2 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 4 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 6 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 8 MMBTUH	20	Reference 3
Low Pressure Steam Boilers		
Low Pressure Steam Boiler - 300 MBTUH	20	Reference 3
Low Pressure Steam Boiler - 1 MMBTUH	20	Reference 3
Low Pressure Steam Boiler - 10 MMBTUH	20	Reference 3
High Pressure Steam Boilers		
High Pressure Steam Boiler - 300 MBTUH	20	Reference 3
High Pressure Steam Boiler - 1 MMBTUH	20	Reference 3
High Pressure Steam Boiler - 10 MMBTUH	20	Reference 3
Boiler Tune up		
Gas Boiler condensing or non-condensing	2	D.O.E
Outdoor Air Reset		
Gas Boiler condensing or non-condensing	5	Reference 48
Stack Dampers		
Gas Boiler condensing or non-condensing	5	Reference 48
Linkageless Controls		
Gas Boiler condensing or non-condensing	16	Reference 43
Modulating Burners		
Gas Boiler condensing or non-condensing	15	Reference 48
Turbulators		
Gas Boiler condensing or non-condensing	20	Reference 3
O2 Trim Control		
Gas Boiler condensing or non-condensing	5	Reference 48
Water Heaters		
Storage Water Heater	15	Reference 35
Tankless Water Heater	20	Reference 35
Steam Traps		
Gas Boiler - Steam Traps - Low and High Pressure	5	Reference 4
Pipe Insulation		
Insulation - Hot Water System	13	Reference 51
Insulation - Steam System	13	Reference 51
Heating System Optimization Study		
Heating System Optimization Study	0	
Implementation - Boiler measures	7	Past Recommissioning projects
Implementation - Steam System measures	7	Past Recommissioning projects
Implementation - Heat Recovery measures	7	Past Recommissioning projects
High Efficiency Furnace	20	Reference 48
Unit Heaters		
Unit Heaters - Non-Condensing	20	
Unit Heaters - Condensing	20	
Unit Heaters - Infrared	15	
Destratification Fans	15	Reference 48

Table12.2.0 Heating Equipment Efficiencies

	Baseline Efficiency (EFFb)	Efficient Efficiency (EFFh)	Unit	Reference
New Boilers (Non-Condensing) <300,000 BTU/h 2012 IECC	82.0%	85.0%*	AFUE	Ref. 11
New Boilers (Non-Condensing) >= 300,000 BTU/h and <=2,500,000 BTU/h	80.0%	85.0%*	Et (Thermal Eff)	Ref. 11
New Boilers (Non-Condensing) >2,500,000 BTU/h	82.0%	85.0%*	Ec (Combustion Eff)	Ref. 11
New Boilers (Condensing) <300,000 BTU/h	82.0%	88.0%*	AFUE	Ref. 48
New Boilers (Condensing) >= 300,000 BTU/h and <=2,500,000 BTU/h	80.0%	88.0%*	Et (Thermal Eff)	Ref. 48
New Boilers (Condensing) >2,500,000 BTU/h	82.0%	88.0%*	Ec (Combustion Eff)	Ref. 48
Retrofit Boilers <300,000 BTU/h	78.0%	88.0%*	AFUE	Ref. 48
Retrofit Boilers >=300,000 BTU/h and <=2,500,000 BTU/h	78.0%	88.0%*	Et (Thermal Eff)	Ref. 48
Retrofit Boilers >2,500,000 BTU/h	78.0%	88.0%*	Ec (Combustion Eff)	Ref. 48
Low Pressure Steam Boilers <300,000 BTU/h	80% **	81.0%*	Et (Thermal Eff)	
Low Pressure Steam Boilers >=300,000 BTU/h	79% **	81.0%*	Et (Thermal Eff)	Ref. 6
High Pressure Steam Boilers <300,000 BTU/h	80% **	81.0%*	Et (Thermal Eff)	
High Pressure Steam Boilers >=300,000 BTU/h	79% **	81.0%*	Et (Thermal Eff)	Ref. 6
Boiler Tune Up (Non-Condensing)	78.24%	80.0%		Ref. 12
Boiler Tune Up (Condensing)	87.2%	88.0%		Ref. 21
Outdoor Air Reset	80.0%	83.16%		Ref. 13
Stack Dampers	80.0%	84.2%		Ref. 14
Modulating Burner Controls	80.0%	83.00%		Ref. 15
O2 Trim Control	80.0%	81.1%		Ref. 16
Steam Traps	80.0%	N/A		Ref. 17
Turbulators	80.0%	82.47%		
Linkageless Controls	80.0%	83.0%		Ref. 42
Commercial Furnaces < 225,000 BTUH input	78.0%	92.0%*	AFUE	Ref. 3
Commercial Furnaces >= 225,000 BTUH input	80.0%	92.0%*	Et (Thermal Eff)	Ref. 3
Water Heaters	80.0%	92.0%*		Ref. 18
Unit Heater (Non-condensing)	80.0%	83.0%*		Ref. 3
Unit Heater (Condensing)	80.0%	90.0%*		Ref. 3
Pipe Insulation - GWH	80.0%	N/A		Ref 17
Pipe Insulation - EWH	100.0%	N/A		

* High efficiency boiler and furnace efficiencies are per customer. Listed efficiencies are minimum qualifying efficiencies.
** All steam boilers are assumed to be forced draft

Table 12.3.0 Effective Full Load Heating Hours (Ref 28, 47, 48)

Equipment	Use	Hours	Explanation
Boiler	Space Heating Only	1,832	Based on MN TRM Table of EFLH weighted average calculated from historical participation
	Domestic Hot Water Only	2,187	Based on Bin Analysis assuming Constant 25% load and 30% oversizing
	Space Heating and Domestic Hot Water	2,307	Based on Bin Analysis assuming constant 15% load and 30% oversizing for the DHW and TRM values for space heating
Furnace	All	849	Based on Bin Analysis assuming 15% oversize factor

13.1 Lighting Controls

Algorithms

$$Customer\ kW = kW\ Connected \times \%\ Savings \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = kW\ Connected \times \%\ Savings \times Hours \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = kW\ Connected \times \%Savings \times Cooling\ kW\ Savings\ Factor \times CF$$

$$Natural\ Gas\ Savings\ (Dth) = kW\ Connected \times \%\ Savings \times Hours \times Heating\ Penalty\ Factor$$

Variables

Cooling_kW_Savings_Factor	See Table 13.1.0	Cooling system secondary demand savings factor resulting from efficient lighting. Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Cooling_kWh_Savings_Factor	See Table 13.1.0	Cooling system secondary energy savings factor resulting from efficient lighting. Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Heating_Penalty_Factor	See Table 13.1.0	Heating system secondary energy penalty factor resulting from efficient lighting. Reduction in lighting demand results in an increase in heating usage, if the customer has gas heating. Existence of gas heating to be determined by HVAC_Type.
CF	See Table 13.3.0	Coincidence Factor is the probability that the peak demand of the lights will coincide with the peak utility system demand, determined by Facility_Type.
Hours	See Table 13.3.0	Annual operating hours, determined by Facility_Type.
% Savings	See Table 13.1.1	Stipulated savings percentage based on control type.
Measure Life	See Table 13.2.0	Length of time the lighting equipment will be operational.
NTG	100%	Net-to-gross.

Customer Inputs	M&V Verified	
HVAC_Type	Yes	Type of heating or cooling, verified during M&V.
Facility_Type	No	Type of facility.
kW_Connected	Yes	Total connected fixture load connected to lighting controls, provided by customer and verified during M&V.

Table 13.1.1 Lighting Controls [4, 5, 24 & 25]

Control Type	% Savings	Full Cost Per Watt
Standalone or Integrated LLLC - Occupancy Sensor	24%	$0.49
Standalone or Integrated LLLC - Daylighting (Photocell) Sensor	28%	$0.49
Standalone or Integrated LLLC - Occupancy and Daylighting (Photocell) Sensor	38%	$0.49
Networked Lighting Controls (w & w/o LLLC)	49%	$0.72
Integrated LLLC - High End Trim	29%	$0.48

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting and HVAC interactions".
2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).
3. State of Minnesota Techncial Reference Manual, Version 4.0 Final Technical Version as of January 31st, 2023. Effective January 1st, 2024. (Hours and CF)
4. Design Lights Consortium. (2017). Energy Savings from Networked Lighting Control (NLC) Systems. Medford: Design Lights Consortium. Retrieved 1 23, 2020, from https://www.designlights.org/lighting-
5. Lawrence Berkeley National Laboratory. (2011). A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings. Berkeley, CA: Lawrence Berkeley National Laboratory. Retrieved 10 01,
6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)
7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com, LightingAtlanta.org, 1000bulbs.com,
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive Factors, Hours and CF.
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/eisa_2007.pdf
13. Adoption of Light-Emitting Diodes in Common Lighting Applications. Prepared for the U.S. Department Of Energy by Navigant Consulting. April 2013.
14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
15. ENERGY STAR ® Integral LED Product Qualifications Requirements. 2010.
16. Caliper Benchmark Report - Performance of Halogen Incandescent MR 16 Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
17. Incandescent Reflector Lamps minimum efficacy standards. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58
18. ENERGY STAR ® Certified Light Bulbs and Light Fixtures Qualified Products Lists. Accessed July 2018.
19. Actual sales data from distributors from 2017-2018. (Baseline Distributor Costs)
20. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
21. Compared lumen equivalency data in the CO Lighting Efficiency downstream program from 2018 and 2019 to identify the baseline equivalency factors for the lamps.
22. "What is a ballast factor, and how does it affect my fluorescent tubes?". July 7, 2016. https://insights.regencylighting.com/what-is-a-ballast-factor-and-how-does-it-affect-my-fluorescent-tubes
23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf
24. Design Lights Consortium. Energy Savings from Networked Lighting Control (NLC) Systems with and without LLLC. Sept 24, 2020. https://www.designlights.org/resources/reports/report-energy-savings-from-networked-lighting-control-nlc-systems-with-and-without-lllc/
25. NEEA. 2022 Luminaire Level Lighting Controls Incremental Cost Study. https://neea.org/img/documents/2022-Luminaire-Level-Lighting-Controls-Incremental-Cost-Study.pdf

Changes from Recent Filing:

Updated NLC measure incremental cost to reflect new value from NEEA 2022 report

13.2 Lighting Retrofit

Algorithms

$$Customer\ kW = (kW\ Exist - kW\ Prop) \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = (kW\ Exist - kW\ Prop) \times Hours\ \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = (kW\ Exist - kW\ Prop) \times Cooling\ kW\ Savings\ Factor \times CF$$

$$kW\ Exist = QTY\ Existing\ Equip \times Existing\ Model\ kW$$

$$kW\ Prop = QTY\ Prop\ Equip \times Equipment\ Model\ kW$$

$$Natural\ Gas\ Savings\ (Dth) = (kW\ Exist - kW\ Prop) \times Hours \times Heating\ Penalty\ Factor$$

Variables

Cooling_kW_Savings_Factor	See Table 13.1.0	Cooling system secondary demand savings factor resulting from efficient lighting. Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Cooling_kWh_Savings_Factor	See Table 13.1.0	Cooling system secondary energy savings factor resulting from efficient lighting. Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Heating_Penalty_Factor	See Table 13.1.0	Heating system secondary energy penalty factor resulting from efficient lighting. Reduction in lighting demand results in an increase in heating usage, if the customer has gas heating. Existence of gas heating to be determined by HVAC_Type.
CF	See Table 13.3.0	Coincidence Factor is the probability that the peak demand of the lights will coincide with the peak utility system demand, determined by Facility_Type.
Hours	See Table 13.3.0	Annual operating hours, determined by Facility_Type.
Measure Life	See Table 13.2.0	Length of time the lighting equipment will be operational.
NTG	100%	Net-to-gross.

Customer Inputs	M&V Verified	
Qty_Existing_Equip	No	Quantity of existing equipment, verified during M&V.
Qty_Prop_Equip	Yes	Quantity of proposed equipment, verified during M&V.
HVAC_Type	Yes	Type of heating or cooling, verified during M&V.
Facility_Type	No	Type of facility.
Existing_Model_kW	No	Existing equipment wattage determined from stipulated fixture or lamp wattage. Specific lighting product provided by customer and verified during M&V.
Equipment_Model_kW	Yes	Proposed equipment wattage of fixture or lamp. Specific lighting product provided by customer and verified during M&V.
Baseline Cost	No	Cost of the baseline technology. For Retrofit, the cost is $0.00 since the baseline is to continue to operate the existing system. For New Construction, the cost is that of the lower efficiency option. Costs are determined through market research and provided by vendors.
High Efficiency Cost	No	Cost of the High Efficiency technology. [9] Equipment and Labor costs are also collected on a per measure basis, data is used to evaluate and identify the need to update costs as needed throughout the year to account for the rapidly evolving market.

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting
2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).
3. State of Minnesota Techncial Reference Manual, Version 4.0 Final Technical Version as of January 31st, 2023. Effective January 1st, 2024. (Hours and CF)
4. Design Lights Consortium. (2017). Energy Savings from Networked Lighting Control (NLC) Systems. Medford: Design Lights Consortium. Retrieved 1 23, 2020,
5. Lawrence Berkeley National Laboratory. (2011). A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings. Berkeley, CA: Lawrence
6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)
7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com,
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007.
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14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November,
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19. Actual sales data from distributors from 2017-2018. (Baseline Distributor Costs)
20. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
21. Compared lumen equivalency data in the CO Lighting Efficiency downstream program from 2018 and 2019 to identify the baseline equivalency factors for the
22. "What is a ballast factor, and how does it affect my fluorescent tubes?". July 7, 2016. https://insights.regencylighting.com/what-is-a-ballast-factor-and-how-does-
23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf

Changes from Recent Filing:

13.3 Lighting Midstream

Algorithms

$$Customer\ kW = Quantity \times \frac{Watts\ Base - Watts\ EE}{1000} \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = Quantity \times \frac{Watts\ Base - Watts\ EE}{1000} \times Hours \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = Quantity \times \frac{Watts\ Base - Watts\ EE}{1000} \times Cooling\ kW\ Savings\ Factor \times CF$$

$$LPW\ EE = (Lumens\ EE)/(Watts\ EE)$$

$$Watts\ Base = Watts\ EE \times \frac{LPW\ EE}{LPW\ Base}$$

$$Natural\ Gas\ Savings\ (Dth) = Quantity \times \frac{Watts\ Base - Watts\ EE}{1000} \times Hours \times Heating\ Penalty\ Factor$$

Applies to: LED Linear Lamps - Type B & C, LED PL/G based CFL Replacement lamp - Type B, LED Screw-in Lamps - HID Replacement

$$Watts\ Base = Watts\ EE \times \frac{LPW\ EE}{LPW\ Base \times Baseline\ Equivelancy\ Factor \times Ballast\ Factor}$$

*Rest of the equations are the same as the first table

Applies to: LED Linear Lamps - Type A, LED PL/G based CFL Replacement lamp - Type A

$$Customer\ kW = Quantity \times \frac{Watts\ Base - Sys\ Watts\ EE}{1000} \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = Quantity \times \frac{Watts\ Base - Sys\ Watts\ EE}{1000} \times Hours \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = Quantity \times \frac{Watts\ Base - Sys\ Watts\ EE}{1000} \times Cooling\ kW\ Savings\ Factor \times CF$$

$$Watts\ Base = Watts\ EE \times \frac{LPW\ EE}{LPW\ Base \times Baseline\ Equivelancy\ Factor \times Ballast\ Factor}$$

$$Sys\ Watts\ EE = (Watts\ EE)/(Ballast\ Efficiency)$$

Variables

LPW_Base	See Table 13.3.1	Efficacy of the baseline technology (lumens per watt).
Cooling_kW_Savings_Factor	1.25	Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. The program will not have direct access to market segment information, so a deemed weighted average was created based on a three year history of downstream participation. [1, 2]
Cooling_kWh_Savings_Factor	1.08	Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning. The program will not have direct access to market segment information, so a deemed weighted average was created based on a three year history of downstream participation. [1, 2]
Heating_Penalty_Factor	-0.000683	Reduction in lighting energy results in an increase in heating usage, if the customer has gas heating (Dth/kWh). [2]
CF	78%	Coincidence Factor is the probability that the peak demand of the lights will coincide with peak utility system demand. The program will not have direct access to market segment information, so a deemed weighted average was created based on a three year history of downstream participation. [1, 2]
Hours	5,119	Annual operating hours. The program will not have direct access to market segment information, so a deemed weighted average based on a three year history of downstream participation was created. [1, 2]
Ballast_Factor	88%	Ballast factor is the measured ability of a fluorescent ballast to produce light from the lamp(s) it powers. In addition to the effect on light output, there is also an indirect impact on energy consumption. A normal ballast factor is assumed here. [16]
Ballast_Efficiency	85%	There is an inefficiency when an LED lamp is running off of a ballast, which adds additional wattage to the nominal lamp wattage. Ballast efficiency may also be referred to as power factor in general terms. Power factor is the fraction of power actually used by the ballast compared to the total power supplied. The ballast efficiency accounts for this inefficiency. [17]
Baseline_Equivalency_Factor	See Table 13.3.2	Accounts for differences in luminaire efficiency (ratio of light emitted by the fixture to the lumen output of the lamp-ballast system alone), lumen depreciation over time, and overdesigned spaces.
Measure Life	See Table 13.3.3	Length of time the lighting equipment will be operational, equals the lifetime hours of the lamp divided by the deemed hours of use.
Baseline Cost	See Table 13.3.4	Cost of the baseline technology.
Labor Cost	See Table 13.3.5	Cost of labor to install the Type B and Type C lamps. [1]
NTG	92%	Net-to-gross factor. [3]

Customer Inputs	M&V Verified	
Quantity	No	Quantity of lamps or retrofit kits.
Measure Category	No	Type of lamp or retrofit kit.
Watts_EE	No	High efficiency lamp wattage. This is defined by the manufacturer and maintained and reported by the distributor.
Lumens_EE	No	High efficiency lamp rated brightness (lumens). This is defined by the manufacturer and maintained and reported by the distributor.
High Efficiency Cost	No	Cost of the high efficiency technology. Costs will be collected from the equipment distributor on the product invoice.

Table 13.3.1 Baseline Lamp Efficacy based on Lamp Category 12 - 17, 24

Measure Category	Avg. Efficacy
A Lamp rated for 310 - 749 Lumens	45.00
A Lamp rated for 750 - 1049 Lumens	45.00
A Lamp rated for 1050 - 1489 Lumens	45.00
A Lamp rated for 1490 - 2600 Lumens	45.00
General Directional (PAR, BR, R)	45.00
Multifaceted Reflector (MR16)	13.00
Decorative (B, BA, Candle, Globe)	10.45
Downlight Retrofit Kit	24.39
Fluorescent Linear Lamps	88.70
PL/G based CFL lamp	69.30
HID Screw-in Lamp	83.20

Table 13.3.2 Baseline Equivalency Factor (BEF) 21

Measure Category	BEF
LED Linear Lamps - Type A	0.70
LED Linear Lamps - Type B, C	0.87
LED PL/G based CFL Replacement Lamp	0.52
LED Screw-in Lamps, HID Replacement	0.62

Table 13.3.3 Measure Lifetimes in Years [8, 18, 20]

Measure Category	Lifetime
LED Interior Lamp - A Lamp	4.2
General Directional (PAR, BR, R)	4.9
Multifaceted Reflector (MR16)	4.9
Decorative (B, BA, Candle, Globe)	3.6
Downlight Retrofit Kit	8.9
LED Linear Lamps - Type A	10.6
LED Linear Lamps - Type B	10.2
LED Linear Lamps - Type C	20.0
LED PL/G based CFL Replacement lamp	10.7
LED Screw-in Lamps, HID Replacement	8.5

Table 13.3.4 Baseline Costs 19

Measure Category	Baseline Cost
A19 0-1049 lm	$1.45
A19 1490-5000 lm	$2.42
Decorative (Candle/Globe)	$3.88
BR30	$3.68
BR40	$4.03
MR16	$4.68
PAR16	$6.25
PAR20	$6.95
R20	$2.60
PAR30	$6.66
PAR38	$7.43
Downlight Retrofit Kit	$3.86
LED Linear Lamps - Type A	$2.21
LED Linear Lamps - Type B	$2.51
LED Linear Lamps - Type C	$2.51
LED PL/G based CFL Replacement lamp	$5.66
LED Screw-in Lamps, HID Replacement	$32.06

Table 13.3.5 Labor Costs10

Measure Category	Labor Cost
LED Linear Lamps - Type B	$8.00
LED Linear Lamps - Type C	$12.00
LED PL/G based CFL Replacement Lamp - Type B	$12.00
LED Screw-in Lamps, HID Replacement	$55.00

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting and HVAC interactions".
2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).
3. State of Minnesota Techncial Reference Manual, Version 4.0 Final Technical Version as of January 31st, 2023. Effective January 1st, 2024. (Hours and CF)
4. Design Lights Consortium. (2017). Energy Savings from Networked Lighting Control (NLC) Systems. Medford: Design Lights Consortium. Retrieved 1 23, 2020, from https://www.designlights.org/lighting-
5. Lawrence Berkeley National Laboratory. (2011). A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings. Berkeley, CA: Lawrence Berkeley National Laboratory. Retrieved 10 01,
6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)
7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com, LightingAtlanta.org, 1000bulbs.com,
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive Factors, Hours and CF.
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/eisa_2007.pdf
13. Adoption of Light-Emitting Diodes in Common Lighting Applications. Prepared for the U.S. Department Of Energy by Navigant Consulting. April 2013.
14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
15. ENERGY STAR ® Integral LED Product Qualifications Requirements. 2010.
16. Caliper Benchmark Report - Performance of Halogen Incandescent MR 16 Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
17. Incandescent Reflector Lamps minimum efficacy standards. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58
18. ENERGY STAR ® Certified Light Bulbs and Light Fixtures Qualified Products Lists. Accessed July 2018.
19. Actual sales data from distributors from 2017-2018. (Baseline Distributor Costs)
20. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
21. Compared lumen equivalency data in the CO Lighting Efficiency downstream program from 2018 and 2019 to identify the baseline equivalency factors for the lamps.
22. "What is a ballast factor, and how does it affect my fluorescent tubes?". July 7, 2016. https://insights.regencylighting.com/what-is-a-ballast-factor-and-how-does-it-affect-my-fluorescent-tubes
23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf
24. Department of Energy, Energy Conservation Program: Energy Conservation Standards for General Service Lamps. https://www.govinfo.gov/content/pkg/FR-2022-05-09/pdf/2022-09477.pdf

Changes from Recent Filing:

Updated GSL baseline lamp efficacies to 45 lm/W standard via EISA ruling

13.4 Lighting New Construction

Algorithms

$$Customer\ kW = (kW\ Exist - kW\ Prop) \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = (kW\ Exist - kW\ Prop) \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = (kW\ Exist - kW\ Prop) \times Hours \times Cooling\ kW\ Savings\ Factor \times CF$$

$$kW\ Exist = QTY\ Existing\ Equip \times Existing\ Model\ kW$$

$$kW\ Prop = QTY\ Prop\ Equip \times Equipment\ Model\ kW$$

$$Natural\ Gas\ Savings\ (Dth) = (kW\ Exist - kW\ Prop) \times Hours \times Heating\ Penalty\ Factor$$

Variables

Cooling_kW_Savings_Factor	See Table 13.1.0	Cooling system secondary demand savings factor resulting from efficient lighting. Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Cooling_kWh_Savings_Factor	See Table 13.1.0	Cooling system secondary energy savings factor resulting from efficient lighting. Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Heating_Penalty_Factor	See Table 13.1.0	Heating system secondary energy penalty factor resulting from efficient lighting. Reduction in lighting demand results in an increase in heating usage, if the customer has gas heating. Existence of gas heating to be determined by HVAC_Type.
CF	See Table 13.3.0	Coincidence Factor is the probability that the peak demand of the lights will coincide with the peak utility system demand, determined by Facility_Type.
Hours	See Table 13.3.0	Annual operating hours, determined by Facility_Type.
Measure Life	See Table 13.2.0	Length of time the lighting equipment will be operational.
NTG	100%	Net-to-gross.

Customer Inputs	M&V Verified	
Qty_Prop_Equip	Yes	Quantity of proposed equipment, verified during M&V.
HVAC_Type	Yes	Type of heating or cooling, verified during M&V.
Existing_Model_kW	No	Existing equipment wattage determined from stipulated fixture or lamp wattage. Specific lighting product provided by customer and verified during M&V.
Equipment_Model_kW	Yes	Proposed equipment wattage of fixture or lamp. Specific lighting product provided by customer and verified during M&V.
Baseline Cost	No	For New Construction, the cost is that of the lower efficiency option. Costs are determined through market research and provided by vendors.
High Efficiency Cost	No	Cost of the High Efficiency technology. [9] Equipment and Labor costs are also collected on a per measure basis, data is used to evaluate and identify the need to update costs as needed throughout the year to account for the rapidly evolving market.

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting and HVAC interactions".
2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).
3. State of Minnesota Techncial Reference Manual, Version 4.0 Final Technical Version as of January 31st, 2023. Effective January 1st, 2024. (Hours and CF)
4. Design Lights Consortium. (2017). Energy Savings from Networked Lighting Control (NLC) Systems. Medford: Design Lights Consortium. Retrieved 1 23, 2020, from
5. Lawrence Berkeley National Laboratory. (2011). A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings. Berkeley, CA: Lawrence Berkeley National Laboratory.
6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)
7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com, LightingAtlanta.org,
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive Factors, Hours and CF.
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/eisa_2007.pdf
13. Adoption of Light-Emitting Diodes in Common Lighting Applications. Prepared for the U.S. Department Of Energy by Navigant Consulting. April 2013.
14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
15. ENERGY STAR ® Integral LED Product Qualifications Requirements. 2010.
16. Caliper Benchmark Report - Performance of Halogen Incandescent MR 16 Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
17. Incandescent Reflector Lamps minimum efficacy standards. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58
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23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf

Changes from Recent Filing:

13.5 Lighting DI

Algorithms

$$Customer\ kW = (kW\ Exist - kW\ Prop) \times Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = (kW\ Exist - kW\ Prop) \times Cooling\ kWh\ Savings\ Factor$$

$$Customer\ PCkW = (kW\ Exist - kW\ Prop) \times Hours \times Cooling\ kW\ Savings\ Factor \times CF$$

$$kW\ Exist = QTY\ Existing\ Equip \times Existing\ Model\ kW$$

$$kW\ Prop = QTY\ Prop\ Equip \times Equipment\ Model\ kW$$

$$Natural\ Gas\ Savings\ (Dth) = (kW\ Exist - kW\ Prop) \times Hours \times Heating\ Penalty\ Factor$$

Variables

Cooling_kW_Savings_Factor	See Table 13.1.0	Cooling system secondary demand savings factor resulting from efficient lighting. Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Cooling_kWh_Savings_Factor	See Table 13.1.0	Cooling system secondary energy savings factor resulting from efficient lighting. Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning. Existence of air conditioning determined by HVAC_Type.
Heating_Penalty_Factor	See Table 13.1.0	Heating system secondary energy penalty factor resulting from efficient lighting. Reduction in lighting demand results in an increase in heating usage, if the customer has gas heating. Existence of gas heating to be determined by HVAC_Type.
CF	See Table 13.5.1	Coincidence Factor is the probability that the peak demand of the lights will coincide with the peak utility system demand, determined by Facility_Type.
Hours	See Table 13.5.1	Annual operating hours, determined by Facility_Type.
Measure Life	25,000	Lifetime of lamps installed through the program in hours. Spec sheets provided by vendor
High Efficiency Cost	See Table 13.5.2	Deemed cost per proposed lamp
NTG	100%	Net-to-gross.

Customer Inputs	M&V Verified	
Qty_Existing_Equip	Yes	Quantity of existing equipment, verified during M&V.
Qty_Prop_Equip	Yes	Quantity of proposed equipment, verified during M&V.
HVAC_Type	Yes	Type of heating or cooling, verified during M&V.
Facility_Type	No	Type of facility.
Existing_Model_kW	Yes	Existing equipment wattage determined from stipulated fixture or lamp wattage. Specific lighting product provided by customer and verified during M&V.
Equipment_Model_kW	Yes	Proposed equipment wattage of fixture or lamp. Specific lighting product provided by customer and verified during M&V.
Baseline Cost	No	Cost of the baseline technology. For Retrofit, the cost is $0.00 since the baseline is to continue to operate the existing system. For New Construction, the cost is that of the lower efficiency option. Costs are determined through market research and provided by vendors.

Table 13.5.1 Multi Family Common-Area Space Type 3	Hours	CF
Hallway	8,760	100%
Stairway	8,760	100%
Lobby/Atrium	5,950	75%
Management Office	5,950	75%
Laundry Room	5,950	75%
Community/Event Room	5,950	75%
Fitness Area	5,950	75%
Storage Area	5,950	75%
Mechanical Rooms	5,950	75%
Safety or Code Required	8,760	100%
Pool/Spa Area	5,950	75%
Parking Lot/Exterior	4,380	0%

Table 13.5.2 Multi Family Lamp Costs	$/Lamp
Multi-Family LED (10W PAR30)	$9.00
Multi-Family LED (11W BR30)	$6.75
Multi-Family LED (11W PAR30)	$9.00
Multi-Family LED (15W A21)	$9.00
Multi-Family LED (15W PAR38)	$10.00
Multi-Family LED (5W Candelabra)	$5.25
Multi-Family LED (6W Globe)	$5.50
Multi-Family LED (9W A19)	$4.80
Nonprofit LED (10W PAR30)	$9.00
Nonprofit LED (11W BR30)	$6.75
Nonprofit LED (11W PAR30)	$9.00
Nonprofit LED (15W A21)	$9.00
Nonprofit LED (15W PAR38)	$10.00
Nonprofit LED (5W Candelabra)	$5.25
Nonprofit LED (6W Globe)	$5.50
Nonprofit LED (9W A19)	$4.80
Multi-Family Linear LED (9W-2ft-T8-Type A)	$6.50
Multi-Family Linear LED (14W-4ft-T8-Type A)	$13.00
Nonprofit Linear LED (9W-2ft-T8-Type A)	$6.50
Nonprofit Linear LED (14W-4ft-T8-Type A)	$13.00

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting and HVAC interactions".
2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).
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6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)
7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com, LightingAtlanta.org, 1000bulbs.com,
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive Factors, Hours and CF.
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/eisa_2007.pdf
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14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
15. ENERGY STAR ® Integral LED Product Qualifications Requirements. 2010.
16. Caliper Benchmark Report - Performance of Halogen Incandescent MR 16 Lamps and LED Replacements. U.S. Department of Energy. November, 2008.
17. Incandescent Reflector Lamps minimum efficacy standards. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58
18. ENERGY STAR ® Certified Light Bulbs and Light Fixtures Qualified Products Lists. Accessed July 2018.
19. Actual sales data from distributors from 2017-2018. (Baseline Distributor Costs)
20. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
21. Compared lumen equivalency data in the CO Lighting Efficiency downstream program from 2018 and 2019 to identify the baseline equivalency factors for the lamps.
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23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf

Changes from Recent Filing:

13.6 Grow Lighting

Algorithms

$$Customer\ kW = \left(\left(\frac{Proposed\ Fixture\ kW\ * Proposed\ Quantity\ *\ \%Reflector\ Eff_{prop}\ *\ Proposed\ PPE}{\%Reflector\ Eff_{base} * Baseline\ PPE}\right) - Proposed\ Quantity * Proposed\ Fixture\ kW\right) * Cooling\ kW\ Savings\ Factor$$

$$Customer\ kWh = \left(\left(\frac{Proposed\ Fixture\ kW\ * Proposed\ Quantity\ *\ \%Reflector\ Eff_{prop}\ *\ Proposed\ PPE}{\%Reflector\ Eff_{base} * Baseline\ PPE}\right) - Proposed\ Quantity * Proposed\ Fixture\ kW\right) * Hours\ * Cooling\ kWh\ Savings\ Factor$$

$$PCkW = Customer\ kW\ *\ CF$$

Variables

%Reflector Eff_base	78.3%	Accounts for reflector losses and amount of useful light delivered using baseline fixtures [2]
%Reflector Eff_prop	97.2%	Accounts for reflector losses and amount of useful light delivered from LED grow lights [2]
Cooling kW Savings Factor*	1.33	Assuming year round A/C cooling for indoor grow facilities
Cooling kWh Savings Factor*	See Table 13.6.1	Assuming year round A/C cooling for indoor grow facilities
Hours	See Table 13.6.1	Annual Hours of Operation
CF	See Table 13.6.1	Coincidence Factor
Incremental Cost	See Table 13.6.2	Average fixture costs per watt based weighted against total watts from historical custom projects
Baseline PPE	See Table 13.6.3	Average value weighted against historical custom project baseline wattage

** These values assume year round mechanical cooling in all facilities. This is the current standard assumption for custom analysis.*

Customer Inputs	M&V Verified	
Grow Room Type*	Yes	Flower or Veg
Proposed Fixture Quantity	Yes	Number of proposed LED grow fixtures being installed
Proposed Fixture PPE (PPF/W)	Yes	Umols/J from spec sheet or DLC listing
Proposed Fixture kW	Yes	kW per proposed LED fixture
Total Equipment Cost	No	Field only used for data collection to update cost assumptions to match changing market conditions
Total Labor Cost	No	Field only used for data collection to update cost assumptions to match changing market conditions

Table 13.6.1: Operating Schedule [1, 4]

Grow Room Type	Annual Hours*	CF*	Cooling kWh Savings Factor
Cannabis Flower Room	4,255	0.68	1.16
Cannabis Veg Room	6,498	0.89	1.24
Flowering Crops (Tomatoes/Peppers/Flowers)	4,200	0.76	1.21
Vegetative/Propagation Growth/Clone Room	6,300	0.95	1.21
Microgreens	6,300	0.95	1.21

** Cannabis values are calculated averages of custom indoor grow project operating schedules*

Table 13.6.2: Incremental Cost per Watt [1]

Baseline Cost/W*	Proposed Cost/W**
$ 0.27	$ 1.40

** Calculated as average baseline cost per watt from historical custom projects weighted against baseline wattage*
*** Calculated as average proposed cost per watt from historical custom projects weighted against proposed wattage*

Table 13.6.3: Baseline PPF [2]

	PPE	Wtd Avg PPE** [1]
Mogul Based HPS	1.02	1.20
DE HPS	1.7	
CMH	1.46	
Fluorescent*	0.84	

** The reference for this was specific to T8. Due to lack of sources T5 is assumed to be equivalent.*
*** Baseline average PPE calculated from historical projects and baseline equipment distribution.*

References:

1. Historical custom grow lighting projects from 2020. 54 spaces and over 5500 proposed fixtures.
2. LED and HID Horticultural Luminaire Testing Report, Lighting Energy Analysis, Natural Resourced Canada, 2018: https://www.lrc.rpi.edu/programs/energy/pdf/HorticulturalLightingReport-Final.pdf
3. Energy Savings Potential of SSL in Horticultural Applications, US Department of Energy Office of Energy Efficiency and Renewable Energy, December 2017: https://www.energy.gov/sites/prod/files/2017/12/f46/ssl_horticulture_dec2017.pdf
4. State of Illinois Techncial Reference Manual, Version 11.0 Final Technical Version as of September 22nd, 2022. Effective January 1st, 2023.

Changes from Recent Filing:

Added clone room under Veg/Propagation room type via IL TRM
Updated baseline PPE via historical participation

Table 13.1.0: HVAC Interactive Factors [1, 2]

HVAC_Type	Cooling_kWh_ Savings_Factor	Cooling_kW_ Savings_Factor	Heating_Penalty_ Factor (Dth/kWh)
Heating Only	1.00	1.00	-0.000683
Heating and Cooling	1.11	1.33	-0.000683
Cooler Door Retrofit to LED	1.44	1.44	0.00
Freezer Door Retrofit to LED	1.70	1.70	0.00

Table 13.2.0: Measure Lifetimes in Years [6, 7, 8]

Measure	Lifetime
LED Fixtures, Retrofit Kits and LED Linear Lamps - Type C	20.0
Lighting Sensors	8.0
Networked Lighting Controls	15.0
Luminaire Level Lighting Controls	15.0
LED Linear Lamps - Type A	10.2
LED Linear Lamps - Type B	10.1
LED PL/G based CFL Replacement lamp	11.1
LED Screw-in Lamps, HID Replacement	8.5
LED Ref and Frz Screw In Fixture Retrofit	5.0

Table 13.3.0: Coincident Peak Demand Factors and Annual Operating Hours by Facility Type [3]

Facility_Type	CF	Annual Operating Hours
24-Hour Facility	100%	8,760
College	81%	3,540
Cooler Door Retrofit to LED	87%	8,760
Elementary School	71%	2,422
Secondary School	58%	4,311
Freezer Door Retrofit to LED	87%	8,760
Grocery/Retail (Greater than 50,000SF)	90%	5,802
Healthcare Office / Outpatient	75%	5,095
Hospital	75%	6,038
Hotel/Motel	21%	3,044
Manufacturing	92%	5,200
Exterior Lighting	0%	4,380
Office	70%	4,439
Other/Misc.	66%	4,576
Restaurant	80%	3,673
Retail	83%	4,719
Safety or Code Required (Including Exit Signs)	100%	8,760
Warehouse	70%	4,746
Company Owned Street Lights	0%	4,140

References:

1. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, ASHRAE Journal - "Calculating lighting and HVAC interactions".

2. COP values from the Deemed Savings for CO Commercial Refrigeration, 2019-2020. (Cooler and Freezer Door Interactive Factors).

3. State of Minnesota Techncial Reference Manual, Version 4.0 Final Technical Version as of January 31st, 2023. Effective January 1st, 2024. (Hours and CF)

4. Design Lights Consortium. (2017). Energy Savings from Networked Lighting Control (NLC) Systems. Medford: Design Lights Consortium. Retrieved 1 23, 2020, from https://www.designlights.org/lighting-controls/reports-tools-resources/nlc-energy-savings-report/

5. Lawrence Berkeley National Laboratory. (2011). A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings. Berkeley, CA: Lawrence Berkeley National Laboratory. Retrieved 10 01, 2017, from https://eta.lbl.gov/sites/default/files/publications/a_meta-analysis_of_energy_savings_from_lighting_controls_in_commercial_buildings_lbnl-5095e.pdf

6. Measure Life for automatically controlled measures from the Deemed Savings for CO Energy Management Systems, 2019-2020. (NLC Measure Life)

7. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
8. Hours of Use to calculate measure life for lamps was determined using a weighted hours of operation from Xcel Energy 2018/2019 participation.
9. LED baseline and proposed costs come from previous Xcel Energy Custom Lighting Efficiency projects, as well as market research through ShineRetrofits.com, LightingAtlanta.org, 1000bulbs.com, grainger.com, Pro Lighting.com, and more.
10. "Lighting Efficiency - MN" and "Lighting - Small Business" participation data from 2016 through 2018.
11. Deemed Savings for 2021-2023 "Product: Lighting Efficiency - MN" to reference deemed values used to create weighted averages for HVAC Interactive Factors, Hours and CF.
12. Energy Independence and Security Act. United States Congress. Jan 4, 2007. http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/eisa_2007.pdf
13. Adoption of Light-Emitting Diodes in Common Lighting Applications. Prepared for the U.S. Department Of Energy by Navigant Consulting. April 2013. http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/led-adoption-report_2013.pdf
14. Caliper Benchmark Report - Performance of Incandescent A-Type and Decorative Lamps and LED Replacements. U.S. Department of Energy. November, 2008. http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/a-type_benchmark_11-08.pdf
15. ENERGY STAR ® Integral LED Product Qualifications Requirements. 2010.
16. Caliper Benchmark Report - Performance of Halogen Incandescent MR 16 Lamps and LED Replacements. U.S. Department of Energy. November, 2008. http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/mr16_benchmark_11-08.pdf
17. Incandescent Reflector Lamps minimum efficacy standards. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58
18. ENERGY STAR ® Certified Light Bulbs and Light Fixtures Qualified Products Lists. Accessed July 2018.
19. Actual sales data from distributors from 2017-2018. (Baseline Distributor Costs)
20. Design Lights Consortium (2018). Qualified Products List as of February 27, 2018. (Lamp Lifetime Hours)
21. Compared lumen equivalency data in the CO Lighting Efficiency downstream program from 2018 and 2019 to identify the baseline equivalency factors for the lamps.
22. "What is a ballast factor, and how does it affect my fluorescent tubes?". July 7, 2016. https://insights.regencylighting.com/what-is-a-ballast-factor-and-how-does-it-affect-my-fluorescent-tubes
23. Power Factor.https://assets.osram-americas.com/assets/documents/FAQ0056-0605.8d13d344-4cd2-42f2-af91-100b2a1a8a4d.pdf
24. Design Lights Consortium. Energy Savings from Networked Lighting Control (NLC) Systems with and without LLLC. Sept 24, 2020. https://www.designlights.org/resources/reports/report-energy-savings-from-networked-lighting-control-nlc-systems-with-and-without-lllc/
25. NEEA. 2020 Luminaire Level Lighting Controls Incremental Cost Study. https://neea.org/img/documents/2020-LLLC-Incremental-Cost-Study.pdf

14.1 Motors

Algorithms

$$Customer\ kWh = (HP\ x\ LF\_Motors\ x\ Conversion\ x\ \left(\frac{1}{Standard\_Eff} - \frac{1}{High\_Eff}\right)\ x\ Hrs\ x\ Refrigeration\_Factor)$$

$$Customer\ Coincident\ kW = (HP\ x\ LF\_Motors\ x\ Conversion\ x\ \left(\frac{1}{Standard\_Eff} - \frac{1}{High\_Eff}\right)\ x\ CF\ x\ Refrigeration\_Factor)$$

$$Incremental\ Cost\ of\ Enhanced\ Motor =$$
$$(NEMA\ Premium\ Cost + \left(Cost\ per\ Percent\ Efficiency\ Upgrade\ x\ (Proposed\ Efficiency\ - Minimum\ Proposed\ Efficiency)\right))$$

Variables

Hrs	Table 14.1 and Table 14.3	Annual operational hours per year of the motor. Deemed values are used for hours based on the type and end use of the motor. The customer provides the following information on the rebate form: HP, industrial/non-industrial, building type, and compressor/pump/fan/other.
LF_Motors	Table 14.2	Motor load factor as a percentage.[3]
COP	Table 14.4	Coefficient of Performance = Refrigeration/Cooling Capacity (BTU/hr) / Energy Input (BTU/hr)
CF	Table 14.5	Coincidence factor
High_Eff	Table 14.6	Efficiency of high efficiency replacement motor as a percentage. New Enhanced and Upgrade Enhanced are NEMA Premium plus 1%. Upgrade is NEMA Premium. The customer will provide the model and serial number of the motor along with actual nameplate efficiency from the new motor. If the actual efficiency is not provided by the customer, it will be determined from specification sheet.
Standard_Eff	Table 14.6	Efficiency of standard replacement motor as a percentage. New Enhanced is NEMA Premium. Upgrade and Upgrade Enhanced are EPACT. Based on customer provided motor size, speed, and enclosure type.
Conversion	0.746	Conversion from HP to kW
Refrigeration_Factor	1+1/COP	Multiplier to include interactive effects of refrigeration or cooling energy to remove heat from the motor. Reduction in motor energy results in a reduction in refrigeration/cooling energy.
Lifetime Upgrade	15	This is the incremental lifetime of retiring an EPACT motor early[1]
Lifetime Enhanced	20	This is the full lifetime of a motor since this is a new to new comparison[3]
NEMA Motor Cost	Table 14.1.1	NEMA Premium Motor Cost
Cost for efficiency point	Table 14.1.1	Difference between NEMA Premium Motor Cost and Enhanced Motor Cost

Customer Inputs	**M&V Verified**	
New motor model and serial number	Yes	HP, efficiency, type, and speed can then be looked up in a database
Application of motor	Yes	
Building type	Yes	Where motor is installed for non-industrial motors
Use of motor	Yes	Pump, fan, other
Equipment is installed	Yes	

Table 14.1.1 Motor Efficiency Cost

Motor HP	NEMA Motor Cost	Cost per efficiency point
1	$ 683.54	$ 134.12
1.5	$ 718.34	$ 148.55
2	$ 726.88	$ 152.09
3	$ 759.91	$ 165.78
5	$ 802.06	$ 183.25
7.5	$ 996.00	$ 263.65
10	$ 1,117.02	$ 313.83
15	$ 2,144.34	$ 441.22
20	$ 2,369.70	$ 534.64
25	$ 2,675.38	$ 661.36
30	$ 2,921.91	$ 763.56
40	$ 3,403.22	$ 963.09
50	$ 3,728.24	$ 1,097.83
60	$ 4,731.77	$ 1,513.84
75	$ 5,507.32	$ 1,835.34
100	$ 7,154.13	$ 2,219.55
125	$ 8,514.50	$ 2,783.49
150	$ 9,729.63	$ 3,287.22
200	$ 11,653.55	$ 4,084.77
250	$ 13,935.15	$ 5,030.61
300	$ 16,722.72	$ 6,186.20
350	$ 26,199.40	$ 10,114.74
400	$ 29,656.70	$ 11,547.96
450	$ 33,407.70	$ 13,102.94
500	$ 34,526.40	$ 13,566.69

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

References:

1. Efficiency Vermont's Technical Reference User Manual, 2004 - Source for operating hours for non-industrial motors (p.15) and source for upgrade measure life
2. Office of Industrial Electric Motor Systems Market Opportunities Assessment : Department of Energy (assessment of 265 Industrial facilities in 1997) - Source for VSD opportunity in the US market along with load factors for fans and pumps along with average savings
3. MN TRM 4.0

Assumptions:

- Each motor is replaced with the same size on a 1 for 1 basis. Motors replaced with different sizes can participate in the Custom Efficiency product.
- Prescriptive rebates are only given for motors put into service, rebates are not given for backup motors.
- Prescriptive rebates are only given to VFD's installed on centrifugal pump or fan applications.
- Rebates do not apply to rewound or repaired motors.

Changes from Recent Filing:

14.2 VFDs

Algorithms

$$Customer\ kWh = \frac{HP \times LF_{Motors} \times Conversion \times Hours \times \%\_Savings\_Drives \times Refigeration\_Factor}{Avg\_Motor\_Efficency}$$

$$Customer\ Coincident\ kW = \frac{HP \times LF_{Motors} \times Conversion \times CF \times \%\_Savings\_Drives \times Refigeration\_Factor}{Avg\_Motor\_Efficency}$$

Variables

Hours	Table 14.1 and Table 14.3	Annual operational hours per year of the motor. Deemed values are used for hours based on the type and end use of the motor. The customer provides the following information on the rebate form: HP, industrial/non-industrial, building type, and compressor/pump/fan/other.
LF_Motors	Table 14.2	Motor load factor as a percentage.[4]
Refrigeration_factor	Table 14.3	Coefficient of Performance = Refrigeration/Cooling Capacity (BTU/hr) / Energy Input (BTU/hr)
CF	Table 14.5	Coincidence factor
Incremental Cost	Table 14.7	Incremental cost for VFD[3]
Avg_Motor Efficiency	Table 14.8	Efficiency of NEMA premium efficient motor as a percentage. Value is a weighted average by HP based on customer past selections.
% Savings Drives	Table 14.9	Energy Savings Factor by Application
Measure life	15	Years[4]
Conversion	0.746	Conversion from horsepower to kW.

Customer Inputs	M&V Verified	
HP	Yes	Rated motor horsepower.
Facility Type	Yes	
Equipment Type	Yes	
Application	Yes	

Assumptions:

- Each VFD is replaced with the same size on a 1 for 1 basis.
- Prescriptive rebates are only given for VFDs put into service, rebates are not given for backup VFDs.
- Prescriptive rebates are only given to VFD's installed on centrifugal pump and fan applications.

References:

1. Efficiency Vermont's Technical Reference User Manual, 2004 - Source for operating hours for non-industrial motors (p.15).
2. Office of Industrial Electric Motor Systems Market Opportunities Assessment : Department of Energy (assessment of 265 Industrial facilities in 1997) - Source for VSD opportunity in the US market along with load factors for fans and pumps along with average savings
3. Costs are derived from customer invoices received through Xcel Energy's prescriptive program.
4. MN TRM 4.0 "C/I HVAC - Variable Speed Drives"

Changes from Recent Filing:

14.3 Refigeration Fans

Algorithms

$$Customer\ kWh = \frac{(EC\ \ _{Baseline\ Fan\ W} - ECM_{Efficient\ Fan\ W})}{1000} x\ Refrigeration_{Factor} x\ ECM_{Hours}$$

$$Customer\ Coincident\ kW = \frac{(ECM_{Baseline\ Fan\ W} - ECM_{Efficient\ Fan\ W})}{1000} x\ Refrigeration_{Factor}\ x\ CF$$

Variables

ECM_Baseline_Fan_Watts	Table 14.3.1	Average input watts for shaded pole or permanent split capacitor motor
ECM_Efficient_Fan_Watts	Table 14.3.1	Average input watts for efficient motor[1]
ECM_Hours	Table 14.3.1	Hours per year (freezer subtracts defrost time)[1]
Incremental Cost	Table 14.3.2	Deemed Incremental Costs
COP	Table 14.4	Coefficient of Performance = Refrigeration/Cooling Capacity (BTU/hr) / Energy Input (BTU/hr)
CF	Table 14.5	Coincidence factor
Refrigeration_Factor	1+1/COP	Multiplier to include interactive effects of refrigeration or cooling energy to remove heat from the motor. Reduction in motor energy results in a reduction in refrigeration/cooling energy.
Lifetime	15	Years

Customer Inputs	M&V Verified	
Size of motor	Yes	Watts
Application of motor	Yes	Display Case or Walk-in
Case or Walk-in temperature (Medium Temp or Low Temp)	Yes	Medium Temp or Low Temp
For Walk-in's: Fan diameter (<= 15 inches or >15 inches	Yes	<= 15 inches or >15 inches

Table 14.3.1

Motor Application	ECM_Baseline_Fan_Watts[1]	ECM_Efficient_Fan_Watts[1,2,3]	ECM_Hours[1]
MediumTemp Shaded Pole to PMSM in display case	49.69	15.25	8,672
Low Temp Shaded Pole to PMSM in display case	49.69	15.25	8,672
MediumTemp Shaded Pole to ECM in display case	49.69	16.50	8,672
Low Temp Shaded Pole to ECM in display case	49.69	16.50	8,672
Med Temp Shaded Pole to ECM in Walk-in	95.08	30.88	8,585
Low Temp Shaded Pole to ECM in Walk-in	95.08	30.88	8,585
Med Temp permanent split capcaitor (PSC) to ECM in Walk-in	96.00	47.00	8,585
Low Temp permanent split capcaitor (PSC) to ECM in Walk-in	96.00	47.00	8,585
Medium Temp Shaded Pole to PMSM in Walk-In	95.08	37.20	8,585
Low Temp Shaded Pole to PMSM in Walk-In	95.08	37.20	8,585

Table 14.3.2

Motor Application	Equipment[1,2]	Labor[1]	Total
Reach-in PMSM	$75.00	$18.30	$93.30
Walk-in ECM	$226.20	$42.81	$269.01
Reach-in ECM	$122.41	$18.30	$140.71

References:

1. ECM baseline and efficient watts and hours are from monitored data from Custom Efficiency projects
2. ENERGY SAVINGS OF PERMANENT MAGNET SYNCHRONOUS FAN MOTOR ASSEMBLY REFRIGERATED CASE EVAPORATORS, Alternative Energy Systems Consulting, Inc., 2016
3. Q-Sync Motors in Commercial Refrigeration: Preliminary Test Results and Projected Benefits, ORNL/TM-2015/466
4. http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf

5. 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0 - Volume 2: Commercial and Industrial Measures

Changes from Recent Filing:

Added PMSM for walk-in

14.4 Fan Efficiency (FEI)

Algorithms

$$Customer\ \ kW = \frac{HP\ \times\ LF \times Conversion}{Avg\_Motor\ Efficiency} \times \left((1 - Control_{Facto}\ ) \times \left(\frac{1}{FEI_{Baseline}} - \frac{1}{FEI} \right)\ \ + Int\_VFD\_Factor \right)$$

$$Baseline\_Cost = \left(A \times \left(\frac{Fan\_Diameter}{Size\_Factor} \right) + \left(\frac{Fan\_Diameter}{Size\_Factor} \right)^B \right) \times (MSP\_Min * Markup\_Base + (MSP\_Base - MSP\_Min) \times Markup\_Increm)$$

$$Proposed\_Cost = (A \times Fan\_Diameter + Fan\_Diameter^B) \times (MSP\_Min * Markup\_Base + (MSP\_Prop - MSP\_\_Base) \times Markup\_Increm)$$

$$Incremental\ Cost = Proposed\_Cost -\ \ Baseline\_Cost + VFD\_Cost$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Coincident\ \ kW = Customer\ kW \times CF$$

Variables

Control_Factor	Table 14.9	Energy Savings Factor by Application
Int_VFD_Factor	Table 14.9	Energy Savings Factor by Application
FEI_Baseline	Table 14.4.1	Minimum Qualifying FEI[6]
Measure life	Table 14.4.2	Years. Integrated controls reduce the lifetime by 5 years.
MSP_Min, MSP_Base, MSP_Prop	Table 14.4.3	The factors to determine manufacturers selling price based on type of fan and efficiency level. These values can change based on the FEI of the fan, and must be calculated. These factors relate to the minimum markup (FEI=1), baseline FEI, and actual proposed FEI, respectively. [1]
Markup_Base	Table 14.4.3	Base cost markup occurring during distribution based on fan type from the DOE.[1]
Markup_Increm	Table 14.4.3	Incremental cost markup due to efficiency increase from distributors based on fan type from the DOE. Rounded to three decimal places. [1]
A	18.919	Constant in Manufacturers Production Cost equation from DOE. Rounded to three decimal places.[1]
B	2.105	Constant in Manufacturers Production Cost equation from DOE. Rounded to three decimal places.[1]
Hours	Table 14.1, 14.3	Based on Segment
LF	Table 14.2	Fan Motor Loading Factor
CF	Table 14.5	Coincidence factor
VFD_Cost	Table 14.7	Incremental cost due to integrated VFD, matches VFD prescriptive rebate.
Avg_Motor Efficiency	Table 14.8	Efficiency of NEMA premium efficient motor as a percentage. Value is a weighted average by HP based on customer past selections.
Conversion	0.746	Conversion from horsepower to kW
Size_Factor	110%	The average fan size increase to reach a qualifying FEI value. This was developed through conversations with MN Trade Partners.[2]

Customer Inputs	M&V Verified	
HP	Yes	Nominal Fan HP
Fan Diameter	Yes	Fan diameter, in inches
Fan Type	Yes	Fan type, available options are in Table 14.4.3
Fan Control	Yes	Fan control, available options are (constant speed or variable speed)
Integrated VFD	Yes	Yes/No option of if a VFD is integrated into fan.
FEI	Yes	Customer Fan Efficiency Index
Equipment Type	Yes	What is the Application of the fan
Industry Segment	Yes	Available options are in tables 14.1 and 14.3
Selection Screenshot Provided	Yes	Selection nameplate showing provided values[4]

Table 14.4.1 FEI Baseline values[6]

Fan Type	Drive Type		
	Variable Speed - Belt	Constant Speed - Belt	Constant Speed - Direct
Axial Cylindrical Housed	0.88	0.88	0.97
Panel	0.95	0.95	0.88
Centrifugal Housed	0.92	0.92	0.92
Centrifugal Unhoused	0.94	0.94	1.03
Inline and mixed flow	0.79	0.79	0.77
Radial	0.82	0.81	0.94
Power Roof Ventilator	0.82	0.82	0.76
Other	0.95	1.00	1

Table 14.4.2 Measure Life based on control strategy

Measure Life	Value
Integrated VFD Measure Life	15
Fan-only Measure Life	20

Table 14.4.3 Incremental Cost Factors[1]

Fan Type	Baseline Markup	Incremental Markup	MSP Factor
Axial Cylindrical Housed	1.780	1.460	0.0101*FEI+1.5084
Panel	1.724	1.442	0.283
Centrifugal Housed	1.665	1.394	21.4022*FEI^3+-78.3942*FEI^2+96.0738*FEI+-38.1369
Centrifugal Unhoused	1.699	1.405	0.941
Inline and mixed flow	1.568	1.368	16.5886*FEI^3+-60.7626*FEI^2+74.3786*FEI+-29.0017
Radial	1.433	1.255	1.309
Power Roof Ventilator	1.551	1.361	0.844

References:

1. DOE NODA V3 LCC, Engineering, and NIA Supplemental Documents From FEI Working Group
2. 13,000 MN Fan Selections From Trade Partner
3. CEC Draft Staff Report - Analysis of efficiency Standards and Test Procedures for Commercial and Industrial Fans and Blowers
4. AMCA Standard 208-18
5. 2019 ASHRAE 90.1
6. MN TRM 4.0 C/I HVAC - Fan Energy Index

Changes from Recent Filing:

Updated FEI baseline values to reflect MN TRM 4.0

14.5 Well Pump VFDs

Algorithms

$$Customer\ kWh = (Base_{kW} - VFD_{kW}) x\ Well\ Hours$$

$$Customer\ Coincident\ kW = (Base_{kW} - VFD_{kW}) x\ CF$$

$$VFD_{kW} = (VFD_{\mathrm{BHP}} / Avg\_Motor\_Efficiency\ /\ \mathrm{VFD_{Eff}}) \times Conversion$$

$$Base_{kW} = (Base_{\mathrm{BHP}} / Avg\_Motor\_Efficiency) \times Conversion$$

$$VFD_{BHP} = \frac{(Flow\ x\ VFD_{Head})}{(Constant\ \ x\ Design_{Pump\ Eff})}$$

$$Base_{BHP} = \frac{(Flow\ x\ Base_{Head})}{(Constant\ x\ Base_{Pump\ Eff})}$$

$$Base_{Pump\ Eff} = -0.40205\ x\ (\%_{Flow})^2 + 1.00876\ x\ \%_{Flow} + 0.20113$$

$$VFD_{Head} = Static_{Head} + Flow_{Coeff}\ x\ (Flow)^2$$

$$Base_{Head} = \%_{Design\ Head}\ x\ Design_{Head}$$

$$Static_{Head} = \%_{Flow} x \left(Max_{Well\ Depth} - Average_{Well\ Depth}\right) + Average_{Well\ Depth}$$

$$Flow_{Coeff} = Peak\ Dynamic\ head\ x\ (Design_{Flow})^2$$

$$\%_{Design\ Head} = -0.11656\ x\ (\%_{Flow})^2 - 0.34465\ x\ \%_{Flow} + 1.46170$$

$$\%_{Flow} = \frac{Flow}{Design_{Flow}}$$

$$Peak\ Dynamic\ head = Design_{Head} - Max\ Well\ Depth$$

Variables

Well Hours	See 14.5.1	Number of hours per year the well pump will operate. Deemed values are used for hours based on the well pump application that will be provided by the customer.
CF	Table 14.5	Coincidence factor[2]
Avg_Motor Efficiency	Table 14.8	Efficiency of NEMA premium efficient motor as a percentage. Value is a weighted average by HP based on customer past selections.
VFD_Eff	97%	Drive efficiency of a VFD, deemed to be 97% using a table of drive efficiency versus percent of rated power using the motor rated power.[1]
Constant	3960	Pump power equation constant used to convert units of feet of water and gallons per minute to HP.
Base_Pump_Eff	Calculated	Percent efficiency of the water well pump at a given percent of design flow rate. The algorithm is defined above and comes from a linear regression of a second-order polynomial on pump curve data (normalized to design head and flow) from Xcel well pump custom rebate projects.[2]
Design_Pump_Eff	80.8%	Pumping efficiency at given conditions (%_Flow). This algorithm comes from a second-order polynomial curve fit of achievable pump efficiency versus flow rate from custom rebates and their associated pump curves. The design pump efficiency is a constant value used at all flow rates for VFD driven pumps.[2]
Conversion	0.746	HP to kW conversion
%_Design_Head	Calculated	Percent of design total pump head occurring at a given percent of design flow rate. The algorithm is defined above and comes from a linear regression of a second-order polynomial on pump curve data (normalized to design head and flow) from seven Xcel well pump custom rebate projects.[2]
Measure Life	15	Years

Customer Inputs	M&V Verified
Pump Rated HP	Yes
Design Flow (GPM)	Yes
Design Head (ft)	Yes
Well Depth (ft)	No
Max Well Depth at design flow (ft)	No
Average Flow Rate (GPM)	No
Application of well pump (agriculture, golf co	Yes

Table 14.5.1: Operating Hours by Application for Well Pumps[2,3,4,5]

Application	Operating Hours
Agricultural Irrigation	1,954
Golf & Landscape Irrigation	1,941
Municipal Water Supply	3,177
Other Water Well Pump	3,630

References:

1. US DOE Advanced Manufacturing Office Energy Tips, Motor Systems Tip Sheet #11, Adjustable Speed Drive Part-Load Efficiency,
2. Xcel Energy well pump and high static head custom motor rebates
3. Bonneville Power Association, Variable Frequency Drives, http://www.bpa.gov/EE/Sectors/agriculture/Pages/Variable-Frequency-Drives.aspx
4. Department of Energy (DOE) Guidelines for Estimating Unmetered Landscaping Water Use,
5. How Many Acres Are Needed for an 18 Hole Golf Course?, http://golftips.golfsmith.com/many-acres-needed-18-hole-golf-course-1812.html

Changes from Recent Filing:

14.6 Pump Efficiency (PEI)

Algorithms

$$Customer\ kW = \frac{HP\ x\ Conversion \times ADj\_Factor}{Avg\_Motor\_Efficiency} \times ((Baseline\ PEI\ -\ Proposed\ PEI)\ \times (1 -\ CTRL_{Factor})\ +\ VFD_{Factor})$$

$$Customer\ kWh\ Savings = Customer\ kW\ x\ Hours$$

$$Customer\ Coincident\ kW = Customer\ kW\ x\ CF$$

$$Pump\ Incremental\ Cost = (Cost\ Factor\ m\ x\ (Baseline\ PEI\ - Proposed\ PEI) + Cost\ Factor\ b) + VFD\ Cost$$

Variables

Baseline_PEI	Table 14.6.1	Pumps manufactured after 2020 must meet the minimum performance standard for the style and size pump This varies for variable pumps, but is a deemed value of 1 for constant speed pumps.[1]
Adj_Factor	Table 14.6.2	Adjustment Factors are derived from a sample of simulated pump installations, and varies
VFD_{Eff}	Table 14.6.6	Efficiency of the integrated VFD
VFD_{Factor}	Table 14.9	Energy Savings Factor by Application
$CTRL_{Factor}$	Table 14.9	Energy Savings Factor by Application
Hours	Table 14.6.3	Hours of Operation per year or (hr/yr.) Hours are associated with customer provided market segments
Cost Factor m	Table 14.6.4	For constant speed to variable speed applications, use average incremental cost found by NEEA per pump based on hp and PEI.
Cost Factor b	Table 14.6.4	For variable speed to variable speed applications, use average incremental cost found by NEEA per pump based on hp and PEI.. This is the same as the CS_to_CS_Incremental_ Cost as the only change is the pump body.
CF	Table 14.5	Coincidence factor
VFD_Cost	Table 14.7	Incremental cost due to integrated VFD, matches VFD prescriptive rebate.
Avg_Motor Efficiency	Table 14.6	Efficiency of NEMA premium efficient motor as a percentage. Value is a weighted average by HP based on customer past selections.
Conversion	0.746	Conversion from HP to kW
Constant Speed Lifetime	20	Years
Variable Speed Lifetime	15	Years

Customer Inputs	M&V Verified	
Proposed_PEI	Yes	Pump efficiency level (PEI), which must be meet the minimum requirements in table below **must be at least .02 PEI below baseline**.
Integrated VFD	Yes	Does the proposed pump have an integrated VFD
Proposed Pump Speed Control	Yes	Identify if the proposed pump speed is constant speed or variable speed.
Horsepower	Yes	Nominal Pump Horsepower as identified on pump motor
Pump Equipment Type	Yes	Equipment Types
Pumping Application	Yes	Check Pumping Application for Commercial HVAC and DHW, Agricultural or Industrial or Municipal
Percent Glycol	No	What percentage Glycol is the system
Pump Class	Yes	Identify type of pump and class

Table 14.6.1 Minimum PEI values

DOE Product Category	1-5 HP	7.5+ HP
All Constant Speed Pumps	1.00	1.00
Non-VT Variable Speed Pumps	0.54	0.50
VT Variable Speed Pumps	0.63	0.60

Table 14.6.2: Adjustment Factors for Pumps[4]

Pump Type	Variable Speed Pumps			Constant Flow Pumps (All Segments)
	Agricultural Irrigation	Industrial and Municipal	Commercial HVAC and DHW	
Non-Vertical Turbine Pump	1.13	1.13	1.22	0.85
Vertical Turbine Pump	1.50	1.50	1.60	1.15

Note: Commercial HVAC is assumed to have pumps with 40% BEP minimum. Agricultural and Industrial/Municipal are assumed to have 20% BEP minimum.
Source CIP_FR_LCC_2015-09-21_VL_VL_LoadFactor_v2.xlsm, taken and simplified from "lookups" tab and is calculated in excel file "ComIndAgPumps_1_1" on tab "Adj Factors"

Table 14.6.3: Pumping Application Data[3]

Application	Agricultural Irrigation	Industrial and Municipal	Commercial HVAC and DHW
Operating Hours (hrs/yr)	2,400	4,000	5,000

Source for hours
DOE, pump subcommittee
Northwest motor database pumping applications, pump subcommittee
Green Motor Rewind UES measure workbook

Table 14.6.4: Pump Cost factors[8]

Incremental Cost		
Type	Motor HP Range	Cost Calculation ($/HP)
Constant	1 - 4.9	$20.43
	5 - 9.9	$10.02
	10 - 24.9	$5.24
	25 - 49.9	$2.98
	50 - 99.9	$1.76
	100 - 200	$1.05
Variable Speed	1 - 1.9	$33.75
	2 - 2.9	$23.29
	3 - 4.9	$16.62
	5 - 9.9	$10.02
	10 - 24.9	$5.24
	25 - 49.9	$2.98
	50 - 99.9	$1.76
	100 - 200	$1.05

Table 14.6.5: Pump Types Considered

Type	HP Range
End Suction Frame Mount (ESFM)	1-200 HP
End Suction Close Coupled (ESCC)	1-200 HP
In-Line (IL)	1-200 HP
Radially Split multi-stage vertical in-line diffuser casing (RSV)	1-200 HP
Vertical Turbine Submersible (ST)	1-200 HP

Table 14.6.6: Integrated VFD Efficiencies

VFD Efficiency	Value
No VFD	100%
Yes VFD	97%

References:

1: DOE pump equipment classes and nominal speed, defined in the Rulemaking
2: These values were derived in CIP_FR_LCC_2015-09-21_CL_baselinePEI.xlsm as an estimate of the current market average efficiency level. This is based on the Table 8.3.4
3: Irrigation hours are taken from metering shown in the Green Motors Rewind UES workbook
4: Work product is included a Utility titled "ComIndAgPumps_1_1" based upon CIP_FR_LCC_2015-09-21_CL_CL_LoadFactor.xlsm
5: Work product from utility work paper based upon CIP_FR_LCC_2015-09-21_Costs.xlsm
6: Supplyhouse.com shows variable speed 1 HP circulator pumps from $1400-$3100; non variable speed are under $1000, some data available at the following website
7: Pump Energy Index (PEI) based upon the Regional Technical Forum (RTF) approved Northwest Energy Efficiency Alliance (NEEA) pump ECS savings analysis from the Efficient
8: MN TRM 4.0 - C/I HVAC - Pump Energy Index - used for incremental costs and PEI baseline

Changes from Recent Filing:

Updated incremental cost and adjustment factors to reflect MN TRM 4.0

14.7 Fractional HP Circ. Pumps

Algorithms

$$Customer\ kWh = (kW_{BASE} - \ kW_{ECM}) \times Hours$$

$$Customer\ Coincident\ kW = (kW_{BASE} - kW_{ECM}) \times CF$$

$$kW_{ECM} = \frac{ECM_{wattage}}{1000}$$

$$kW_{BASE} = \frac{kW_{ECM}}{Baseline\_Conversion}$$

$$Incrmental\ cost = ECM_{wattage} * Cost\ Factor_M + Cost\ Factor_b$$

Variables

Hours	Table 14.7.1	Annual operational hours per year of the motor. Deemed values are used for hours based on the type and use of the motor.
CF	Table 14.7.1	Deemed Coincident Factor
Incremental Cost	14.7.2	$/Nameplate Watt[1]
Conversion	0.746	HP to kW conversion
Baseline_Conversion	0.18	Multiplier to convert the nameplate power of a proposed motor to the assumed baseline wattage. [1]
Lifetime	15	The lifetime of an ECM circulator pump[1]

Customer Inputs	M&V Verified	
ECM Wattage	Yes	If wattage isnt listed on the nameplate then convert the HP to Watts (ECM HP*746)
Application	Yes	DHW Circulator, Heating Water Circulator, or Cooling Water Circulator

Table 14.7.1 Operating hours and CF by application[1]

Type	Hours	CF
DHW Circulator	2190	100.0%
Heating Water Circulator	2582	0.0%
Cooling Water Circulator	1191	29.9%

Table 14.8.2 Incremental Cost Factor[2]

Cost Factor M	Cost Factor b
$ 0.1851	$ 135.34

Assumptions:

Domestic Hot water pumps are installed with on demand controls

References:

1. MN TRM Version 4.0, "C/I HVAC - ECM Circulators" p. 314
2. Xcel energy research into the cost difference between an ECM and PSC (September 2019)

Changes from Recent Filing:

14.8 Fractional HP Fan Motors

Algorithms

$$Customer\ kWh = (CFM\ \times\ Box_{Factor} \times LF \times Hours)\ /\ Conversion$$

$$Customer\ Coincident\ kW = (CFM \times Box_{Factor}\ \times\ LF\ \times CF)\ /\ Conversion$$

$$Incrmental\ cost = HP * Cost\ Factor_M + Cost\ Factor_b$$

Variables

LF	90%	Load Factor for Fractional ECM Fans per MN TRM[1]
Box_Factor	Table 14.8.1	The savings factor in w/CFM based[1]
Cost Factor M	Table 14.8.2	Dollars Per HP
Cost Factor b	Table 14.8.2	Dollars
Hours	Table 14.8.3	Operating Hours for Fractional HP ECM Fans based on EFLH per MN TRM[1]
CF	90%	Coincident Factor for Fractional ECM Fans per MN TRM[1]
Conversion	1000	Watts to kW conversion
Lifetime	15	Lifetime of an ECM[1]

Customer Inputs	M&V Verified	
ECM HP	Yes	HP or Converted Wattage of ECM
Building Type	Yes	Building area the fan is Serving
CFM	Yes	The rated CFM of the ECM Fan

Table 14.8.1 Box Factor based on CFM[1]

CFM	Watts / CFM
<1000	0.31
>=1000	0.21

Table 14.8.2 Incremental Cost Factor[3]

Cost Factor M	Cost Factor b
$ 138.07	$ 135.34

Table 14.8.3 Fractional ECM Operating Hours[1]

Building Type	Average Hours
Office	2,528
Retail	2,230
Hospitals	3,290
Elementary/Secondary Schools	2,672
Restaurant	2,204
Warehouse	2,002
Hotels/Motels	2,727
Grocery	2,230
Health	2,746
College/University	2,538
Manufacturing	1,736
Other/Miscellaneous	2,519

Assumptions:

- Prescriptive rebates are only given for motors put into service, rebates are not given for backup motors.
- Rebates do not apply to rewound or repaired motors.
- Termainal ECM Fan Operating Hours are lower due to direct correlation to heating and cooling energy use.

References:

1. MN TRM Version 4.0, "C/I HVAC - ECM Fan Motors" p. 317
2. IECC 2018
3. Xcel energy research into the cost difference between an ECM and PSC (September 2019)

Changes from Recent Filing:

14.9 Integrated Drives

Algorithms

$$Customer\ kWh = HP \times LF_{Motors} \times Conversion \times Hours \times Refigeration\_Factor \times \left(\frac{1 + \%\ Savings\ Drives}{Baseline_{Eff}} - \frac{1}{Proposed_{Eff}}\right)$$

$$Customer\ Coincident\ kW = HP \times LF_{Motors} \times Conversion \times CF \times Refigeration\_Factor \times \left(\frac{1 + \%\ Savings\ Drives}{Baseline_{Eff}} - \frac{1}{Proposed_{Eff}}\right)$$

Variables

Hours	Table 14.1 and Table 14.3	Annual operational hours per year of the motor. Deemed values are used for hours based on the type and use of the motor. The customer provides the following information on the rebate form: HP, industrial/non-industrial, building type, and compressor/pump/fan/other.[1]
LF_Motors	Table 14.2	Motor load factor as a percentage.[2]
Refrigeration Factor	Table 14.3	Coefficient of Performance = Refrigeration/Cooling Capacity (BTU/hr) / Energy Input (BTU/hr)
CF	Table 14.5	Coincidence factor
Incremental Cost	Table 14.7	Incremental cost for integrated drives based on type[3]
Baseline_Eff	Table 14.8	Efficiency of NEMA premium efficient motor as a percentage. Value is a weighted average by HP based on customer past selections.
Proposed_Eff	Table 14.8	Peak Efficiency of the Motor and Drive combo. This is deemed for Switched Reluctance Motors, and provided by the customers for EC motors
% Savings Drives	Table 14.9	Average savings achieved by installing a VFD on a fan or pumping motor.[2]
Measure life	15	Years[1]
Conversion	0.746	Conversion from horsepower to kW.

Customer Inputs	M&V Verified	
HP	Yes	Rated motor horsepower.
Proposed Eff	Yes	Peak efficiency of Motor and Drive Combo
Facility Type	Yes	
Application	Yes	
Motor Type	No	Switched reluctance motor with controler or EC motor with integrated drive

Assumptions:

- Each intergated motors and drives is replaced with the same size on a 1 for 1 basis.
- Prescriptive rebates are only given for intergated motors and drives put into service, rebates are not given for backup intergated motors and drives.
- Prescriptive rebates are only given to intergated motors and drive's installed on centrifugal pump and fan applications.

References:

1. Efficiency Vermont's Technical Reference User Manual, 2004 - Source for operating hours for non-industrial motors (p.15) and source for measure life, source for load factor
2. Office of Industrial Electric Motor Systems Market Opportunities Assessment : Department of Energy (assessment of 265 Industrial facilities in 1997) - Source for VSD opportunity in the US market along with load factors for fans and pumps along with average savings
3. Costs are derived from customer invoices received through Xcel Energy's prescriptive program.

Changes from Recent Filing:

New measure from last Triennial, filed as a modifciation in 2022

Table 14.1: Operating Hours by Motor Size, Industrial Applications[3]

HP	Fans	Pumps	Data Center	Case Fans	Air Compressor	Other
1	4550	3380	8760	8629	1257	2435
1.5	4550	3380	8760	8629	1257	2435
2	4550	3380	8760	8629	1257	2435
3	4550	3380	8760	8629	1257	2435
5	4550	3380	8760	8629	1257	2435
7.5	4316	4121	8760	8629	2131	2939
10	4316	4121	8760	8629	2131	2939
15	4316	4121	8760	8629	2131	2939
20	4316	4121	8760	8629	2131	2939
25	5101	4889	8760	8629	3528	3488
30	5101	4889	8760	8629	3528	3488
40	5101	4889	8760	8629	3528	3488
50	5101	4889	8760	8629	3528	3488
60	6151	5667	8760	8629	4520	5079
75	6151	5667	8760	8629	4520	5079
100	6151	5667	8760	8629	4520	5079
125	5964	5126	8760	8629	4685	5137
150	5964	5126	8760	8629	4685	5137
200	5964	5126	8760	8629	4685	5137
250	7044	5968	8760	8629	6148	6102
300	7044	5968	8760	8629	6148	6102
350	7044	5968	8760	8629	6148	6102
400	7044	5968	8760	8629	6148	6102
450	7044	5968	8760	8629	6148	6102
500	7044	5968	8760	8629	6148	6102

Table 14.2 Load Factors[3,4,5]

Application	Load Factor
Other	75%
Pump	75%
ECM Fan	90%
Fan	65%

Table 14.3: Operating Hours by Application for all products other than motor controllers, Non-Industrial[4]

Building Type	Pumps	Fans	Other
Office	2000	6192	4500
Retail	2000	3261	4500
Hospitals	2754	8374	4500
Elementary/Secondary Schools	2190	3699	4500
Restaurant	2000	4155	4500
Warehouse	2241	6389	4500
Hotels/Motels	4231	3719	4500
Grocery	2080	6389	4500
Health	2559	2000	4500
College/University	3641	3631	4500
Data Center	8760	8760	0

Table 14.4 COPs for different systems

Application	COP
Low Temperature	1.43
Medium Temperature	2.28
HVAC	3.00
Data Center	4.00

Table 14.5 Coincidence Factors[1,2,4,8]

Application	CF
Motors	78%
Well Pumps	38%
Pumps	90%
Fans	78%
Display Case Refrigeration Fans	99%
Walk-in Refrigeration Fans	98%

Table 14.6 Efficiencies by Motor Types[6]

Motor Tag	HP	Speed	Type	EPACT Motor Efficiency	NEMA Premium Motor Efficiency	NEMA Premium +1% Motor Efficiency	NEMA Premium Cost	NEMA +1% Cost
1 HP 900 RPM ODP	1	900	ODP	74.0%	75.5%	76.5%	$ 683.54	$ 817.66
1.5 HP 900 RPM ODP	1.5	900	ODP	75.5%	77.0%	78.0%	$ 718.34	$ 866.89
2 HP 900 RPM ODP	2	900	ODP	85.5%	86.5%	87.5%	$ 726.88	$ 878.97
3 HP 900 RPM ODP	3	900	ODP	86.5%	87.5%	88.5%	$ 759.91	$ 925.69
5 HP 900 RPM ODP	5	900	ODP	87.5%	88.5%	89.5%	$ 802.06	$ 985.31
7.5 HP 900 RPM ODP	7.5	900	ODP	88.5%	89.5%	90.5%	$ 996.00	$ 1,259.65
10 HP 900 RPM ODP	10	900	ODP	89.5%	90.2%	91.2%	$ 1,117.02	$ 1,430.85
15 HP 900 RPM ODP	15	900	ODP	89.5%	90.2%	91.2%	$ 2,144.34	$ 2,585.56
20 HP 900 RPM ODP	20	900	ODP	90.2%	91.0%	92.0%	$ 2,369.70	$ 2,904.34
25 HP 900 RPM ODP	25	900	ODP	90.2%	91.0%	92.0%	$ 2,675.38	$ 3,336.74
30 HP 900 RPM ODP	30	900	ODP	91.0%	91.7%	92.7%	$ 2,921.91	$ 3,685.47
40 HP 900 RPM ODP	40	900	ODP	91.0%	91.7%	92.7%	$ 3,403.22	$ 4,366.31
50 HP 900 RPM ODP	50	900	ODP	91.7%	92.4%	93.4%	$ 3,728.24	$ 4,826.07
60 HP 900 RPM ODP	60	900	ODP	92.4%	93.0%	94.0%	$ 4,731.77	$ 6,245.61
75 HP 900 RPM ODP	75	900	ODP	93.6%	94.1%	95.1%	$ 5,507.32	$ 7,342.66
100 HP 900 RPM ODP	100	900	ODP	93.6%	94.1%	95.1%	$ 7,154.13	$ 9,373.68
125 HP 900 RPM ODP	125	900	ODP	93.6%	94.1%	95.1%	$ 8,514.50	$ 11,297.99
150 HP 900 RPM ODP	150	900	ODP	93.6%	94.1%	95.1%	$ 9,729.63	$ 13,016.85
200 HP 900 RPM ODP	200	900	ODP	93.6%	94.1%	95.1%	$ 11,653.55	$ 15,738.32
250 HP 900 RPM ODP	250	900	ODP	94.5%	95.0%	96.0%	$ 13,935.15	$ 18,965.76
300 HP 900 RPM ODP	300	900	ODP	94.5%	95.0%	96.0%	$ 16,722.72	$ 22,908.92
350 HP 900 RPM ODP	350	900	ODP	94.5%	95.0%	96.0%	$ 26,199.40	$ 36,314.14
400 HP 900 RPM ODP	400	900	ODP	94.9%	95.1%	96.1%	$ 29,656.70	$ 41,204.66
450 HP 900 RPM ODP	450	900	ODP	95.3%	95.5%	96.5%	$ 33,407.70	$ 46,510.64
500 HP 900 RPM ODP	500	900	ODP	95.3%	95.5%	96.5%	$ 34,526.40	$ 48,093.09
1 HP 1200 RPM ODP	1	1200	ODP	80.0%	82.5%	83.5%	$ -	$ -
1.5 HP 1200 RPM ODP	1.5	1200	ODP	84.0%	86.5%	87.5%	$ 716.40	$ 864.15
2 HP 1200 RPM ODP	2	1200	ODP	85.5%	87.5%	88.5%	$ 828.88	$ 1,023.25
3 HP 1200 RPM ODP	3	1200	ODP	86.5%	88.5%	89.5%	$ 941.35	$ 1,182.35
5 HP 1200 RPM ODP	5	1200	ODP	87.5%	89.5%	90.5%	$ 1,105.25	$ 1,414.19
7.5 HP 1200 RPM ODP	7.5	1200	ODP	88.5%	90.2%	91.2%	$ 1,315.35	$ 1,711.39
10 HP 1200 RPM ODP	10	1200	ODP	90.2%	91.7%	92.7%	$ 1,575.50	$ 2,079.38
15 HP 1200 RPM ODP	15	1200	ODP	90.2%	91.7%	92.7%	$ 1,801.55	$ 2,399.14
20 HP 1200 RPM ODP	20	1200	ODP	91.0%	92.4%	93.4%	$ 2,974.75	$ 3,760.22
25 HP 1200 RPM ODP	25	1200	ODP	91.7%	93.0%	94.0%	$ 3,322.35	$ 4,251.91
30 HP 1200 RPM ODP	30	1200	ODP	92.4%	93.6%	94.6%	$ 3,735.95	$ 4,836.97
40 HP 1200 RPM ODP	40	1200	ODP	93.0%	94.1%	95.1%	$ 4,066.13	$ 5,304.03
50 HP 1200 RPM ODP	50	1200	ODP	93.0%	94.1%	95.1%	$ 4,726.50	$ 6,238.15
60 HP 1200 RPM ODP	60	1200	ODP	93.6%	94.5%	95.5%	$ 5,424.45	$ 7,225.44
75 HP 1200 RPM ODP	75	1200	ODP	93.6%	94.5%	95.5%	$ 6,117.45	$ 8,205.72
100 HP 1200 RPM ODP	100	1200	ODP	94.1%	95.0%	96.0%	$ 7,139.35	$ 9,651.25
125 HP 1200 RPM ODP	125	1200	ODP	94.1%	95.0%	96.0%	$ 10,344.80	$ 13,887.04
150 HP 1200 RPM ODP	150	1200	ODP	94.5%	95.4%	96.4%	$ 10,672.60	$ 14,350.73
200 HP 1200 RPM ODP	200	1200	ODP	94.5%	95.4%	96.4%	$ 11,810.55	$ 15,960.41
250 HP 1200 RPM ODP	250	1200	ODP	95.4%	95.8%	96.8%	$ 20,313.28	$ 27,987.94
300 HP 1200 RPM ODP	300	1200	ODP	95.4%	95.8%	96.8%	$ 33,679.53	$ 46,895.16
350 HP 1200 RPM ODP	350	1200	ODP	95.4%	95.8%	96.8%	$ 39,811.60	$ 55,569.27
400 HP 1200 RPM ODP	400	1200	ODP	95.8%	95.9%	96.9%	$ 51,564.68	$ 72,194.58
450 HP 1200 RPM ODP	450	1200	ODP	96.2%	96.3%	97.3%	$ 54,578.50	$ 76,457.78
500 HP 1200 RPM ODP	500	1200	ODP	96.2%	96.3%	97.3%	$ 67,037.12	$ 94,081.10
1 HP 1800 RPM ODP	1	1800	ODP	82.5%	85.5%	86.5%	$ 70,241.55	$ 98,613.93
1.5 HP 1800 RPM ODP	1.5	1800	ODP	84.0%	86.5%	87.5%	$ 723.55	$ 874.26
2 HP 1800 RPM ODP	2	1800	ODP	84.0%	86.5%	87.5%	$ 759.03	$ 924.44
3 HP 1800 RPM ODP	3	1800	ODP	86.5%	89.5%	90.5%	$ 784.05	$ 959.84
5 HP 1800 RPM ODP	5	1800	ODP	87.5%	89.5%	90.5%	$ 899.55	$ 1,123.22
7.5 HP 1800 RPM ODP	7.5	1800	ODP	88.5%	91.0%	92.0%	$ 1,067.58	$ 1,360.90
10 HP 1800 RPM ODP	10	1800	ODP	89.5%	91.7%	92.7%	$ 1,229.55	$ 1,590.02
15 HP 1800 RPM ODP	15	1800	ODP	91.0%	93.0%	94.0%	$ 1,491.35	$ 1,960.35
20 HP 1800 RPM ODP	20	1800	ODP	91.0%	93.0%	94.0%	$ 2,568.85	$ 3,186.05
25 HP 1800 RPM ODP	25	1800	ODP	91.7%	93.6%	94.6%	$ 2,893.08	$ 3,644.68
30 HP 1800 RPM ODP	30	1800	ODP	92.4%	94.1%	95.1%	$ 3,183.20	$ 4,055.08
40 HP 1800 RPM ODP	40	1800	ODP	93.0%	94.1%	95.1%	$ 3,364.43	$ 4,311.43
50 HP 1800 RPM ODP	50	1800	ODP	93.0%	94.5%	95.5%	$ 4,411.08	$ 5,791.97
60 HP 1800 RPM ODP	60	1800	ODP	93.6%	95.0%	96.0%	$ 4,970.43	$ 6,583.20
75 HP 1800 RPM ODP	75	1800	ODP	94.1%	95.0%	96.0%	$ 5,787.73	$ 7,739.31
100 HP 1800 RPM ODP	100	1800	ODP	94.1%	95.4%	96.4%	$ 6,601.18	$ 8,889.97
125 HP 1800 RPM ODP	125	1800	ODP	94.5%	95.4%	96.4%	$ 8,076.88	$ 10,678.95
150 HP 1800 RPM ODP	150	1800	ODP	95.0%	95.8%	96.8%	$ 8,579.30	$ 11,389.65
200 HP 1800 RPM ODP	200	1800	ODP	95.0%	95.8%	96.8%	$ 10,300.80	$ 13,824.80
250 HP 1800 RPM ODP	250	1800	ODP	95.4%	95.8%	96.8%	$ 12,974.08	$ 17,606.28
300 HP 1800 RPM ODP	300	1800	ODP	95.4%	95.8%	96.8%	$ 18,016.13	$ 24,738.51
350 HP 1800 RPM ODP	350	1800	ODP	95.4%	95.8%	96.8%	$ 18,736.70	$ 25,757.80
400 HP 1800 RPM ODP	400	1800	ODP	95.4%	95.8%	96.8%	$ 34,781.70	$ 48,454.24
450 HP 1800 RPM ODP	450	1800	ODP	95.8%	96.2%	97.2%	$ 37,371.59	$ 52,117.76
500 HP 1800 RPM ODP	500	1800	ODP	95.8%	96.2%	97.2%	$ 39,215.70	$ 54,726.34
1 HP 3600 RPM ODP	1	3600	ODP	76.3%	77.0%	78.0%	$ 40,963.08	$ 57,198.10
1.5 HP 3600 RPM ODP	1.5	3600	ODP	82.5%	84.0%	85.0%	$ 677.35	$ 808.91
2 HP 3600 RPM ODP	2	3600	ODP	84.0%	85.5%	86.5%	$ 722.18	$ 872.31
3 HP 3600 RPM ODP	3	3600	ODP	84.0%	85.5%	86.5%	$ 719.70	$ 868.81
5 HP 3600 RPM ODP	5	3600	ODP	85.5%	86.5%	87.5%	$ 745.55	$ 905.38
7.5 HP 3600 RPM ODP	7.5	3600	ODP	87.5%	88.5%	89.5%	$ 779.65	$ 953.62
10 HP 3600 RPM ODP	10	3600	ODP	88.5%	89.5%	90.5%	$ 975.45	$ 1,230.58
15 HP 3600 RPM ODP	15	3600	ODP	89.5%	90.2%	91.2%	$ 1,106.63	$ 1,416.14
20 HP 3600 RPM ODP	20	3600	ODP	90.2%	91.0%	92.0%	$ 2,091.73	$ 2,511.13
25 HP 3600 RPM ODP	25	3600	ODP	91.0%	91.7%	92.7%	$ 2,297.15	$ 2,801.72

30 HP 3600 RPM ODP	30	3600	ODP	91.0%	91.7%	92.7%	$ 2,559.50	$ 3,172.83
40 HP 3600 RPM ODP	40	3600	ODP	91.7%	92.4%	93.4%	$ 2,755.03	$ 3,449.41
50 HP 3600 RPM ODP	50	3600	ODP	92.4%	93.0%	94.0%	$ 3,116.38	$ 3,960.55
60 HP 3600 RPM ODP	60	3600	ODP	93.0%	93.6%	94.6%	$ 3,381.48	$ 4,335.55
75 HP 3600 RPM ODP	75	3600	ODP	93.0%	93.6%	94.6%	$ 4,086.03	$ 5,332.17
100 HP 3600 RPM ODP	100	3600	ODP	93.0%	93.6%	94.6%	$ 4,714.13	$ 6,220.65
125 HP 3600 RPM ODP	125	3600	ODP	93.6%	94.1%	95.1%	$ 6,070.75	$ 7,841.19
150 HP 3600 RPM ODP	150	3600	ODP	93.6%	94.1%	95.1%	$ 7,226.85	$ 9,476.55
200 HP 3600 RPM ODP	200	3600	ODP	94.5%	95.0%	96.0%	$ 8,300.73	$ 10,995.59
250 HP 3600 RPM ODP	250	3600	ODP	94.5%	95.0%	96.0%	$ 9,924.05	$ 13,291.87
300 HP 3600 RPM ODP	300	3600	ODP	95.0%	95.4%	96.4%	$ 10,946.23	$ 14,737.78
350 HP 3600 RPM ODP	350	3600	ODP	95.0%	95.4%	96.4%	$ 14,795.95	$ 20,183.41
400 HP 3600 RPM ODP	400	3600	ODP	95.4%	95.8%	96.8%	$ 20,305.85	$ 27,977.43
450 HP 3600 RPM ODP	450	3600	ODP	95.8%	96.2%	97.2%	$ 21,128.58	$ 29,141.22
500 HP 3600 RPM ODP	500	3600	ODP	95.8%	96.2%	97.2%	$ 23,659.46	$ 32,721.28
1 HP 900 RPM TEFC	1	900	TEFC	74.0%	75.5%	76.5%	$ 34,138.29	$ 47,544.10
1.5 HP 900 RPM TEFC	1.5	900	TEFC	77.0%	78.5%	79.5%	$ 606.40	$ 708.54
2 HP 900 RPM TEFC	2	900	TEFC	82.5%	84.0%	85.0%	$ 667.18	$ 794.51
3 HP 900 RPM TEFC	3	900	TEFC	84.0%	85.5%	86.5%	$ 699.08	$ 839.64
5 HP 900 RPM TEFC	5	900	TEFC	85.5%	86.5%	87.5%	$ 705.40	$ 848.59
7.5 HP 900 RPM TEFC	7.5	900	TEFC	85.5%	86.5%	87.5%	$ 733.45	$ 888.26
10 HP 900 RPM TEFC	10	900	TEFC	88.5%	89.5%	90.5%	$ 948.23	$ 1,192.07
15 HP 900 RPM TEFC	15	900	TEFC	88.5%	89.5%	90.5%	$ 1,038.98	$ 1,320.44
20 HP 900 RPM TEFC	20	900	TEFC	89.5%	90.2%	91.2%	$ 2,031.23	$ 2,425.55
25 HP 900 RPM TEFC	25	900	TEFC	89.5%	90.2%	91.2%	$ 2,211.08	$ 2,679.96
30 HP 900 RPM TEFC	30	900	TEFC	91.0%	91.7%	92.7%	$ 2,488.28	$ 3,072.07
40 HP 900 RPM TEFC	40	900	TEFC	91.0%	91.7%	92.7%	$ 2,741.28	$ 3,429.95
50 HP 900 RPM TEFC	50	900	TEFC	91.7%	92.4%	93.4%	$ 3,078.70	$ 3,907.26
60 HP 900 RPM TEFC	60	900	TEFC	91.7%	92.4%	93.4%	$ 3,285.23	$ 4,199.40
75 HP 900 RPM TEFC	75	900	TEFC	93.0%	93.6%	94.6%	$ 3,970.80	$ 5,169.18
100 HP 900 RPM TEFC	100	900	TEFC	93.0%	93.6%	94.6%	$ 4,878.30	$ 6,452.88
125 HP 900 RPM TEFC	125	900	TEFC	93.6%	94.1%	95.1%	$ 5,917.58	$ 7,624.51
150 HP 900 RPM TEFC	150	900	TEFC	93.6%	94.1%	95.1%	$ 7,118.23	$ 9,322.89
200 HP 900 RPM TEFC	200	900	TEFC	94.1%	94.5%	95.5%	$ 8,361.50	$ 11,081.56
250 HP 900 RPM TEFC	250	900	TEFC	94.5%	95.0%	96.0%	$ 9,714.78	$ 12,995.84
300 HP 900 RPM TEFC	300	900	TEFC	95.0%	95.8%	96.8%	$ 11,613.65	$ 15,681.89
350 HP 900 RPM TEFC	350	900	TEFC	95.0%	95.8%	96.8%	$ 14,419.20	$ 19,650.48
400 HP 900 RPM TEFC	400	900	TEFC	95.0%	95.8%	96.8%	$ 18,744.95	$ 25,769.46
450 HP 900 RPM TEFC	450	900	TEFC	95.0%	95.8%	96.8%	$ 22,947.65	$ 31,714.39
500 HP 900 RPM TEFC	500	900	TEFC	95.0%	95.8%	96.8%	$ 25,087.07	$ 34,740.71
1 HP 1200 RPM TEFC	1	1200	TEFC	80.0%	82.5%	83.5%	$ 38,469.75	$ 53,671.15
1.5 HP 1200 RPM TEFC	1.5	1200	TEFC	85.5%	87.5%	88.5%	$ 1,250.45	$ 1,619.59
2 HP 1200 RPM TEFC	2	1200	TEFC	86.5%	88.5%	89.5%	$ 1,468.25	$ 1,927.67
3 HP 1200 RPM TEFC	3	1200	TEFC	87.5%	89.5%	90.5%	$ 1,757.55	$ 2,336.90
5 HP 1200 RPM TEFC	5	1200	TEFC	87.5%	89.5%	90.5%	$ 1,875.25	$ 2,503.40
7.5 HP 1200 RPM TEFC	7.5	1200	TEFC	89.5%	91.0%	92.0%	$ 2,771.75	$ 3,771.54
10 HP 1200 RPM TEFC	10	1200	TEFC	89.5%	91.0%	92.0%	$ 3,117.70	$ 4,260.90
15 HP 1200 RPM TEFC	15	1200	TEFC	90.2%	91.7%	92.7%	$ 3,576.95	$ 4,910.53
20 HP 1200 RPM TEFC	20	1200	TEFC	90.2%	91.7%	92.7%	$ 5,373.85	$ 7,153.86
25 HP 1200 RPM TEFC	25	1200	TEFC	91.7%	93.0%	94.0%	$ 5,975.00	$ 8,004.22
30 HP 1200 RPM TEFC	30	1200	TEFC	91.7%	93.0%	94.0%	$ 7,192.70	$ 9,726.71
40 HP 1200 RPM TEFC	40	1200	TEFC	93.0%	94.1%	95.1%	$ 7,543.60	$ 10,223.08
50 HP 1200 RPM TEFC	50	1200	TEFC	93.0%	94.1%	95.1%	$ 8,512.15	$ 11,593.14
60 HP 1200 RPM TEFC	60	1200	TEFC	93.6%	94.5%	95.5%	$ 10,238.60	$ 14,035.29
75 HP 1200 RPM TEFC	75	1200	TEFC	93.6%	94.5%	95.5%	$ 11,820.95	$ 16,273.60
100 HP 1200 RPM TEFC	100	1200	TEFC	94.1%	95.0%	96.0%	$ 14,341.05	$ 19,838.41
125 HP 1200 RPM TEFC	125	1200	TEFC	94.1%	95.0%	96.0%	$ 17,278.65	$ 23,695.31
150 HP 1200 RPM TEFC	150	1200	TEFC	95.0%	95.8%	96.8%	$ 18,752.65	$ 25,780.35
200 HP 1200 RPM TEFC	200	1200	TEFC	95.0%	95.8%	96.8%	$ 21,278.25	$ 29,352.94
250 HP 1200 RPM TEFC	250	1200	TEFC	95.0%	95.8%	96.8%	$ 26,523.05	$ 36,771.97
300 HP 1200 RPM TEFC	300	1200	TEFC	95.0%	95.8%	96.8%	$ 31,735.95	$ 44,145.87
350 HP 1200 RPM TEFC	350	1200	TEFC	95.0%	95.8%	96.8%	$ 37,840.40	$ 52,780.91
400 HP 1200 RPM TEFC	400	1200	TEFC	95.0%	95.8%	96.8%	$ 49,540.55	$ 69,331.35
450 HP 1200 RPM TEFC	450	1200	TEFC	95.0%	95.8%	96.8%	$ 52,540.80	$ 73,575.35
500 HP 1200 RPM TEFC	500	1200	TEFC	95.0%	95.8%	96.8%	$ 64,943.30	$ 91,119.29
1 HP 1800 RPM TEFC	1	1800	TEFC	82.5%	85.5%	86.5%	$ 68,133.30	$ 95,631.71
1.5 HP 1800 RPM TEFC	1.5	1800	TEFC	84.0%	86.5%	87.5%	$ 714.75	$ 861.81
2 HP 1800 RPM TEFC	2	1800	TEFC	84.0%	86.5%	87.5%	$ 706.50	$ 850.14
3 HP 1800 RPM TEFC	3	1800	TEFC	87.5%	89.5%	90.5%	$ 868.20	$ 1,078.87
5 HP 1800 RPM TEFC	5	1800	TEFC	87.5%	89.5%	90.5%	$ 1,010.93	$ 1,280.77
7.5 HP 1800 RPM TEFC	7.5	1800	TEFC	89.5%	91.7%	92.7%	$ 1,166.85	$ 1,501.33
10 HP 1800 RPM TEFC	10	1800	TEFC	89.5%	91.7%	92.7%	$ 1,605.20	$ 2,121.40
15 HP 1800 RPM TEFC	15	1800	TEFC	91.0%	92.4%	93.4%	$ 1,817.23	$ 2,421.32
20 HP 1800 RPM TEFC	20	1800	TEFC	91.0%	93.0%	94.0%	$ 3,063.03	$ 3,885.09
25 HP 1800 RPM TEFC	25	1800	TEFC	92.4%	93.6%	94.6%	$ 3,610.28	$ 4,659.20
30 HP 1800 RPM TEFC	30	1800	TEFC	92.4%	93.6%	94.6%	$ 4,007.65	$ 5,221.30
40 HP 1800 RPM TEFC	40	1800	TEFC	93.0%	94.1%	95.1%	$ 4,494.95	$ 5,910.61
50 HP 1800 RPM TEFC	50	1800	TEFC	93.0%	94.5%	95.5%	$ 5,492.10	$ 7,321.13
60 HP 1800 RPM TEFC	60	1800	TEFC	93.6%	95.0%	96.0%	$ 6,293.18	$ 8,454.29
75 HP 1800 RPM TEFC	75	1800	TEFC	94.1%	95.4%	96.4%	$ 7,321.68	$ 9,909.16
100 HP 1800 RPM TEFC	100	1800	TEFC	94.5%	95.4%	96.4%	$ 8,389.78	$ 11,420.04
125 HP 1800 RPM TEFC	125	1800	TEFC	94.5%	95.4%	96.4%	$ 11,167.33	$ 15,050.54
150 HP 1800 RPM TEFC	150	1800	TEFC	95.0%	95.8%	96.8%	$ 12,670.20	$ 17,176.43
200 HP 1800 RPM TEFC	200	1800	TEFC	95.0%	96.2%	97.2%	$ 14,267.40	$ 19,435.75
250 HP 1800 RPM TEFC	250	1800	TEFC	95.0%	96.2%	97.2%	$ 17,679.60	$ 24,262.47
300 HP 1800 RPM TEFC	300	1800	TEFC	95.4%	96.2%	97.2%	$ 23,882.23	$ 33,036.39
350 HP 1800 RPM TEFC	350	1800	TEFC	95.4%	96.2%	97.2%	$ 24,943.45	$ 34,537.55
400 HP 1800 RPM TEFC	400	1800	TEFC	95.4%	96.2%	97.2%	$ 48,573.65	$ 67,963.62
450 HP 1800 RPM TEFC	450	1800	TEFC	95.4%	96.2%	97.2%	$ 52,387.90	$ 73,359.07
500 HP 1800 RPM TEFC	500	1800	TEFC	95.8%	96.2%	97.2%	$ 55,103.80	$ 77,200.84

1 HP 3600 RPM TEFC	1	3600	TEFC	75.5%	77.0%	78.0%	$ 57,677.25	$ 80,841.11
1.5 HP 3600 RPM TEFC	1.5	3600	TEFC	82.5%	84.0%	85.0%	$ 691.10	$ 828.36
2 HP 3600 RPM TEFC	2	3600	TEFC	84.0%	85.5%	86.5%	$ 713.65	$ 860.26
3 HP 3600 RPM TEFC	3	3600	TEFC	85.5%	86.5%	87.5%	$ 735.65	$ 891.38
5 HP 3600 RPM TEFC	5	3600	TEFC	87.5%	88.5%	89.5%	$ 777.45	$ 950.50
7.5 HP 3600 RPM TEFC	7.5	3600	TEFC	88.5%	89.5%	90.5%	$ 829.43	$ 1,024.02
10 HP 3600 RPM TEFC	10	3600	TEFC	89.5%	90.2%	91.2%	$ 1,021.10	$ 1,295.16
15 HP 3600 RPM TEFC	15	3600	TEFC	90.2%	91.0%	92.0%	$ 1,129.73	$ 1,448.81
20 HP 3600 RPM TEFC	20	3600	TEFC	90.2%	91.0%	92.0%	$ 2,208.60	$ 2,676.46
25 HP 3600 RPM TEFC	25	3600	TEFC	91.0%	91.7%	92.7%	$ 2,458.30	$ 3,029.67
30 HP 3600 RPM TEFC	30	3600	TEFC	91.0%	91.7%	92.7%	$ 2,816.90	$ 3,536.93
40 HP 3600 RPM TEFC	40	3600	TEFC	91.7%	92.4%	93.4%	$ 3,125.73	$ 3,973.78
50 HP 3600 RPM TEFC	50	3600	TEFC	92.4%	93.0%	94.0%	$ 3,753.55	$ 4,861.87
60 HP 3600 RPM TEFC	60	3600	TEFC	93.0%	93.6%	94.6%	$ 4,151.75	$ 5,425.14
75 HP 3600 RPM TEFC	75	3600	TEFC	93.0%	93.6%	94.6%	$ 5,520.43	$ 7,361.20
100 HP 3600 RPM TEFC	100	3600	TEFC	93.6%	94.1%	95.1%	$ 6,476.05	$ 8,712.98
125 HP 3600 RPM TEFC	125	3600	TEFC	94.5%	95.0%	96.0%	$ 8,477.28	$ 11,245.33
150 HP 3600 RPM TEFC	150	3600	TEFC	94.5%	95.0%	96.0%	$ 10,087.13	$ 13,522.54
200 HP 3600 RPM TEFC	200	3600	TEFC	95.0%	95.4%	96.4%	$ 11,474.78	$ 15,485.44
250 HP 3600 RPM TEFC	250	3600	TEFC	95.4%	95.8%	96.8%	$ 13,765.80	$ 18,726.21
300 HP 3600 RPM TEFC	300	3600	TEFC	95.4%	95.8%	96.8%	$ 17,585.55	$ 24,129.43
350 HP 3600 RPM TEFC	350	3600	TEFC	95.4%	95.8%	96.8%	$ 24,941.25	$ 34,534.43
400 HP 3600 RPM TEFC	400	3600	TEFC	95.4%	95.8%	96.8%	$ 27,741.03	$ 38,494.85
450 HP 3600 RPM TEFC	450	3600	TEFC	95.4%	95.8%	96.8%	$ 36,483.00	$ 50,860.80
500 HP 3600 RPM TEFC	500	3600	TEFC	95.4%	95.8%	96.8%	$ 43,985.00	$ 61,472.75

Table 14.7 Incremental Costs for VFDs (Derived from customer invoices)

HP	Total Installed Cost	Switched Reluctance Motor[7]	EC Motor[7]
1	$2,182.10	$1,034.00	$2,588.78
2	$2,493.50	$1,073.00	$2,752.19
2	$2,741.03	$1,132.00	$2,915.60
3	$3,132.19	$1,282.00	$3,388.43
5	$3,705.41	$2,271.00	$3,594.60
8	$4,234.18	$3,030.00	$4,592.88
10	$4,654.52	$3,500.00	$5,648.33
15	$5,318.74	$4,619.00	NA
20	$5,846.74	$5,409.00	NA
25	$6,292.12	NA	NA
30	$6,681.09	NA	NA
40	$7,344.33	NA	NA
50	$7,903.80	NA	NA
60	$8,392.40	NA	NA
75	$9,031.71	NA	NA
100	$9,928.29	NA	NA
125	$10,684.59	NA	NA
150	$11,345.11	NA	NA
200	$12,471.35	NA	NA

Table 14.8 Average Motor Efficiency (Derived From Past Participation)

HP	EPACT	NEMA	NEMA +1%	Switched Reluctance[7]
1	81.4%	84.1%	85.1%	86.7%
1.5	83.7%	86.1%	87.1%	87.7%
2	84.1%	86.4%	87.4%	89.6%
3	86.5%	88.9%	89.9%	91.5%
5	87.4%	89.2%	90.2%	92.6%
7.5	88.7%	90.9%	91.9%	93.8%
10	89.4%	91.4%	92.4%	93.6%
15	90.8%	92.4%	93.4%	93.6%
20	90.9%	92.8%	93.8%	94.0%
25	91.8%	93.3%	94.3%	NA
30	92.2%	93.5%	94.5%	NA
40	92.8%	93.8%	94.8%	NA
50	92.9%	94.3%	95.3%	NA
60	93.5%	94.6%	95.6%	NA
75	93.9%	95.0%	96.0%	NA
100	94.2%	95.2%	96.2%	NA
125	94.4%	95.3%	96.3%	NA
150	94.9%	95.6%	96.6%	NA
200	94.9%	95.8%	96.8%	NA
250	95.0%	95.8%	96.8%	NA
300	95.4%	95.8%	96.8%	NA
350	95.4%	96.0%	97.0%	NA
400	95.4%	96.2%	97.2%	NA
450	95.6%	96.2%	97.2%	NA
500	95.8%	96.2%	97.2%	NA

Table 14.9 VFD Energy Savings Factors [6]

Application	ESF
Pumps	
Hot Water Pump	0.482
Chiller Water or Condenser Water Pump	0.432
Industrial	0.333
Other	0.333
Fans	
Constant Volume (no flow control)	0.535
Cooling Tower Fan	0.249
Industrial	0.333
Other	0.333

References

1. NYSERDA (New York State Energy Research and Development Authority), Energy $mart Programs Deemed Savings Database - Source for coincidence factor and useful life
2. Xcel Energy well pump and high static head custom motor rebates
3. Office of Industrial Electric Motor Systems Market Opportunities Assessment : Department of Energy (assessment of 265 Industrial facilities in 1997) - Source for VSD opportunity in the US market along with load factors for fans and pumps along with average savings
4. Efficiency Vermont's Technical Reference User Manual, 2004 - Source for operating hours for non-industrial motors (p.15) and source for measure life, source for load factor
5. MN TRM Version 3.0, "C/I HVAC - ECM Fans" p. 274
6. MN TRM Version 4.0, "C/I HVAC - Variable Speed Drives" p.367
7. Information provided by manufacturer
8. MN TRM Version 4.0, "C/I HVAC - Pump Energy Index" p.381

15.1 Modeled Residential New Construction

Algorithms

$$Customer\ kWh = kWh_{Reference\ Home} - kWhAs_{Built\ Home}$$

$$Summer\ Peak\ kW = Summer\ Peak\ kWReference_{Home} - Summer\ Peak\ kWAs_{Built\ Home}$$

$$WinterPeak\ kW = Winter\ Peak\ kWReference_{Home} - Winter\ Peak\ kWAs_{Built\ Home}$$

$$Customer\ Dth = DthReference - DthAs_{Built\ Home}$$

$$\%\ Better\ Than\ Code = \frac{(MMBTU_{Reference\ Home} - MMBTUAs_{Built\ Home})}{MMBTU_{Reference\ Home}}$$

$$MMBTU_{Reference\ Home} = \{(Heating\ kWh_{Reference\ Home} + Cooling\ kWhReference_{Home} + Water\ Heating\ kWhReference_{Home} + Lighting\ and\ Appliance\ kWh_{Reference\ Home})\ x\ \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ thReference_{Home} + Water\ Heating\ thReference_{Home} + Lighting\ and\ Appliance\ th_{Reference\ Home})\ x\ \frac{1}{10}\}$$

$$MMBTU_{As\ Built\ Home} = \{(Heating\ kWh_{As\ Built\ Home} + Cooling\ kWhAs_{Built\ Home} + Water\ Heating\ kWhAs_{Built\ Home} + Lighting\ and\ Appliance\ kWh_{As\ Built\ Home})\ x\ \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ thAs_{Built\ Home} + Water\ Heating\ thAs_{Built\ Home} + Lighting\ and\ Appliance\ th_{As\ Built\ Home})\ x\ \frac{1}{10}\}$$

$$ICC_{As\ Built\ Home} = \left(\frac{ICC}{SF_a}\ x\ \%\ Better\ Than\ Code^2 + \frac{ICC}{SF_b}\ x\ \%\ Better\ Than\ Code + \frac{ICC}{SFc}\right) x\ ICC\ Adj\ Factor$$

$$ICC\ Adj\ Factor = 1 + (ICC_{Adj\ a}\ x \ln(Home\ Size) + ICCAdj_{b})$$

Variables

Coincidence Factor	90%	Deemed concidence factor
Lifetime	20	Deemed lifetime
ICC_ADJ_a	Table 15.1.1	Constants for use in calculating an Incremental Cost / Square Foot of home. The cost curve is derived from information provided by Residential Science Resources estimates and home modeling of the most common measures implemented to improve the envelope performance over local codes (Reference 3).
ICC_ADJ_b	Table 15.1.1	
ICC/SF_a	Table 15.1.2	Constants for use in calculating an adjustment factor to correct the incremental cost for home size. An increase in homes size reduces the cost per square foot for the same set of measures due to economies of scale. This factor is used in conjunction with the As Built ICC SF cost formula (Reference 2).
ICC/SF_b	Table 15.1.2	
ICC/SF_c	Table 15.1.2	

Modeler Inputs	M&V Verified	
As-Built HERS Score	Yes	As-Built Home's HERS Index Score calculated by the Home Rater using a software modeling tool and provided under HERS Index (Final)
Home_Size	Yes	Total modeled conditioned space of home (sqft)
Summer Peak kW (Reference)	Yes	Reference home summer demand
Winter Peak kW (Reference)	Yes	Reference home winter demand
Reference Heating kW	Yes	Reference home electric heating energy
Reference Cooling kW	Yes	Reference home electric cooling energy
Reference Water Heating kW	Yes	Reference home electric water heating energy
Reference Lights & Appliances kW	Yes	Reference home electric lights & appliance energy
Reference Heating Therms	Yes	Reference home gas heating energy
Reference Water Heating Therms	Yes	Reference home gas water heating energy
Reference Lights and Appliances Therms	Yes	Reference home gas lights & appliance energy
Summer Peak kW (As Built)	Yes	As-built home summer demand
Winter Peak kW (As Built)	Yes	As-built home winter demand
As Built Heating kW	Yes	As-built home electric heating energy
As Built Cooling kW	Yes	As-built home electric cooling energy
As Built Water Heating kW	Yes	As-built home electric water heating energy
As Built Lights & Appliances kW	Yes	As-built home electric lights & appliance energy
As Built Heating Therms	Yes	As-built home gas heating energy
As Built Water Heating Therms	Yes	As-built home gas water heating energy
As Built Lights and Appliances Therms	Yes	As-built home gas lights & appliance energy

Table 15.1.1 Incremental Cost per Square Foot Adjustment Factor Constants

	ICC_ADJ_a	ICC_ADJ_b
IECC 2012	-0.817361291	6.658377406
IECC 2012 - Electric Homes	-0.817361291	6.658377406

Table 15.1.2 Incremental Cost per Square Foot Formula Constants

	ICC/SF_a	ICC/SF_b	ICC/SF_c
IECC 2012	3.0439544984582	4.3783644005126	0.1745156687153
IECC 2012 - Electric Homes	13.6712134574157	3.3698547185842	0.3320586636442

References:

1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
2. RSR energy savings measure modeling, 2016
3. RSR energy savings measure modeling, 2019

Changes from Recent Filing:

15.2 Modeled Affordable Residential New Construction

Algorithms

$$Customer\ kWh = kWh_{Reference\ Home} - kWhAs_{\ Built\ Home}$$

$$Summer\ Peak\ kW = Summer\ Peak\ kWReference_{\ Home} - Summer\ Peak\ kWAs_{\ Built\ Home}$$

$$WinterPeak\ kW = Winter\ Peak\ kWReference_{\ Home} - Winter\ Peak\ kWAs_{\ Built\ Home}$$

$$Customer\ Dth = DthReference - DthAs_{\ Built\ Home}$$

$$\%\ Better\ \ Than\ Code\ = \frac{(MMBTU_{Reference\ Home} - MMBTUAs_{\ Built\ Home})}{MMBTU_{Reference\ Home}}$$

$$MMBTU_{Reference\ Home}\ = \{(Heating\ kWh_{\ Reference\ Home} + Cooling\ kWhReference_{\ Home} + Water\ Heating\ kWhReference_{\ Home} + Lighting\ and\ Appliance\ kWh_{\ Reference\ Home})\ x\ \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ thReference_{\ Home} + Water\ Heating\ thReference_{\ Home} + Lighting\ and\ Appliance\ th_{\ Reference\ Home})\ x\ \frac{1}{10}\}$$

$$MMBTU_{As\ Built\ \ Home}\ = \{(Heating\ kWh_{\ As\ Built\ Home} + Cooling\ kWhAs_{\ Built\ Home} + Water\ Heating\ kWhAs_{\ Built\ Home} + Lighting\ and\ Appliance\ kWh_{\ As\ Built\ Home})\ x\ \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ thAs_{\ Built\ Home} + Water\ Heating\ thAs_{\ Built\ Home} + Lighting\ and\ Appliance\ th_{\ As\ Built\ Home})\ x\ \frac{1}{10}\}$$

Variables

Coincidence Factor	90%	Deemed concidence factor
Lifetime	20	Deemed lifetime

Modeler Inputs	M&V Verified	
As-Built HERS Score	Yes	As-Built Home's HERS Index Score calculated by the Home Rater using a software modeling tool and provided under HERS Index (Final)
Home_Size	Yes	Total modeled conditioned space of home (sqft)
Summer Peak kW (Reference)	Yes	Reference home summer demand
Winter Peak kW (Reference)	Yes	Reference home winter demand
Reference Heating kW	Yes	Reference home electric heating energy
Reference Cooling kW	Yes	Reference home electric cooling energy
Reference Water Heating kW	Yes	Reference home electric water heating energy
Reference Lights & Appliances kW	Yes	Reference home electric lights & appliance energy
Reference Heating Therms	Yes	Reference home gas heating energy
Reference Water Heating Therms	Yes	Reference home gas water heating energy
Reference Lights and Appliances Therms	Yes	Reference home gas lights & appliance energy
Summer Peak kW (As Built)	Yes	As-built home summer demand
Winter Peak kW (As Built)	Yes	As-built home winter demand
As Built Heating kW	Yes	As-built home electric heating energy
As Built Cooling kW	Yes	As-built home electric cooling energy
As Built Water Heating kW	Yes	As-built home electric water heating energy
As Built Lights & Appliances kW	Yes	As-built home electric lights & appliance energy
As Built Heating Therms	Yes	As-built home gas heating energy
As Built Water Heating Therms	Yes	As-built home gas water heating energy
As Built Lights and Appliances Therms	Yes	As-built home gas lights & appliance energy

Table 15.2.1 Incremental Cost by Path and Customer Type (Reference 4)

	Combo	Gas	Electric
11 MSR	$ 13,819.71	$ 10,441.53	$ 14,129.71
12 MSR	$ 14,541.50	$ 10,986.88	$ 14,851.50
13 MSR	$ 14,400.69	$ 10,880.49	$ 14,910.69
10% Overall UA	$ 12,286.45	$ 9,283.07	$ 12,617.45
15% Overall UA	$ 13,078.24	$ 9,881.31	$ 13,409.24
20% Overall UA	$ 16,698.98	$ 12,616.97	$ 17,029.98

References:

1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
2. ICF incremental cost by measure modeling, 2023

Changes from Recent Filing:

Added Affordable New Home Construction

16.1 Anti-Sweat Heater Controls

Algorithms

$$Customer\ kW = kW_{Door} \times \left(1 + \left(\frac{Door\ HF}{COP}\right)\right) \times PAF \times Doors\ Controlled$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

Doors Controlled	Customer Input	Number of doors being controlled
kW_Door	See Table 16.1.1	Average anti-sweat heater kW per door without controls
Door HF	0.35	Residual Heat fraction; estimated percentage of the heat produced by the heaters that remains in the freezer or cooler case and must be removed by the refrigeration unit. (Reference 24)
PAF	See Table 16.1.1	Percent of time the anti-sweat heaters are turned off by the controller
Hours	See Table 16.1.1	Hours per year
Lifetime	12	Measure Lifetime
Incremental Cost per Ton	See Table 16.1.1	Incremental cost of efficient measures; See Table 1.1.1
Coincidence Factor	See Table 16.1.1	Coincidence Factor (Reference 15)

Customer Inputs	M&V Verified	
Application temperature (medium or low temperature case)	Yes	
Number of doors controlled	Yes	

Table 16.1.1	Eq. kW Door (Reference 24)	Eq. PAF	ASHC Hours	ASH Incremental Cost	Eq. Coincidence Factor
Anti-Sweat Heater - Med Temp	0.105	90%	8,760	$180.00	90%
Anti-Sweat Heater - Low Temp	0.191	90%	8,760	$180.00	90%

References:

15. Monitored data from Custom Efficiency projects
24. SCE Workpaper WPSCNRRN0009, Revision 0, Anti-Sweat Heat (ASH) Controls, October 15, 2007
25. Wisconsin Focus on Energy Anti-Sweat Heater Controls Technical Data Sheet, 2004.
40. State of Wisconsin, Public Service Commission of Wisconsin, Focus on Energy Evaluation, Business Programs Deemed Savings Manual, March 22, 2010.
41. The minimum value calculated on Forecast Weather Data Analysis or Forecast Door Openings
42. Illinois Statewide TRM 2015
43. Efficiency Maine Commercial TRM 2015

Changes from Recent Filing:

No Changes

16.2 No Heat Doors

Algorithms

$$Customer\ kW = (kW_{Baseline} - kW_{Proposed}) \times \left(1 + \left(\frac{Door\ HF}{COP}\right)\right) \times Quantity$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

Quantity	Customer Input	Quantity of proposed equipment installed
kW Baseline	See Table 16.2.1	Average kW for a standard case door (Reference 23 and 24)
KW Proposed	See Table 16.2.1	Average kW for a no heat case door (Reference 2)
Door HF	0.35	Estimated percentage of the heat produced by the heaters that remains in the freezer or cooler case and must be removed by the refrigeration unit.
Hours	8,760	Hours per year for no heat case doors (Reference 2)
Lifetime	12.00	Measure Lifetime (Reference 44)
NHD Incremental Cost	See Table 16.2.1	Incremental cost per door
Coincidence Factor	100%	Equipment coincidence factor

Customer Inputs	M&V Verified	
Application temperature (medium or low temperature case)	Yes	
Quantity (# of doors)	Yes	

Table 16.2.1	kW Baseline	kW Proposed	NHD Incremental Cost
No Heat Case Door - Medium Temp.	0.105	0.000	$275.00
No Heat Case Door - Low Temp.	0.191	0.000	$800.00

References:

2. PSC of Wisconsin, Focus on Energy Evaluation, Business Programs: Deemed Savings Manual V1.0
20. Energy Savings Potential and R&D Opportunities for Commercial Refrigeration, Final Report; Submitted to: U.S. Department of Energy, Energy Efficiency and Renewable Energy Building Technologies Program; Navigant Consulting, Inc.; September 23, 2009
23. Pennsylvania PUC Technical Reference Manual, June 2012
24. SCE Workpaper WPSCNRRN0009, Revision 0, Anti-Sweat Heat (ASH) Controls, October 15, 2007
44. California Energy Commission and California Public Utilities Commission. Database for Efficient Resources (DEER) 2008, Effective/Remaining Useful Life Values.

Changes from Recent Filing:

No Changes

16.3 Evaporator Fan Motor Controls

Algorithms

$$Customer\ kW = (kW_{Baseline} - kW_{Proposed}) \times \left(1 + \left(\frac{Heat\ Fraction}{COP}\right)\right) \times Quantity$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

Quantity	Customer Input	Quantity of proposed equipment installed
Speed Reduction	25%	New speed as a percent of full speed (Reference 15)
kW Baseline	0.09696	Average input power for shaded pole motor (Reference 15)
kW Proposed	0.00303	Average input power for shaded pole motor at new speed using fan affinity laws and power exponent of 2.5
Heat Fraction	1.00	Estimated percentage of the heat produced by the heaters that remains in the freezer or cooler case and must be removed by the refrigeration unit.
Hours	See Table 16.3.1	Annual hours at reduced speed for medium and low temperature applications
Lifetime	15.00	Measure Lifetime (Reference 20)
Incremental Cost	$351.49	Incremental cost of efficient measures (Reference 21)
Coincidence Factor	See Table 16.3.1	Coincidence factor for medium and low temperature applications

Customer Inputs	M&V Verified	
Application temperature (medium or low temperature walk-in)	Yes	
Quantity (# of motors controlled)	Yes	

Table 16.3.1	Load Factor	Hours	Coincidence Factor
EFMC - Medium Temp.	62%	3,329	38%
EFMC - Low Temp.	80%	1,717	20%

References:

2. PSC of Wisconsin, Focus on Energy Evaluation, Business Programs: Deemed Savings Manual V1.0, p.4-103 to 4-106.
15. Monitored data from Custom Efficiency projects
20. Energy Savings Potential and R&D Opportunities for Commercial Refrigeration, Final Report; Submitted to: U.S. Department of Energy, Energy Efficiency and Renewable Energy Building Technologies Program; Navigant Consulting, Inc.; September 23, 2011
21. http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf

Changes from Recent Filing:

No Changes

16.4 Medium Temperature Reach-in Case

Algorithms

$$Customer\ kW = Savings\ Factor \times (Load_{Baseline} - Load_{Proposed}) \times Load\ Factor \times \left(\left(\frac{1}{COP}\right)/3412\right) \times Linear\ Feet$$

$$Customer\ kWh = Customer\ kW \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

Linear Feet	Customer Input	Proposed linear feet of equipment installed
Savings Factor	1.00	Amount of time doors are active
TDA	5.5	Total Display area per linear foot. Assumed to be 5.5 square feet based on a 5.5 foot tall glass door.
Baseline Load	1,652	Btuh/ft load of the standard efficiency refrigerated case (Reference 38)
Proposed Load	262	Btuh/ft load of the high efficiency refrigerated case. (Reference 5)
Load Factor	62.0%	Duty cycle of compressor for Medium Temperature
Hours	8,760	Equipment hours per year
Lifetime	15.00	Measure Lifetime
Incremental Cost	See Table 16.4.1	Incremental cost per linear feet of efficient measure (Reference 21).
Coincidence Factor	100%	Equipment coincidence factor

Customer Inputs	**M&V Verified**	
Application temperature (medium temperature)	Yes	
Linear feet installed	Yes	

Table 16.4.1	**Incremental Cost**
Retrofit Medium Temp. Case (Ref. 21)	$686.29
New Medium Temp. Case (Ref. 45)	$337.58

References:

2. PSC of Wisconsin, Focus on Energy Evaluation, Business Programs: Deemed Savings Manual V1.0, p. 4-103 to 4-106.
3. NREL/TP-550-46101 "Grocery Store 50% Energy Savings Technical Support Document" September 2010
5. Average of multiple vendor products
21. http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf
38. 2015 International Energy Conservation Code (IECC)
45. Custom Project History of Medium Temperature Cases

Changes from Recent Filing:

No Changes

16.5 Close The Case

Algorithms

$$kWh\ Open = (Load \times FI\ Open) \times Load\ Factor \times \left(\frac{\left(\frac{1}{COP}\right)}{3412}\right) \times RefHours - HVAC\ kWh\ Open$$

$$kWh\ Closed = (Load \times FI\ Closed) \times Load\ Factor \times \left(\frac{\left(\frac{1}{COP}\right)}{3412}\right) \times RefHours - HVAC\ kWh\ Closed$$

$$HVAC\ kWh\ Open = (Load \times FI\ Open) \times \left(\frac{\left(\frac{1}{COP}\right)}{3412}\right) \times Cooling\ Hours \times Cooling\ Duty\ Cycle$$

$$HVAC\ kWh\ Closed = (Load \times FI\ Closed) \times \left(\frac{\left(\frac{1}{COP}\right)}{3412}\right) \times Cooling\ Hours \times Cooling\ Duty\ Cycle$$

$$Customer\ Dth = (Load \times (FI\ Closed - FI\ Open)) \times Heating\ Hours \times 1/1000000 \times \frac{1}{Heating\ Eff}$$

$$Customer\ kWh = (kWh\ Open - kWh\ Closed) \times LinearFeet$$

$$Customer\ kW = \frac{Customer\ kWh}{Ref\ Hours}$$

$$Customer\ Coincident\ kW\ =\ Customer\ kW\ \times\ Coincidence\ Factor$$

Variables

Linear Feet	Customer Input	Proposed linear feet of equipment installed
Load	See Table 16.5.1	Total refrigeration load per linear foot for Medium and Low Temp. Cases
FI Open	See Table 16.5.1	Fraction of Refrigerated Case Load that is infiltration for open cases
FI Closed	See Table 16.5.1	Fraction of Refrigerated Case Load that is infiltration for closed cases
FCR	13%	Fraction of Refrigerated Case Load that is conduction and radiation (Ref 33)
Cooling Hours	3027	Number of hours per year that facility is in cooling mode, assuming facility balance point of 60 F for typical Minneapolis weather.
Cooling Duty Cycle	70%	Cooling compressor duty cycle
COP hvac	3.2	Coefficient of Performance for facility HVAC system, from Ref 33. This assumes a DX rooftop unit or similar
Heating Hours	5125	Number of hours per year that facility is in heating mode, assuming facility balance point of 60 F for typical Minneapolis weather, with a 5 degree economizing dead band before heating starts at 55 F
Heating Eff	78%	Efficiency of heating system from (Ref. 33)
Lifetime	12.00	Measure Lifetime (Ref 11)
Incremental Cost	$497.82	Incremental cost of efficient measures per linear foot (Ref 34) The incremental cost is split by avoided revenue requirements between gas and electric cost.
Coincidence Factor	100%	Coincidence Factor, based on 8,760 hour run time per year

Customer Inputs	**M&V Verified**	
Application temperature (medium or low temperature)	Yes	
Linear feet installed	Yes	

Table 16.5.1	**Load (Btu/hr/ft)**	**FI Open**	**FI Closed**
Medium Temp. Cases	1500	81.77%	13.77%
Low Temp. Cases	1850	82.76%	14.76%

References:

11. 2008 Database for Energy-Efficient Resources, EUL/RUL (Effective/Remaining Useful Life) Values.
21. http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf
26. Energy Use of Doored and Open Vertical Refrigerated Display Cases, Fricke and Becker; Presented at 2010 International Refrigeration and Air Conditioning Conference
27. Infiltration Modeling Guidelines for Commercial Building Energy Analysis, US Department of Energy Sept 2009
29. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, presented on page 28 of the 11/93 issue of the ASHRAE Journal - "Calculating lighting and HVAC interactions".
33. Wisconsin Focus on Energy Technical Reference Manual 2015, pg. 238-241
34. Costs calculated and derived from four open-to-closed refrigerated case custom rebate projects.
35. Work Paper PECIREF_PGE604 Vertical Refrigerated Case, Medium Temperature: Open to Closed (Retrofit)

Changes from Recent Filing:

Corrected values for Cooling Hours and Heating Hours

16.6 Walk-in Freezer Defrost Controls

Algorithms

$$Customer\ kWh = ((Baseline\ Duration/(60 \times Baseline\ Interval)) - (Proposed\ Duration/(60 \times Proposed\ Interval))) \times Defrost\ Wattage\ \times Hours \times (1 + 1/COPFreezer)$$

$$Customer\ Coincident\ kW = (Customer\ \ kWh\ \times Coincidence\ Factor)/Hours$$

Variables

Hours	8760	Annual operating hours of refrigeration system
Baseline Interval	6.0	Baseline hours between defrost cycles (Ref. 46)
Proposed Interval	24.0	Proposed hours between defrost cycles (Ref. 46)
Baseline Duration	40.0	Baseline defrost duration with timer control (Ref. 46)
Proposed Duration	27.0	Proposed defrost duration with demand controls (Ref. 46)
Lifetime	15	Assumed lifetime for commercial controls
Incremental Cost	$1,695.00	Average cost from Custom projects (Ref. 47)
Coincidence Factor	100%	Savings coincidence with summer hours 2pm-6pm

Customer Inputs	**M&V Verified**	
Defrost Wattage	Yes	Defrost coil wattage being controlled

References:

46. Energy Analysis of KE2 Controllers for Walk-in Freezers; Michaels Energy; January 20, 2015
47. Custom project history of Defrost Controls

Changes from Recent Filing:

Updated Incremental Cost

16.7 Floating Head Pressure Controls

Algorithms

$$Avg\ LT\ kW = LT\ Tons \times LT\ \%Load \times (LT\ Eff\ Baseline - \text{LT Eff Proposed})$$

$$Avg\ MT\ kW = MT\ Tons \times MT\ \%Load \times (MT\ Eff\ Baseline - \text{MT Eff Proposed})$$

$$Customer\ kW = Avg\ LT\ kW + Avg\ MT\ kW$$

$$Customer\ kWh = (Avg\ LT\ kW + Avg\ MT\ kW) \times \text{Hours}$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables

Hours	8760	Annual operating hours of refrigeration system
LT %Load	75%	Low Temperature Load Factor (Ref. 48)
MT %Load	50%	Medium Temperature Load Factor (Ref. 48)
LT Eff Baseline	2.19	Low Temperature Baseline Average kW/Ton (Ref. 48)
LT Eff Proposed	1.97	Low Temperature Proposed Average kW/Ton (Ref. 48)
MT Eff Baseline	1.13	Medium Temperature Baseline Average kW/Ton (Ref. 48)
MT Eff Proposed	0.96	Medium Temperature Proposed Average kW/Ton (Ref. 48)
Lifetime	15	Assumed lifetime for commercial controls
Incremental Cost	$4,185.00	Average cost from completed Custom projects (Ref. 49)
Coincidence Factor	0%	Savings coincidence with summer hours 2pm-6pm

Customer Inputs	**M&V Verified**	
LT Tons	Yes	Design evaporator load on low temperature racks
MT Tons	Yes	Design evaporator load on medium temperature racks

References:

48. Custom M&V project energy consumption, operation, and savings on Floating Head Pressure Controls
49. History of Completed Custom project costs for Floating Head Pressure Controls

Changes from Recent Filing:

No Changes

16.8 DI Strip Curtains

Algorithms

$$Customer\ kW = Quantity\ \times kW\ Per\ SF \times Area\ SF$$

$$Customer\ kWh = Quantity\ \times kWh\ Per\ SF \times Area\ SF$$

$$Customer\ Coincident\ kW\ =\ Customer\ kW\ \times\ \ Coincidence\ Factor$$

Variables

Area SF	See Table 16.8.1	Door area in square feet. (Reference 1)
kW Per SF	See Table 16.8.1	kW saved per square foot of curtain installed. (Reference 1)
kWh Per SF	See Table 16.8.1	kWh saved per square foot of curtain installed. (Reference 1)
Lifetime	4	Measure Lifetime in years. (Reference 1)
Total Cost*	$270.83	Incremental cost of efficient measures (Reference 1) *Costs are re-evaluated throughout the year and updated to account for the evolving market.
Coincidence Factor	100%	Coincidence factor for medium and low temperature applications. (Reference 1)

Customer Inputs

	M&V Verified	
Facility Type	Yes	Facility and its temperature application
Quantity	Yes	
Pre Existing Curtains?	No	

Table 16.8.1

Facility Type	Pre-Existing Curtains?	kWh Savings/ Sq Ft	kW Savings/ Sq Ft	Doorway Area Sq Ft
Supermarket - Cooler	Yes	37	0.0042	35
	No	108	0.0123	35
Supermarket - Freezer	Yes	119	0.0136	35
	No	349	0.0398	35
Convenience Store - Cooler	Yes	5	0.0006	21
	No	20	0.0023	21
Convenience Store - Freezer	Yes	8	0.0009	21
	No	27	0.0031	21
Restaurant - Cooler	Yes	8	0.0009	21
	No	30	0.0034	21
Restaurant - Freezer	Yes	34	0.0039	21
	No	119	0.0136	21
Refrigerated Warehouse	Yes	254	0.0290	80
	No	729	0.0832	80

References:

1. Data from Illinois TRM 2019. Efficient equipment is a strip curtain at least 0.06 inches thick and covers entire doorway. A doorway area of 26.5 sq ft was assumed based on the weighted average of estimated customer participants by customer type.

Changes from Recent Filing:

No Changes

16.9 DI Auto Close Doors

Algorithms

$$Customer\ kW = Quantity\ \times PCkW$$

$$Customer\ kWh = Quantity \times kWh$$

$$Customer\ Coincident\ kW\ = Quantity \times PCkW$$

Variables

kWh	See Table 16.9.1	kWh saved per door. (Reference 1)
PCkW	See Table 16.9.1	PCkW saved per door. (Reference 1)
Lifetime	8	Measure Lifetime in years. (Reference 1)
Total Cost*	$156.82	Incremental cost of efficient measures (Reference 1) *Costs are re-evaluated throughout the year and updated to account for the evolving market.

Customer Inputs	M&V Verified	
Application	Yes	Walk-in Cooler or Freezer
Quantity	Yes	
Pre Existing Curtains	No	

Table 16.9.1

Application	Annual kWh	PCkW
Walk-in Cooler	943	0.137
Walk-in Freezer	2,307	0.309

References:

1. Data from Illinois TRM 2019 and DEER Database. Baseline assumes no auto closers.

Changes from Recent Filing:

No Changes

16.10 Refrigeration Recommissioning

$$Customer\ kW = kW\ Savings$$

$$Customer\ kWh = kW\ Savings \times Hours$$

$$Customer\ Coincident\ kW = Customer\ kW \times Coincidence\ Factor$$

Variables (Reference 1)

kWh Savings	39,244	Custom calculation on an individual basis. Estimate based on an average kWh savings from past Custom refrigeration recommissioning projects.
kW Savings	4.480	Custom calculation on an individual basis. Estimate based on an average kW savings from past Custom refrigeration recommissioning projects.
Coincidence Factor	37.5%	Coincidence of energy demand savings to grid peak demand, calculated on individual basis. Estimate based on participation history in past Custom refrigeration recommissioning projects.
Lifetime	7	Standard lifetime assumption for recommissioning measures.
Incremental Cost	$4,401	Based on average incremental from past Custom refrigeration recommissioning projects.

References:

1. Past Custom refrigeration recommissioning projects.

Changes from Recent Filing:

New Custom Measure

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Table 16.6.0

COP_{Cooler}	2.28	Medium Temperature COP for Coolers
$COP_{Freezer}$	1.43	Low Temperature COP for Freezers
Annual Hours	8,760	Hours per year of Refrigeration system operation
Door HF	0.35	Door Residual Heat Fraction
Ref Hours	8,760	Annual hours for refrigeration equipment
MT Load Factor	62%	Compressor Duty Cycle - Medium Temp.
LT Load Factor	80%	Compressor Duty Cycle - Low Temp.

References

1. Energy Savings Potential and R&D Opportunities for Commercial Refrigeration, Final Report; Submitted to: U.S. Department of Energy, Energy Efficiency and Renewable Energy Building Technologies Program; Navigant Consulting, Inc.; September 23, 2009
2. PSC of Wisconsin, Focus on Energy Evaluation, Business Programs: Deemed Savings Manual V1.0
3. NREL/TP-550-46101 "Grocery Store 50% Energy Savings Technical Support Document" September 2009
4. State of Illinois Energy Efficiency Technical Reference Manual, Page 131. July 18, 2012.
5. Average of multiple vendor products
7. US DOE Building America Program. Building America Analysis Spreadsheet, Standard Benchmark DHW Schedules
8. State of Illinois Energy Efficiency Technical Reference Manual, June 1st, 2012. Pages 109-113.
11. 2008 Database for Energy-Efficient Resources, EUL/RUL (Effective/Remaining Useful Life) Values.
14. Efficiency Vermont Technical Reference User Manual, 2/19/2010.
15. Monitored data from Custom Efficiency projects
16. Northwest Regional Technical Forum
17. Comprehensive Process and Impact Evaluation of the (Xcel Energy) Colorado Motor and Drive Efficiency Program, FINAL, March 28, 2011, TetraTech
18. ECM incremental costs are from Southern California Edison Work Paper WPSCNRRN0011: Evaporator Fan Motors
19. New York Standard Approach for Estimating Energy Savings from Energy Efficiency Measures in Commercial and Industrial Programs, Sept 1, 2009.
20. Energy Savings Potential and R&D Opportunities for Commercial Refrigeration, Final Report; Submitted to: U.S. Department of Energy, Energy Efficiency and Renewable Energy Building Technologies Program; Navigant Consulting, Inc.; September 23, 2009
21. http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf
22. A Study of Energy Efficient Solutions for Anti-Sweat Heaters. Southern California Edison RTTC. December 1999
23. Pennsylvania PUC Technical Reference Manual, June 2011
24. SCE Workpaper WPSCNRRN0009, Revision 0, Anti-Sweat Heat (ASH) Controls, October 15, 2007
25. Wisconsin Focus on Energy Anti-Sweat Heater Controls Technical Data Sheet, 2004.
26. Energy Use of Doored and Open Vertical Refrigerated Display Cases, Fricke and Becker; Presented at 2010 International Refrigeration
27. Infiltration Modeling Guidelines for Commercial Building Energy Analysis, US Department of Energy Sept 2009
28. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant. CF and hours
29. HVAC Interactive Factors developed based on the Rundquist Simplified HVAC Interaction Factor method for Minnesota, presented on page 28 of the 11/93 issue of the ASHRAE Journal - "Calculating lighting and HVAC interactions".
30. Technical Reference User Manual No. 2004-31, Efficiency Vermont, 12/31/04. CF and Hours
31. Deemed Savings Database, Minnesota Office of Energy Security, 2008. CF, Hours, kW, Costs, Measure life
33. Wisconsin Focus on Energy Technical Reference Manual 2015, pg. 238-241
34. Costs calculated and derived from four open-to-closed refrigerated case custom rebate projects.
35. Work Paper PECIREF_PGE604 Vertical Refrigerated Case, Medium Temperature: Open to Closed (Retrofit)
36. ENERGY STAR
38. 2015 International Energy Conservation Code (IECC)
39. State of Illinois Energy Efficiency Technical Reference Manual, Pages 60-63 & Pages 90-97. February 8th, 2017.
40. State of Wisconsin, Public Service Commission of Wisconsin, Focus on Energy Evaluation, Business Programs Deemed Savings Manual, March 22, 2010.
41. The minimum value calculated on Forecast Weather Data Analysis or Forecast Door Openings
42. Illinois Statewide TRM 2015
43. Efficiency Maine Commercial TRM 2015
44. California Energy Commission and California Public Utilities Commission. Database for Efficient Resources (DEER) 2008, Effective/Remaining Useful Life Values.
45. Custom Project History of Medium Temperature Cases
46. Energy Analysis of KE2 Controllers for Walk-in Freezers; Michaels Energy; January 20, 2015
47. Custom project history of Defrost Controls
48. Custom M&V project energy consumption, operation, and savings on Floating Head Pressure Controls
49. History of Completed Custom project costs for Floating Head Pressure Controls

21.1 Residential Codes & Standards

Algorithms

$$Program\ Net\ Annual\ Therms = (Program\ Gross\ Potential\ Annual\ Therms * Construction\ Adjustment\ Factor) * Compliance\ Rate * Annual\ Utility\ Attribution$$

$$Program\ Net\ Annual\ kWh = (Program\ Gross\ Potential\ Annual\ kWh * Construction\ Adjustment\ Factor) * Compliance\ Rate * Annual\ Utility\ Attribution$$

$$Program\ Net\ PC\ kW = \frac{Program\ Net\ Annual\ kWh}{8760}$$

Variables

Program Gross Potential Annual (kWh)	Calculated Value	Calculated value for annual electric savings for each program year. (see Description 21.1.1)
Construction Adjustment Factor	See Description 21.1.1	Xcel Energy included an adjustment factor applied to the program gross potential annual kWh to account for differences in assumed construction volume and actual construction volume in prospective states and are leaving this adjustment factor in for retrospective states, but recognize that it will be up to the evaluator to determine if it's use is appropriate.
Compliance Rate $_{yr\ x}$	Table 21.1.3	Assumed compliance rate for each year after a new code is adopted. (See Description 21.1.2)
Annual Utility Attribtion	Calculated Value	Assumed 68% for construction affected by 2024 program activities, and 76% for 2025-2029 program activities. (See Description 21.1.3)
Foundation Type	See Table 21.1.6 and Table 21.1.7	Foundation type - slab, crawlspace, heated basement, and unheated basement.
Heating System Type	See Table 21.1.6 and Table 21.1.7	Heating system type - electric resistance, gas furnace, oil furnace, heat pump
Lifetime	20	Measure Lifetime.
Incremental Cost	$0.00	Difference in cost between the baseline product and the more efficient product.

Customer Inputs	M&V Verified	
None	N/A	

Table 21.1.1 Gross Annual Residential Electric Savings

Program Year	Gross Potential Savings (MWh)
2024	40,028
2025	81,657
2026	16,620
Total	**138,305**

Table 21.1.2 Gross Annual Residential Gas Savings

Program Year	Gross Potential Savings (Dth)
2024	215,833
2025	440,299
2026	47,196
Total	**703,328**

Table 21.1.3 Compliance Rates By Year Since Code Adopted (Program Year)

Program Year	Residential Compliance Rate
PY1 (2024)	Full compliance
PY2 (2025)	Full compliance
PY3 (2026)	60%

Table 21.1.4 Assumed Code Adoption Schedule By County Group

Sector	PY0 Baseline	PY1 2024	PY2 2025	PY3 2026
Residential	IECC 2006	IECC 2012	IECC 2012	IECC 2012

Table 21.1.5 Code Compliance Activities in Minnesota & Utilities' Proportion

Activity	Department of Labor & Industry	U of MN	AMBO	Utilities (PY1)	Portion Attribuitable to Utilities (PY1)	Utilities (PY2-3)
Trainings	$7,600	$3,000	$800	$24,975	68%	$50,950
Circuit Rider	$144,000	$0	$0	$240,000	63%	$360,000
Technical Tools	$0	$0	$0	$64,688	100%	$73,063
Utility Attribution					68%	

Table 21.1.6 Single-Family Homes Heating System and Foundation Type, Percent of Floor Area

	Foundation Type			
Heating System Type	Slab	Crawlspace	Heated Basement	Unheated Basement
Electric Resistance	0.80%	0.60%	1.70%	0.50%
Gas Furnace	13.00%	10.10%	27.40%	8.60%
Oil Furnace	0.20%	0.10%	0.40%	0.10%
Heat Pump	8.00%	6.20%	16.90%	5.30%

Table 21.1.7 Multifamily Homes Heating System and Foundation Type, Percent of Floor Area

	Foundation Type			
Heating System Type	Slab	Crawlspace	Heated Basement	Unheated Basement
Electric Resistance	0.80%	0.60%	1.70%	0.50%
Gas Furnace	13.00%	10.10%	27.40%	8.60%
Oil Furnace	0.20%	0.10%	0.40%	0.10%
Heat Pump	8.00%	6.20%	16.90%	5.30%

Descriptions

21.1 Program Gross Potential Annual kWh

Gross potential savings was calculated by comparing the difference between a building's energy use intensity (EUI) that just meets a jurisdictions current energy code and a building's EUI that just meets the previous code. The gross potential savings calculation assumes that all buildings are 100% compliant with code and that there is no over- or under-performance of buildings relative to code, which prevents double counting of savings relative to new construction programs. EUI data was obtained from the Pacific Northwest National Laboratory (PNNL) Residential Prototype Building Models (https://www.energycodes.gov/development/residential/iecc_models) for single family detached houses and multifamily low-rise detached apartment buildings in ASHRAE climate zones 6A and 7 for for 2006 IECC, 2012 IECC, and 2021 IECC. Appendix C page C-1 discusses the data sources for these assumptions in detail.

Minnesota adopts code statewide. As such, gross potential savings in Minnesota was conducted in two groups, one each for climate zones 6A and 7.

As discussed in Section 4.2 of the Report (page 32), under current state law, Minnesota energy codes can be updated every six years. During 2020, the last update cycle, the residential energy code was not updated. There were two bills in the Minnesota legislature in 2022 that could impact the energy code, but neither bill was adopted. Therefore, we assumed the state would remain on the same six year cycle during the forecast period with the next code update enforced in 2026. The Department of Labor and Industry started the review process for the 2021 IECC, so we assumed the state would adopt 2021 IECC for residential. For these calculations, we assumed that codes become effective at the start of the calendar year. The resulting code adoption schedule is shown in Table 21.1.4 Assumed Code Adoption Schedule By County Group (See CHAPTER 4.2 AND PAGE 33 OF REPORT).

Savings were calculated for each year of the program using the EUI for each building type within each county group and the code adoption schedule. To calculate savings the EUI is multiplied by the total square footage of residentiall new construction in a jurisdiction. The utilities obtained historical construction square footage from the Census Building Permit Survey and from the Census Survey of Construction for the residential sector. Detailed information, data sources, and assumptions for construction data is discussed in the gross potential savings section of the report (Chapter 4.2 pages 30-34) and Appendix C pages C-1 through C-7.

Census data for 2015 through 2020 were used to estimate an average yearly statewide growth rate for single-family and low-rise multifamily new construction. Single-family construction starts were used in this calculation given variability of the low-rise multifamily growth rate during this time period. The research team then consulted more recent sources that suggest overall construction growth will be down in the US between 2022-2025 and adjusted the estimated growth rate accordingly. Additional detail on the growth rates, and how they were derived, is included in Appendix C page C-4.

21.2 Compliance Rate

The gross potential savings assumes buildings are 100% compliant with code. However, in practice, not all buildings are 100% compliant with code. Minnesota compliance studies show increasing compliance with code as time goes on, which aligns with the results from compliance studies and programs in other states. Since the residential code will have been on the 2012 IECC for 10 years by the time the proposed program would start, and the Minnesota compliance studies show high compliance, the utilities assumed the program would not achieve substantially higher compliance rates; full compliance was assumed for PY1 and PY2. Estimates of compliance from other regions at various points throughout a code cycle were used to estimate compliance for Minnesota after the new code is enforced in 2026. In other states, after a new code is adopted, compliance rates drop to between 50 – 80%, where 50% was found in a state (Arizona) where the code hadn't changed in a long time, and the program was fairly new; and 80% (Massachusetts) was found in a state where new codes were adopted every three years and had a robust codes program. As the Minnesota residential code hasn't changed in over a decade, the utilities assumed 60% compliance after the new code is adopted in 2026. By 2026 the program would be fully launched, so the utilities also assumed compliance will increase by 10% each year. Compliance rates are outlined in Table 21.1.3 Compliance Rates By Number of Years since Code Adoption and Program Year (See CHAPTER 4.2 AND PAGE 35 OF REPORT).

21.3 Annual Utility Attribution

Attribution refers to the portion of code savings that can be credited to the utility's program efforts for increasing code compliance or assisting with the adoption of codes and standards (Cadmus. "California Statewide Codes and Standards Program Impact Evaluation Phase Two Volume Two: 2013 T24." June 23, 2017). While there is not currently a codes program in Minnesota, there are other organizations that conduct compliance improvement activities in Minnesota. To capture the influence of these activities, the utilities gathered detailed information on activities performed by key market actors within the state. These activities, as well as proposed activities designed to meet current market gaps and complement existing activities, are shown in Table 21.1.4 Code Compliance Activities in Minnesota & Utilities Proportion (See CHAPTER 4.2 PAGES 37 OF REPORT). Additional details regarding the information collected is available in the section "Attribution & Claimable Savings" of the report page 36-37. The utilities then determined the proportion of each activity the utilities were responsible for relative to other actors, and took an average of these activities to determine the total proportion of code activities for which the utilities are currently responsible, which is shown in Table 21.1.4 Code Compliance Activities in Minnesota & Utilities Proportion (See CHAPTER 4.2 PAGE 37 OF REPORT). Attribution is lower in the first program year, at 68%, as it is assumed the program will be ramping up, and Minnesota is approaching the end of a code cycle. Attribution increases to 76% in PY2-PY6 once the utilities begin ramping up code compliance support activities in anticipation of a code change. It is important to note that this calculation assumes activities conducted by other organizations that conduct compliance improvement activities in Minnesota will remain constant; no ramp up in anticipation of a code change is assumed for these organizations.

References:

1. Minnesota Code Program Development Report, January 2023, Prepared by TRC

17.0 DEEMED Tables

Table 17.0.1: Effective Full Load Hours	Cooling EFLH		Heating EFLH		Heat Pump Impacted Heating EFLH ** EFLH_Heating_HP			
	Single Family	Multi-Family ***	Single Family	Multi-Family ***	Single Family	Multi-Family ***	Altitude Adjustment Factor	HSPF Climate Zone Adjustment Factor
Zone 1 (Northern MN ****)	213	228	2,280	1,761	N/A	N/A	1.000	85%
Zone 2 (St. Cloud Regional Airport)	454	538	2,017	1,558	583	450	1.000	85%
Zone 3 (MSP Airport)	392	464	1,881	1,453	673	520	1.000	85%

Notes: Climate Zone 2 - St Cloud NSRDB TMY3 2021 data for station 761584

** the heat pump impacted hours are determined at a cutoff temperature of 30 F.

*** The ratios between Single Family and Multi-Family EFLH derived from the MN TRM 3.3 Heating and Cooling full load hours

**** Northern MN based on MN TRM v3.3

	Cold Climate Heat Pump Full Load Hours w/ 5 F Cutover *****		Cold Climate Heat Pump Full Load Hours w/ 10 F Cutover *****		Cold Climate Heat Pump Full Load Hours w/ 15 F Cutover *****		Cold Climate Heat Pump Full Load Hours w/ 20 F Cutover *****		Cold Climate Heat Pump Full Load Hours w/ 25 F Cutover *****	
Table 17.0.2: Effective Full Load Hours Cold Climate Heat Pumps	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family
Zone 2 (Middle St. Cloud Regional AP)	1,582	1,222	1,398	1,080	1,285	992	1,059	818	868	670
Zone 3 (Southern MN/Twin Cities)	1,588	1,226	1,505	1,162	1,382	1,067	1,209	934	860	664
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0

**** All Cutover Temperatures are defined as the Outdoor Ambient Temperature where Backup Heat or Supplemental Heat is required to serve the load

	for units manufactured after 1/1/2023				
Table 17.0.3: Minimum Qualifying Efficiency	Minimum Qualifying SEER2	Minimum Qualifying EER2	Minimum qualifying HSPF2	Minimum qualifying Heating COP at 5 F	Capacity Maintenance
High Efficiency Air Conditioner - Split System	15.2	12.0	N/A	N/A	
Air Source Heat Pump - Split System	15.2	9.6	7.8	N/A	
Mini-Split & Multi-Split Heat Pumps	15.2	9.3	8.5	N/A	
Cold Climate Air Source Heat Pumps (Ducted & Mixed Ducted / Non-Ducted)	15.20	10.0	8.1	1.75	70% (5 F Max / 47 F Rated)
Cold Climate Mini-Split & Multi-Split Heat Pumps (Non-Ducted)	16.00	9.00	9.50	1.75	70% (5 F Max / 47 F Rated)
Ground Source Heat Pump **	N/A	16.0	N/A	3.3	

** Ground Loop Brine to Air with entering temperatures of 77 F cooling mode and 32 F heating mode

Table 17.0.4: Baseline Efficiencies	for units manufactured after 1/1/2023			
Equipment Type	SEER2 Baseline	EER2 Baseline	HSPF2 Baseline (HP Baseline)	Default COP2 Baseline (ER or Gas Heating)
High Efficiency Air Conditioner - Split System	13.40	11.42	N/A	N/A
High Efficiency Air Conditioner - Packaged System	13.40	11.42	N/A	N/A
Air Source Heat Pump - Split System - Gas Backup *	13.40	11.42	N/A	0.96
Air Source Heat Pump - Split System - Elec Resist. Backup *	13.40	11.42	3.412	1.00
Air Source Heat Pump - Cooling Only ***	14.30	10.17	7.5	N/A
Mini-Split & Multi-Split Heat Pumps - Gas Backup *	13.40	11.42	N/A	0.96
Mini-Split & Multi-Split Heat Pumps - Elec Resist. Backup *	13.40	11.42	3.412	1.00
Cold Climate Air Source Heat Pumps - Gas Backup *	13.40	11.42	N/A	0.96
Cold Climate Air Source Heat Pumps - Elec Resist. Backup *	13.40	11.42	3.412	1.00
Cold Climate Mini-Split & Multi-Split Heat Pumps - Gas Backup *	13.40	11.42	N/A	0.96
Cold Climate Mini-Split & Multi-Split Heat Pumps - Elec Resist. Backup *	13.40	11.42	3.412	1.00
Gorund Source Heat Pump w/ Furance & AC Baseline	13.40	11.42	N/A	0.80
Gorund Source Heat Pump w/ ER in Air Handler & AC Baseline	13.40	11.42	N/A	1.00
Gorund Source Heat Pump w/ Boiler + Air Handler & AC Baseline	13.40	11.42	N/A	0.84

* ASHP & MSHP baseline case is a Standard AC with Condensing Furnace, Boiler, or Electric Resistance Heat

*** Baseline is code minimum ASHP

Table 17.0.5: Coincidence Factors, Baseline Efficiencies and Lifetimes

Equipment Type	Deemed Equipment Coincidence Factor	Deemed QI Coincidence Factor	Lifetime	Notes
High Efficiency Air Conditioner	90%	90%	18	(Reference 17)
Air Source Heat Pump	90%	90%	18	(Reference 17)
Mini-Split & Multi-Split Heat Pumps	90%	N/A	15	
Ground Source Heat Pump **	90%	100%	20	

** Baseline for GSHP is Code minimum AC and Gas Fired Furnace.

Table 17.0.6: QI Factors (Reference 4, Reference 6, Reference 7, Reference 14)

Home Type - equipment type	Sizing Loss	Refrigeration Charge	Improper Airflow	Duct Leakage	Baseline System Loss NO QI	Proposed System Uncorrectable Losses **
New Home - AC	0%	7.0%	2.0%	0%	9.0%	0%
Existing Home - AC	2.0%	7.0%	2.0%	8.3%	19.3%	3.7%
New Home - ASHP *	0%	7.0%	2.0%	0%	9.0%	0%
Existing Home - ASHP *	2.0%	7.0%	2.0%	8.3%	19.3%	3.7%
New Home - GSHP *	0%	0.0%	2.0%	0%	9.0%	0%
Existing Home - GSHP *	2.0%	0.0%	2.0%	8.3%	19.3%	3.7%
New Home MSHP *	0.0%	0.0%	0.0%	0.0%	9.0%	0.0%
Existing Home MSHP *	0.0%	0.0%	0.0%	0.0%	19.3%	0.0%

Notes: * The baseline Cooling System for these measures will be a non-quality installed AC system of comparable capacity and in the same Home Type
** Uncorrectable losses are with respect to the proposed system installation

Table 17.0.7: Conversion Factors

Conversion Factor from BTUH to kW	3,412	BTU/kW-hr
Btu to Dth	1,000,000	BTU/Dth
Therm to Dth	10	Therm/Dth
Btu to Therm	100,000	Btu/Therm
Convert from Btu/wh to kW/ton	12	Btu/wh per kW/ton
Conversion between watts and kilowatts	1,000	watts/kilowatt
Conversion between BTU/h and tons	12,000	BTUh / ton

Table 17.0.8: Cooling & Heating Weather Data for Load Estimates	**Maximum Outside Air Temperature (F)**	**Mimimum Outside Air Temperature (F)**	**Balance Point OSA Temperature (F)**	**Balance Point Load (BTUH)**
Zone 3 - MN Minn St Paul	99	-24	60	0
Zone 2 - MN St Cloud Regional	94	-24	60	0
	0	0	60	0
	0	0	60	0

Table 17.0.9: AHRI Cross walk factors (Converting Appendix M to Appendix M1)	**SEER2**	**EER2**	**HSPF2**
ducted	0.95	0.95	0.85
non-ducted	1	1	0.9
packaged	0.95	0.95	0.84

References for All Measures:

1. Building America, Research Benchmark Definitions, 2010. (see p. 10) http://www.nrel.gov/docs/fy10osti/47246.pdf
2. ASHRAE, 2019, Applications Handbook, Ch. 38, table 4, Comparison of Service Life Estimates
3. DOE Appliance Standards Website, Residential Central Air Conditioners and Heat Pumps. https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/75
4. Neme, Proctor, Nadel, ACEEE, 1999. Energy Savings Potential From Addressing Residential Air Conditioner and Heat Pump Installation Problems, http://aceee.org/research-report/a992
5. State of Minnesota Technical reference Manual For Energy Conservation Improvement Programs, Version 3.3
6. GSHP Incremental costs were determined from analysis of invoices collected in similar measures for Public Service Company of CO
7. NREL 2011 Measure Guideline Sealing and Insulating Ducts in Existing Homes. http://www.nrel.gov/docs/fy12osti/53494.pdf
8. State of Illinois Technical Reference Manual Version 8, dated 2020
9. For explanation of duct sealing requirements for new homes see "Significant Changes to the 2015 Minnesota Residential Codes (MR 1303, 1309 and 1322)". http://www.ci.minneapolis.mn.us/www/groups/public/@regservices/documents/webcontent/wcms1p-142763.pdf
10. Incremental costs for MSHPs and ccMSHPs were determined from anlaylsis of invoices collected in similar measures for Pubilc Service Company of CO.
11. MSHP equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-life-report-residential-and-commercialindustrial-lighting-and-hvac-measures
12. For estimated life of GSHP see http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640 (indoor components up to 25 years; ground loop =50 years)
13. Costs obtained from "2010-2012 WO017 Ex Ante Measure Cost Study Final Report", by Itron, May 2014. These are used in the DEER 2016 database.
14.For assumptions on losses related to overcharge or undercharge on refrigerant see "Sensitivity Analysis of Installation Faults on Heat Pump Performance", by P. Domanski, et. al., Sept 2014, http://www.acca.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=f02c1f61-4d1d-4a24-971d-cc9ea3e626b2&forceDialog=0
15. ENERGY STAR Connected Thermostat Key Product Criteria, Version 1.0, Rev. Jan 2017 - https://www.energystar.gov/products/heating_cooling/smart_thermostats/key_product_criteria
16. Code of Federal Regulations Title 10: Energy PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS Subpart C—Energy and Water Conservation Standards https://www.ecfr.gov/cgi-bin/text-idx?SID=2942a69a6328c23266612378a0725e60&mc=true&node=se10.3.430_132&rgn=div8
17: "Measure Life Report - Residential and Commercial/Industrial Lighting and HVAC Measures", dated June 2007 for The New England State Program Working Group prepared by GDS Associates, Inc.
18. Assumptions on EC fan operating modes. Center for Energy and Environment Comments to Docket Number EERE-2010-BT-STD-0011-0022, July 27, 2010
19. Baseline Furnace Fan Energy for efficient fuel switching measures derived from CFR 430 requirements for furnaces manufactured after 2019. fan energy requirements found at: https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-C/section-430.32
20. Xcel Energy, January 2019. Typical MN Residential Smart Switch Load Relief 2011-2015.
21. Xcel Energy, January 2019. Saver's Switch Control History.
22. Xcel Energy. January 2006. Residential Saver's Switch 2005 Impact Evaluation.
23. http://wpb-radon.com/radon_fan_performance.html33:5032:50A33:50
24. Information from manufacturer and contractors (Radonaway)
25. https://www.radonaway.com/products/radon-fans/rp140-pro.php
26. Energy Information Administration's (EIA) 2009 Residential Energy Consumption Survey (RECS)
27. Bin analysis using RECS data for thermostat operation and typical MN home cooling and heating conditions.
28. Energy Information Administration's (EIA) 2015 Residential Energy Consumption Survey (RECS)
29. State of Minnesota Technical reference Manual For Energy Conservation Improvement Programs, Version 4.0

17.1 Res AC

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{EqCooling} + Customer\ kW_{QICooling}$

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment} + Customer\ Coincident\ kW_{QI}$

Customer Dth_QI Existing Home = Dth Heat_NoQI Existing Home_Eff - Dth Heat_QI Existing Home_Eff

$$EER_{baseline} = iCoef0 * (SEER^2_{baaseline}) + iCoef1 * SEER_{baseline}$$

$$Customer\ kW_{Cooling} = \frac{Size_{Cool} * 1/(1 + AC\ Oversize\ Factor)}{12{,}000} \times \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{proposed} * (1 - Loss_{Uncorr})}\right)\right)$$

$$Customer\ kWh_{Cooling} = \frac{Size_{Cool} * 1/(1 + AC\ Oversize\ Factor)}{12{,}000} * EFLH_{cooling} * ((\frac{12}{SEER_{baseline} * (1 - Loss_{NoQI})}) - \left(\frac{12}{SEER_{proposed} * (1 - Loss_{Uncorr})}\right))$$

$$Customer\ Coincident\ kW_{\square} = Coincidence\ Factor * \frac{Size\_Cool}{12{,}000} * (\left(\frac{12}{EER_{Baseline}}\right) - \left(\frac{12}{EER_{Proposed}}\right))$$

$$Customer\ Coincident\ kW_{\square} = Coincidence\ Factor * \ Customer\ kW_{EqCooling}$$

$$Incremental\ Capital\ Cost_{Equipment} = \ Inc\ Cost\ per\ Ton_{EQ} * \frac{Size\_Cool}{12{,}000}$$

$$Incremental\ Capital\ Cost_{QI}\ New\ Home = Inc\ Cost_{QI}$$

$$Incremental\ Capital\ Cost_{QI}\ Existing\ Home = MAX(75, Inc\ Cost_{QI} - \frac{Size\_Cool}{12{,}000} * Cost\ per\ Ton_{baseline}))$$

AC with Furnace Heating Savings

Customer Dth_QI Existing Home = Dth Heat_NoQI Existing Home_Eff - Dth Heat_QI Existing Home_Eff

*Dth Heat_NoQI Existing Home_Eff = Size_Heat * 1/(1 + Oversize Factor) * (1 - Altitude_Adj_Factor) * EFLH_Heat * 1/(Furnace_Eff * (1 - Loss_DuctLeakage)) / 1,000,000*

*Dth Heat_QI Existing Home_Eff = Size_Heat * 1/(1 + Oversize Factor) * (1 - Altitude_Adj_Factor) * EFLH_Heat * 1 / (Furnace_Eff * (1 - Uncorr_Loss)) / 1,000,000*

*Estimated Furnace Size_Heat = Const_a * Size_Cool + Const_b* *NOTE: only if actual furnace capacity is not available*

Note: All formulas using SEER, EER, and HSPF are valid with SEER2, EER2, HSPF2 substitutions.

Variables

$Inc\ Cost\ per\ Ton\_EQ$	See Table 17.1.1	Deemed Plan A Incremental Capital Cost per Ton, Based On Unit Efficiency (New Construction)
$Cost\ per\ Ton\_baseline$	See Table 17.1.1	Baseline capital cost per ton for equipment
EER baseline	See Table 17.0.3	Baseline EER as calculated for residential equipment from the code required SEER.
SEER baseline	See Table 17.0.3	IECC 2012 identified code minimum SEER
Sizing Loss	See Table 17.0.4	
$Loss\_NoQI$	See Table 17.0.4	
$Loss\_Uncorr$	See Table 17.0.4	
$Inc\ Cost\_QI$	See Table 17.1.2	
Coincidence Factor_EQ	See Table 17.0.3	
Coincidence Factor_QI	See Table 17.0.3	
$iCoef0$	-0.02	coefficient used in polynomial conversion to derive AC's EER (or EER2) from a known SEER (or SEER2).
$iCoef1$	1.12	coefficient used in polynomial conversion to derive AC's EER (or EER2) from a known SEER (or SEER2).
EFLH cooling	See Table 17.0.1	Effective Full Load Hours for cooling load energy savings
EFLH_Heat	See Table 17.0.1	Effective Full Load Hours for heating load QI energy savings
EFLH_Heating_HP	See Table 17.0.1	Effective Full Load Hours for Heat Pump impacted energy savings
AC Oversize Factor	10%	Air Conditioning Oversize factor to account for safety factors in load calculations and rounding to available equipment sizes.
Furnace Eff	95% / 80%	Furnace efficiency based on customer provided Furnace Type; Condensing = 95% and Non-Condensing = 80%
Oversize Factor	See Table 17.5.4	Furnace Oversize factor to account for equipment sizing and safety factors. 30% Per MN TRM.
Const_a	1.13530	polynomial constant used for estimating the size of the furnace associated with a New AC unit in an existing furance system.
Const_b	19625	polynomial constant used for estimating the size of the furnace associated with a New AC unit in an existing furance system.
Lifetime	18	for all AC units (Reference 17)
Minimum Qualifying Efficiency	See Table 17.0.2	

Conversion Factors	See Table 17.0.5	for all conversion factors

Customer Inputs	M&V Verified	
Size_Cool	Yes	AHRI cooling size rating of Cooling equipment, AC, ASHP, MSHP
Size_Heat (Furnace)	No	Size of existing furnace associated with new AC in existing homes. This will be provided by the vendor. In the case where the size cannot be determined, the estimated size heat will be used.
Furnace Type	Yes	Condensing or non-Condensing, If Furnace Type is unknown, then Condensing will be used.
Quantity proposed equipment	Yes	
EER proposed	Yes	AHRI certified EER
SEER proposed	Yes	AHRI certified EER
Home Type	No	New or Existing home
County	No	Location of the home for determining weather zones.
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities

Table 17.1.1 Incremental Capital Costs

SEER	AC Cost per Ton	AC Incremental Cost per Ton
13.4 SEER2	$ 2,599.55	N/A
15.2 SEER2	$ 2,783.80	$ 184.25
16 SEER2	$ 2,875.93	$ 276.38

Table 17.1.2: Incremental Capital Costs - Quality Install (Reference 6)

Measures	New Home	Existing Home*
Quality Installation	$ 103.56	$ 259.80

Changes from Recent Filing:

Updated to January 2023 federal standards using calculations for SEER2, EER2, and HSPF2 and revised federal minimums

17.2 Res GSHP

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{EqCooling} + Customer\ kW_{QICooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment} + Customer\ Coincident\ kW_{QI}$

AC Cooling with Gas Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling} + Customer\ kWh_{EQ}\&_{QIHeating}\ Penalty + Customer\ Furnace\ Fan\ kWh$

$Customer\ DTherms\ Savings = Customer\ GSHP\ DTh_{EQ}\&_{QIHeating}$

AC Cooling with Electric Resistance Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling} + Customer\ kWh_{EQHeating} + Customer\ kWh_{QIHeating}$

$$Customer\ kW_{EqCooling} = \frac{\frac{Full\_Load\_Cool}{12{,}000}}{(1 - Sizing\ Loss)} \times \left(\left(\frac{12}{EER_{baseline}}\right) - \left(\frac{12}{EER_{proposed}}\right)\right)$$

$$Customer\ kW_{QICooling} = \frac{Full\_Load\_Cool}{12{,}000} * 12/(EER\_proposed\ ) * ((\frac{1}{1 - Loss_{NoQI}}) - \left(\frac{1}{1 - Loss_{Uncorr}}\right))$$

$$Customer\ Coincident\ kW_{Equipment} = Coincidence\ Factor * \frac{Full\_Load\_Cool}{12{,}000} * \frac{1}{1 - Sizing\ Loss} * (\left(\frac{12}{EER_{baseline}}\right) - \left(\frac{12}{EER_{Cooling}}\right))$$

$$Customer\ Coincident\ kW_{QI} = Coincidence\ Factor * \frac{12}{EER_{Cooling}} * \frac{Full\_Load\_Cool}{12{,}000} * ((\frac{1}{1 - Loss_{NoQI}}) - \left(\frac{1}{1 - Loss_{Uncorr}}\right))$$

$$Customer\ kWh_{EqCooling} = \frac{\left(\frac{Full\_Load\_Cool}{12{,}000}\right)}{1 - Sizing\ Loss} * EFLH_{cooling} * ((\frac{12}{SEER_{baseline}}) - \left(\frac{12}{SEER_{proposed}}\right))$$

$$Customer\ kWh_{QICooling} = \frac{Full\_Load\_Cool}{12{,}000} * EFLH_{cooling} * \frac{12}{SEER_{proposed}} * ((\frac{1}{1 - Loss_{NoQI}}) - \left(\frac{1}{1 - Loss_{Uncorr}}\right))$$

$$Incremental\ Capital\ Cost_{Equipment} = \frac{Size\_Heat}{12{,}000} * (\ GSHP\_Cost\_per\_Heat\_Ton\ ) - Full_{Load_{Cooling}}/12000 * Base\_AC\_Cost\_per\_Ton - Base\_Furnace\_Cost$$

$$Incremental\ Capital\ Cost_{QI}\ New\ Home = Inc\ Cost_{QI}$$

$$Incremental\ Capital\ Cost_{QI}\ E\ Home = MAX(75, Inc\ Cost_{QI} - \frac{Size\_Heat}{12{,}000} * (\left(\frac{1}{1 - Sizing\ Loss}\right) - 1) * Cost\ per\ Ton_{baseline}))$$

$$load\ profile\ slope\ (m) = \frac{(-1 * Size_{Heat} - balance\ pt\ load\ )}{(\ Min\ OAT\ - balance\ pt\ temp\ )}$$

*load profile y intercept (b) = (-1 * Size_Heat) - (m * Min OAT)*

*Full_Load_Cooling = m * Max OAT + b*

$Customer\ kWh_{EQ}\&_{QIHeating}$ *Penalty = Size_Heat / (1 - Loss_uncorr) * EFLH_Heat * ((0 - (1 / (COP_Eff * 3.412)) / 1000*

$Customer\ GSHP\ DTh_{EQ}\&_{QIHeating} =$ *Size_Heat / (1 – Loss_No_QI_Duct_Leakage) ∗ EFLH_Heat ∗ (1 / Baseline Gas Eff) / 100000*

*Customer Furnace Fan kWh = Furnace_Fan_kW * EFLH_Heat*

$Customer\ kWh_{EQHeating} =$ *Size_Heat / (1 - loss_no_QI) * EFLH_Heat * (1 / (COP_baseline * 3.412) - (1 / (COP_Eff * 3.412))/1000*

$$Customer\ kWh_{QIHeating} = Size\_Heat * EFLH\_Heat * 1 / (\ COP_{Eff} * 3.412\ ) * (\ 1 / (1 - loss\_No\_QI) - 1/(Loss\_uncorr\ )/1000$$

Variables

COP_Baseline	See Table 17.0.3	Baseline COP for Ground Source Heat Pump system with Electric Resistance Baseline Heat
Balance Point Load	0	BTUH - Heating and cooling loads are zero at the balance point outdoor ambient temperature.
Balance Point Temperature	60	Outdoor Ambient Temperature at which residential cooling and heating load profiles equal zero BTUH.
Max OAT	98	Maximum Outdoor Ambient Temperature used in building ASHP load profile; TMY3 basis.
Min OAT	-23	Minimum Outdoor Ambient Temperature for caluclating full load heating; TMY3 Basis.
Furnace Fan kW	0.257	EC Motor Furnace Fan operating kW for use in baseline fan energy (Reference 19)
GSHP Heating Oversize Factor	15%	Oversize allowance when sizing and selecting
Coincidence Factor	90%	Probability of peak kW coincidence with system summer peak kW
Baseline Gas Eff	See Table 17.5.3	Efficinecy of the baseline gas furnace based on home type, new or existing
EER_Base	See Table 17.0.3	Efficinecy of the baseline Air Condtioner
EFLH_Cooling	See Table 17.0.1	

EFLH_Heating	See Table 17.0.1	
Sizing Loss	See Table 17.0.4	
Loss_NoQI	See Table 17.0.4	
Loss_Uncorr	See Table 17.0.4	
Inc Cost_QI	See Table 17.1.2	
GSHP_Cost_per_Heat_Ton	See Table 17.2.1	Cost per heating ton of a ground source heat pump system including wells
Base_AC_Cost_per_Ton	See Table 17.2.1	
Base_Furnace_Cost	See Table 17.2.1	
Lifetime	20	
Minimum Qualifying Efficiency	See Table 17.0.2	

Customer Inputs	**M&V Verified**	
Size_Heat	Yes	
COP_Eff	Yes	
Size_Cool	Yes	
EER_Eff	Yes	
Home Type	Yes	Existing or New home
Baseline Heat Type	No	For Existing Homes there is a choice of Electric Resistance or Gas Heat. For New Homes the baseline will be Electric Resistance.
County	No	Location of the home for determining weather zones.

Table 17.2.1. Incremental Capital Costs - New Construction (Plan A) - Reference 6

SEER	Base_AC_Cost_per_ Ton (Includes Labor)	Base_Furnace_Cost (includes Labor)	GSHP Cost per Heat Ton
GSHP - EXISTING HOME	$ 952.00	$ 5,196.44	$ 3,957.00
GSHP - NEW HOME	$ 952.00	$ 5,596.59	$ 3,957.00

Table 18.2.1 Incremental Capital Costs - New Construction (Plan A) - Reference 6

	Baseline AC Cost per Ton w/ Labor	Baseline Cost of Heat / kBTUH	Baseline Air Handler	Proposed Cost per Heat Ton Including Wells
GSHP - w/ Gas Furance & AC Baseline	$ 2,599.55	$ 48.37		$ 6,960.00
GSHP - w/ ER Heat & Air Handler & AC Baseline	$ 2,599.55	$ 40.00	$ 1,200.00	$ 6,960.00
GSHP - w/ Boiler Heat & Air Handler & AC Baseline	$ 2,599.55	$ 74.22	$ 1,200.00	$ 6,960.00

Changes from Recent Filing:

Added Efficient Fuel Switching Heating savings for GSHP measures. Updated to January 2023 federal standards using calculations for SEER2, EER2, and HSPF2

17.3 Res ASHP

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{EqCooling} + Customer\ kW_{QICooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment} + Customer\ Coincident\ kW_{QI}$

ASHP Baseline Cooling Only:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling}$

Electric Resistance Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling} + Customer\ kWh_{EQHeating} + Customer\ kWh_{QIHeating}$

$$EER_{baseline} = iCoef0 * (SEER^2_{baaseline}) + iCoef1 * SEER_{baseline} + iCoef2$$

$$EER2_{baseline} = iCoef0 * (SEER2^2_{baaseline}) + iCoef1 * SEER2_{baseline} + iCoef2$$

$$Customer\ kW_{Cooling} = \frac{Size\_Cool * 1/(1 + AC\ Oversize\ Factor)}{12{,}000} \times \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{proposed} * (1 - Loss_{Uncorr})}\right)\right)$$

$$Customer\ kWh_{Cooling} = \frac{Size\_Cool * 1/(1 + AC\ Oversize\ Factor)}{12{,}000} * EFLH_{cooling} * ((\frac{12}{SEER_{baseline} * (1 - Loss_{NoQI})}) - \left(\frac{12}{SEER_{proposed} * (1 - Loss_{Uncorr})}\right))$$

$$Customer\ Coincident\ kW_{\square} = Coincidence\ Factor * Customer\ kW_{Cooling}$$

$Incremental\ Capital\ Cost_{Equipment} = Cost\ per\ Ton_{Proposed} * \frac{Size_{Cool}}{12{,}000} - Cost\ per\ Ton_{baseline} * \frac{Size_{Cool}}{12{,}000}$ *- Cost / kBTUh_Heat * Full_Load_Heat/ Furnace_Eff_Baseline/ 1000 - Baseline Air Handling*

$$Incremental\ Capital\ Cost_{QI}\ New\ Home = Inc\ Cost_{QI}$$

$$Incremental\ Capital\ Cost_{QI}\ Existing\ Home = MAX(75, Inc\ Cost_{QI} - \frac{Size\_Cool}{12{,}000} * (\left(\frac{1}{1 - Sizing\ Loss}\right) - 1) * Cost\ per\ Ton_{baseline}))$$

ASHP Heating Energy Savings

m_load_profile = (balance pt load - Size_Cool $* 1/(1 + AC\ Oversize\ Factor)$*) / (balance pt temp - Max OAT)*

b_load_profile = Size_Cool $* 1/(1 + AC\ Oversize\ Factor)$ *- (m_load_profile * Max OAT)*

*Full Load Heat = m_load_profile * Min OAT + b_load_profile*

Electric Resistance Heat Baseline:

$Customer\ kWh_{EQHeating}$ *= -1 * Full_Load_Heat * EFLH_Heating_HP * (1 / (HSPF_Baseline * HSPF_Adj_Factor) - 1 / (HSPF_Proposed * HSPF_Adj_Factor)) / 1000*

$Customer\ kWh_{QIHeating}$ *= -1 * Full_Load_Heat * EFLH_Heating_HP * 1 / (HSPF_Proposed * HSPF_Adj_Factor) * (1 / (1- loss_No_QI) - 1/Loss_uncorr) / 1000*

Dual Fuel Gas Heat Baseline

*Customer DTherms_EQ Saved = (-1 * Full_Load_Heat * EFLH_Heating_HP)/ COP_Baseline / 1,000,000*

*Customer kWh_Heating Penalty = Furnace_Fan_kW * EFLH_Heating_HP - Full_Load_Heat * EFLH_Heating_HP * (0 - (1 / (HPSF_Proposed*HSPF_Adj_Factor))) / 1000*

Customer DTherms_QI = -1 Full_Load_Heat * (EFLH_Heat - EFLH_Heating_HP) / COP_Baseline * (1 / (1 - Loss_DuctLeakage) - 1 / (1 - Uncorr_Loss)) / 1,000,000*

Note: All formulas using SEER, EER, and HSPF are valid with SEER2, EER2, HSPF2 substitutions.

Variables

Inc Cost per Ton_EQ	See Table 17.3.1	Deemed Plan A Incremental Capital Cost per Ton, Based On Unit Efficiency (New Construction)
Cost per Ton_baseline	See Table 17.3.1	Baseline capital cost per ton for equipment
EER baseline	See Table 17.0.3	Baseline EER as calculated for residential equipment from the code required SEER.
SEER baseline	See Table 17.0.3	IECC 2012 identified code minimum SEER
Sizing Loss	See Table 17.0.4	
Loss_NoQI	See Table 17.0.4	
Loss_Uncorr	See Table 17.0.4	
Inc Cost_QI	See Table 17.1.2	
Coincidence Factor_EQ	See Table 17.0.3	
Coincidence Factor_QI	See Table 17.0.3	
EFLH_Cooling	See Table 17.0.1	Effective Full Load Hours for cooling load energy savings
EFLH_Heating_HP	See Table 17.0.1	Effective Full Load Hours for Heat Pump impacted energy savings
EFLH_Heat	See Table 17.0.1	Effective Full Load Hours for entire heating season including backup heat operation.
ASHP / MSHP operating temperature cutoff	35	Outdoor Ambient Temperature at which heat pump operation ceases and electric resistance heating begins
Balance Point Temperature	60	Outdoor Ambient Temperature at which residential cooling and heating load profiles equal zero BTUH
Max OAT	See Table 17.0.8	Maximum Outdoor Ambient Temperature used in building ASHP load profile; TMY3 basis
Min OAT	See Table 17.0.8	Minimum Outdoor Ambient Temperature for caluclating full load heating; TMY3 Basis.
Balance Point Load	0	BTUH - Heating and cooling loads are zero at the balance point outdoor ambient temperature

HSPF_Adj_Factor	See Table 17.0.1	Adjustment factor for correcting HSPF from published data in climate zone IV to Minnesota Climate zone V. The HSPF_Adjustment_Factor for Electric Resistance Heat will be 1.
HSPF_Basline	See Table 17.0.3	Electric heating season performance factor or COP of 1. no climate zone correction required.
AC Oversize Factor	10%	Air Conditioning Oversize factor to account for safety factors in load calculations and rounding to available equipment sizes.
m_load_profile	Calculated	load profile slope (m)
b_load_profile	Calculated	load profile y intercept (b)
Full Load Heat	Calculated	calculated full load heating BTUH required to serve the home or space at the minimum Outside Air Temperature
Furnace_Fan_kW	0.257	Furnace Fan EC Motor kW demand for baseline energy calculations for ASHP and MSHP measures. (Reference 19)
Cost / kBTUh Heat - Baseline Furnace	$ 59.72	Average High Efficiency Furnace Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Boiler	$ 89.77	Average High Efficiency Boiler Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Electric Resistance	$ 40.00	Average Cost for electric duct heater / kBTUH; installed costs
Baseline Air Handler	$ 1,200.00	Average Cost for Baseline Air Handler for use with ER Heat or Boiler Heat associated with Air Conditioning; installed costs
Incremental Cost	See Table 17.3.1	Incremental cost per ton of new ASHP units except for the low income Home Energy Services Program.
Incremental Cost	See Table 17.3.2	Incremental cost per new ASHP unit for the low income Home Energy Services Program.
Incremental Cost	See Table 17.3.3	Incremental cost per new ASHP unit for the low income Low Income Multi-Family Savings Program.
Lifetime	18	for all ASHP units (Reference 17)
Minimum Qualifying Efficiency	See Table 17.0.2	

Conversion Factors

	3412	Conversion between BTU/h and kilowatts

Customer Inputs	M&V Verified	
Size_Cool	Yes	AHRI cooling size rating of Cooling equipment, AC, ASHP, MSHP
Size_Heat (Furnace)	No	Size of existing furnace associated with new AC in existing homes. This will be provided by the vendor. In the case where the size cannot be determined, the estimated size heat will be used.
Furnace Type	Yes	Condensing or non-Condensing, If Furnace Type is unknown, then Condensing will be used.
Qty_Prop_equip	Yes	quantity of proposed equipment
EER_Proposed	Yes	AHRI certified EER
SEER_Proposed	Yes	AHRI certified EER
HSPF_Proposed	Yes	AHRI certified for ASHP and MSHP units
Home Type	No	New or Existing home
County	No	Location of the home for determining weather zones.
BTUH Heating @ 47 F	Yes	BTUH capacity of heat pump units at specified temperature
BTUH Heating @ 17 F	Yes	BTUH capacity of heat pump units at specified temperature
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities

Table 17.3.1: Incremental Capital Costs - New Construction (Plan A) - Reference 6

SEER	ASHP Cost per Ton Installed	ASHP to ASHP Incremental Cost per Ton
13 SEER	N/A	N/A
14 SEER/14.5 SEER	$ 3,065.00	N/A
15.2+ SEER with Furnace	$ 7,962.61	$ 4,897.61
15.2+ SEER without Furnace	$ 5,360.52	$ 2,295.52

Table 18.3.2. Baseline Costs

ASHP Scenario	Baseline Cost per Ton (Res AC) Installed	AC to ASHP Incremental Cost per Ton
Dual Fuel ASHP	$ 2,507.42	$ 5,455.19
ASHP w/ ER Baseline	$ 2,507.42	$ 2,853.11

Table 17.3.2 Incremental Capital Costs - Home Energy Savings Program

	Cost per Unit
16 SEER ASHP & Installation	$9,942.00

Table 17.3.3. Incremental Capital Costs - Low Income Multi-Family Savings Program

	Cost per Unit
16 SEER ASHP & Installation	$9,942.00

Changes from Recent Filing:

Added Efficient Fuel Switching to the ASHP measures
Updated to January 2023 federal standards using calculations for SEER2, EER2, and HSPF2
Updated costs based on evaluation of invoices

17.4 Res MSHP

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{Cooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment}$

Electric Resistance Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{Cooling} + Customer\ kWh_{Heating}$

Dual Fuel Gas Heat Baseline:

Customer kWh Savings = Customer $kWh_{Cooling}$ *+ Customer kWh_Heating Penalty*

Customer Dtherm Savings = Customer DTherms_EQ Heating

$$Customer\ kW_{Cooling} = Qty_{prop} * \frac{Size_{Cool}}{12{,}000} * \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{proposed}}\right)\right)$$

$$Customer\ kWh_{Cooling} = Qty_{Prop} * \frac{Size\_Cool}{12{,}000} * EFLH_{cooling} * ((\frac{12}{SEER_{baseline} * (1 - Loss_{NoQI})}) - \left(\frac{12}{SEER_{proposed}}\right))$$

$$Customer\ Coincident\ kW_{equipment} = Qty_{Prop} * Coincidence\ Factor * \frac{Size\_Cool}{12{,}000} * (\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{Cooling}}\right))$$

$$Incremental\ Capital\ Cost_{Equipment} = Qty_{Prop} * Inc\ Cost\ per\ Ton_{EQ} * \frac{Size\_Cool}{12{,}000}$$

$MSHP\ Heating\ Energy\ Savings$

m_load_profile = (balance pt load - Size_Cool) / (balance pt temp - Max OAT)

*b_load_profile = Size_Cool - (m_load_profile * Max OAT)*

*Full Load Heat = m_load_profile * Min OAT + b_load_profile*

*HSPF_Baseline_Adj = HSPF_Baseline * HSPF_Adjustment_Factor*

*HSPF_Proposed_Adj = HSPF_Proposed * HSPF_Adjustment_Factor*

$Customer\ kWh_{Heating} = Qty_{Prop}$ *(-1 * Full_Load_Heat * EFLH_Heating_HP * ((1 / HSPF_Baseline_Adj - (1 / HSPF_Proposed_Adj)) / 1000*

*Customer DTherms_EQ Saved = (-1 * Full_Load_Heat * EFLH_Heating_HP)/ COP_Baseline / 1,000,000*

*Customer kWh_Heating Penalty = - 1 * Full_Load_Heat * EFLH_Heating_HP * (0 - (1 / (HPSF_Proposed*HSPF_Adj_Factor))) / 1000*

Note: All formulas using SEER, EER, and HSPF are valid with SEER2, EER2, HSPF2 substitutions.

Variables

$Inc\ Cost\ per\ Ton\_EQ$	See Table 17.4.1	Deemed Plan A Incremental Capital Cost per Ton, Based On Unit Efficiency (New Construction)
$Cost\ per\ Ton\_baseline$	See Table 17.4.1	Baseline capital cost per ton for equipment
EER baseline	See Table 17.0.3	Baseline EER as calculated for residential equipment from the code required SEER.
SEER baseline	See Table 17.0.3	IECC 2012 identified code minimum SEER
Coincidence Factor	See Table 17.0.3	
EFLH_Cooling	See Table 17.0.1	Effective Full Load Hours for cooling load energy savings
EFLH_Heating_HP	See Table 17.0.1	Effective Full Load Hours for Heat Pump impacted energy savings
Furnace_Fan_kW	0.257	Furnace Fan EC Motor kW demand for baseline energy calculations for ASHP and MSHP measures. (Reference 19)
ASHP / MSHP operating temperature cutoff	35	Outdoor Ambient Temperature at which heat pump operation ceases and electric resistance heating begins
Balance Point Temperature	60	Outdoor Ambient Temperature at which residential cooling and heating load profiles equal zero BTUH
Max OAT	See Table 17.0.8	Maximum Outdoor Ambient Temperature used in building ASHP load profile; TMY3 basis
Min OAT	See Table 17.0.8	Minimum Outdoor Ambient Temperature for caluclating full load heating; TMY3 Basis.
HSPF_Adj_Factor	See Table 17.0.1	Adjustment factor for correcting HSPF from published data in climate zone IV to Minnesota Climate zone V. The HSPF_Adjustment_Factor for Electric Resistance Heat will be 1.
HSPF_Baseline	See Table 17.0.3	Baseline heating season performance factor for code minimum MSHP. For Electric Resistance Heat Baseline the HSPF will be 3.412 based on a COP of 1 and does not require climate zone correction.
Balance Point Load	0	BTUH - Heating and cooling loads are zero at the balance point outdoor ambient temperature
AC Oversize Factor	10%	Air Conditioning Oversize factor to account for safety factors in load calculations and rounding to available equipment sizes.
m_load_profile	Calculated	load profile slope (m)
b_load_profile	Calculated	load profile y intercept (b)
Full Load Heat	Calculated	calculated full load heating BTUH required to serve the home or space at the minimum Outside Air Temperature

COP Baseline	See Table 17.0.4 or Customer Input	Backup heat gas fired furnace efficiency based on customer provided Furnace / Boiler Type; Condensing = 96% Non-Condensing Furnace = 80%, Non-condensing Boiler = 84%. If unknown then the default is 96%
Cost / kBTUh Heat - Baseline Furnace	$ 59.72	Average High Efficiency Furnace Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Boiler	$ 89.77	Average High Efficiency Boiler Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Electric Resistance	$ 40.00	Average Cost for air handler and electric duct heater / kBTUH; installed costs
Baseline Air Handler	$ 1,200.00	Average Cost for Baseline Air Handler for use with ER Heat or Boiler Heat associated with Air Conditioning; installed costs
Lifetime	See Table 17.0.3	for all MSHP units.
Minimum Qualifying Efficiency	See Table 17.1.2	

Customer Inputs	M&V Verified	
Size_Cool	Yes	AHRI cooling size rating of Cooling equipment, AC, ASHP, MSHP
Size_Heat (Furnace)	No	Size of existing furnace associated with new AC in existing homes. This will be provided by the vendor. In the case where the size cannot be determined, the estimated size heat will be used.
Baseline Heating Type	Yes	Baseline heating type; Condensing or non-condensing gas furnace, Condensing or non-Condensing gas boiler, or electric resistance backup heat
Quantity proposed equipment	Yes	
EER proposed	Yes	AHRI certified EER
SEER proposed	Yes	AHRI certified EER
HSPF Proposed	Yes	AHRI certified for ASHP and MSHP units
Home Type	No	New or Existing home
County	No	Location of the home for determining weather zones.
BTUH Heating @ 47 F	Yes	BTUH capacity of heat pump units at specified temperature
BTUH Heating @ 17 F	Yes	BTUH capacity of heat pump units at specified temperature
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities

Table 17.4.1 Incremental Capital Costs - Mini-Split Heat Pump (Reference 8)

Mini-Split Heat Pump	Baseline AC Cost per Cooling Ton	Cost/Efficient Indoor Head or Coil	Cost Per Unit
Mini-Split Heat Pump (15.2+ SEER2, 11.5+ EER2, 7.8+ HSPF2)	$ 2,599.55	$ 5,291.23	
Multi-Split Heat Pump (15.2+ SEER2, 11.5+ EER2, 7.8+ HSPF2)	$ 2,599.55	$ 4,508.69	
Multi-Split Heat Pump w/ 2 Heads for HESP Program			$ 9,000.00

Changes from Recent Filing:

Updated to January 2023 federal standards using calculations for
Added non-QI factors to formula for baseline AC
Updated costs based on evaluation of invoices
Added Efficient Fuel Switching to the MSHP measures

17.5 Furnace

Algorithms

$$Customer\ DTh = Qty\_Prop\_Equip * \left(\left(Size_{Heat} \times \frac{EFF_{Proposed}}{EFF_{Baseline}}\right) - Size_{Heat}\right) \times 1/(1 + Oversize\ Factor) \times \frac{EFLH_{heating}}{1{,}000{,}000}$$

$$Customer\ kW = Qty\_Prop\_Equip * (ECM\_Baseline\_kW - ECM\_Proposed\_kW)$$

$$Customer\ Coincident\ kW = Customer\ kW * Coincidence\_Factor$$

$$Customer\ kWh = Customer\ kW * ECM\_Operating\_Hours$$

$$Electric\_O\&M\_Cost -= Qty\_Prop\_Equip * ECM\_Heating\_Penalty$$

Variables

Eff_Baseline	See Table 17.5.3	Efficiency of baseline code minimum furnace or boiler
EFLH_Heating	See Table 17.0.1	Equivalent Full Load Heating Hours assumed for installed high efficiency furnace
Eff_Baseline	77.5%	Average efficiency of the Furnace or Boiler before tune-up over the two years
Eff_Proposed	80%	Efficiency of the Furnace or Boiler after the tune-up
ECM_Baseline_kW	See Table 17.5.5	Average PSC furnace fan kW (Reference 5, 6)
ECM_Proposed_kW	See Table 17.5.5	Average ECM furnace fan kW (Reference 5, 6)
ECM_Heating_Penalty	See Table 17.5.5	O&M Dollars spent in additional gas use to offset heating done by fan during winter
ECM_Operating_Hours	See Table 17.5.5	ECM furnace fan hours of operation
Coincidence_Factor	See Table 17.5.6	Percentage of Customer_kW savings that will coincide with peak summer kW savings
Oversize Factor	See Table 17.5.4	Oversizing factors used in selecting new boiler and furnace equipment
Incremental Cost Furnaces	See Table 17.5.1	Incremental costs of efficient equipment
Incremental Cost Boilers	See Table 17.5.2	Incremental costs of efficient equipment
Incremental Cost	See Table 17.5.6	Incremental costs of efficient equipment and Tune-ups for the Home Energy Savings Program
Lifetime	See Table 17.5.3	Measure Life for new Furnaces, Boilers, and Smart Thermostats
Lifetime	See Table 17.5.6	Measure Life for efficient equipment and Tune-ups for the Home Energy Savings Program
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh

Customer Inputs	M&V Verified	
$Size\_Heat$	Yes	New Furnace or Boiler namplate Input BTUH rating at sea level (BTUH, Input) provided by Customer
$EFF\_proposed$	Yes	Efficiency for higher efficiency Boiler or Furnace will be provided by the customer on the rebate form.
Qty_Prop_Equip	Yes	Quantity of installed equipment
County	No	Location of the home for determining weather zones.
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities

Table 17.5.1: Furnace Costs (Reference 29)	Incremental Cost New Home	Incremental Cost Existing Home
95% Furnace	$165.00	$736.00
96% Furnace	$379.00	$950.00
97% Furnace	$477.00	$1,048.00

Table 17.5.2: Boiler Incremental Costs (Reference 29)	Incremental Cost New Home	Incremental Cost Existing Home
85% Boiler	$1,446.00	$1,446.00
90% Boiler	$2,379.00	$2,379.00
95% Boiler	$3,001.00	$3,001.00

Table 17.5.3 (Reference 29)	EFF baseline	Lifetime
New Furnace in Existing Home	80%	18
New Furnace in New Home	90%	18
Boilers	84%	20
ENERGY STAR smart thermostat	n/a	10

Table 17.5.4: Oversize Factor	Oversize factor (Reference 5)
Existing Furnace 80% AFUE	30.0%
New Energy Star Furnace => 92% AFUE, < 96% AFUE	30.0%
New Energy Star Furnace => 96% AFUE	30.0%
Existing boilers => 78% - 82% AFUE	30.0%
New boilers => 85% AFUE	30.0%
New boilers => 90% AFUE	30.0%
New boilers => 95% AFUE	30.0%

Table 17.5.5: ECM Retrofit Savings	ECM_Baseline_kW	ECM_Proposed_kW	ECM_Operating _Hours	ECM_Heating_ Penalty
Retrofit ECM w/ AC	0.569	0.357	2,542	$ (9.50)
Retrofit ECM w/o AC	0.501	0.298	2,133	$ (9.50)

Table 17.5.6: HESP ECM & Tune-ups Life, Cost, and CF (Reference 29)	Measure Life	Incremental Cost	Coincidence _Factor
Retrofit ECM w/ AC	7	$845.00	63%
Retrofit ECM w/o AC	7	$845.00	27%
95% Furnace & Installation	18	$4,432.50	N/A
95% Boiler & Installation	20	$9,172.50	N/A
Furnace Tune up	2	$330.00	N/A
Boiler Tune up	2	$430.00	N/A

Changes from Recent Filing:

Updated Incrmental Costs to MN TRM 4.0

17.5 Programmable T-stat

Algorithms

Customer kWh =Cooling_Delta_T x kWh_Savings_per_Degree

Customer kW = Cooling_Delta_T x kW_Savings_per_Degree

Customer Coincident kW = Customer kW x Coincdience Factor

Customer Dth =Heating_Delta_T x Dth_Savings_per_Degree

Variables

Variable ID:	Value	Description
kW_Savings_per_Degree	0.094	kW per degree F of setback (Reference 26, Reference 27)
kWh_Savings_per_Degree	65.669	kWh per degree F of setback (Reference 26, Reference 27)
kW_Savings_per_Degree_2	0.047	kW per degree F of setback for second thermostat = half of savings for first thermostat (Reference 26, Reference 27)
kWh_Savings_per_Degree_2	32.834	kWh per degree F of setback for second thermostat = half of savings for first thermostat (Reference 26, Reference 27)
Dth_Savings_per_Degree	3.218	Dth per degree F of setback (Reference 26, Reference 27)
Dth_Savings_per_Degree_2	1.609	Dth per degree F of setback for second thermostat = half of savings for first thermostat (Reference 26, Reference 27)
kW_Savings_Kits	See Table 17.6.3	kW savings for School Education Kits based on a deemed average setback of about 1 degree F per week.
kWh_Savings_Kits	See Table 17.6.3	kWh savings for School Education Kits based on a deemed average setback of about 1 degree F per week.
Dth_Savings_Kits	See Table 17.6.3	Dth savings for School Education Kits based on a deemed average setback of about 1 degree F per week.
Coincidence Factor	See Table 17.6.1	Calculated using an assumed 3.1 hours away from home during peak coincident period
Measure Life	See Table 17.6.1	
Incremnetal Cost	See Table 17.6.2	

Customer Inputs	M&V Verified	
Cooling_Delta_T	Yes	Average difference between normal operation and cooling setback temperature in degrees F based on information provided by the customer during the interview.
Heating_Delta_T	Yes	Average difference between normal operation and heating setback temperature in degrees F based on information provided by the customer during the interview.

Table 17.6.1: Measure Life and Coincidence Factor (Reference 5)

Type of measure:	Measure life:	Coincidence Factor:
Programmable thermostat (CF and Hours apply to Cooling energy)	10	76%

Table 17.6.2: Measure Incremental Costs - A la Carte Measures

	Vendor Cost ($/Unit)	Low Income HE Squad ($/Unit)	Home Energy Savings Program ($/Unit)	School Education Kit Inc. Cost:
Programmable Thermostat	$35.00	$35.00	$35.00	$0.00

Table 17.6.3: Deemed Savings for School Education Kits

Type of measure:	kWh	PCkW	Dtherms
Existing Programmable Thermostat - School	51.7	0.066	3.3

Changes from Recent Filing:

None

17.6 Smart T-stat

Algorithms

$$Customer\ kW = (Cooling\ kW \times ES\ Reduction_{cooling}) \times Cooling\ Scaling\ Factor$$

$$Customer\ kWh = (Baseline\ Cooling\ kWh \times ES\ Reduction_{cooling}) \times Cooling\ Scaling\ Factor + (Heating\ kW \times ES\ Reduction_{heating}) \times Hours_{heating} \times Heating\ Scaling\ Factor$$

$$Customer\ Coincident\ kW = (Cooling\ kW \times ES\ Reduction_{cooling}) \times Coincidence\ Factor \times Cooling\ Scaling\ Factor$$

$$CustomerDTh = (Baseline\ DTh \times ES\ Reduction_{heating}) \times Heating\ Scaling\ Factor$$

Variables

ES Reduction Heating	8%	Energy Star Connected Thermostat criteria for annual heating equipment runtime reduction (Reference 15)
ES Reduction Cooling	10%	Energy Star Connected Thermostat criteria for annual cooling equipment runtime reduction (Reference 15)
Cooling Scaling Factor	See Table 17.8.2	Cooling Scaling factor based on home type
Heating Scaling Factor	See Table 17.8.2	Heating Scaling factor based on home type
Average Home Cooling capacity	2.250	Average Home model capacity for Res Cooling (Tons)
Average Home Cooling efficiency SEER	13.400	Average Home model SEER rating
Average Home Cooling efficiency EER	11.417	Average Home model EER rating (converted from SEER)
Cooling kW	2.365	Average Home model kW for Res Cooling - 2.25 ton unit
Baseline Cooling kWh	760	Average cooling kWh input in baseline home (Reference 5)
Hours Cooling	See Table 17.0.1	Cooling Equivalent Full Load Hours
Baseline Dth	69.0	Average Heating Input Dtherms (Reference 5)
Heating kW	8.601	Equivalent full load heating demand kW
Hours Heating	See Table 17.0.1	Single Family Heating Equivalent Full Load Hours
EnergyStar_CF	76%	Calculated using an assumed 3.1 hours away from home during peak coincident period
Gas Heating System Effiiciency	80%	average heating system effiiciency in existing homes
Electric Heating System Effiiciency	100%	electric resistance heating system effiiciency in existing homes
Lifetime	10	Measure life for Energy Star Smart Thermostat EE Measure (Reference 5)
Incremental Cost	See Table 17.7.1	Incremental cost for ENERGY STAR smart thermostat (Reference 5)
Cooling Scaling Factor	See Table 17.7.2	Cooling Scaling factor based on home type
Heating Scaling Factor	See Table 17.7.2	Heating Scaling factor based on home type

Customer Inputs	M&V Verified	
Certified Energy Star Connected Thermostat	Yes	
Single Family Home	Yes	
Central AC	Yes	
Gas or Electric Resistance Heat	Yes	

Table 17.7.1	Incremental Cost
ENERGY STAR smart thermostat (Reference 5)	$200.00
Home Energy Squad Smart Thermostat	$125.00
Home Energy Squad upgraded Smart Thermostat	$225.00

Table 17.7.2 (Reference 28)

Smart Thermostat Type	Saver Switch	Single Family	Multi-Family	Townhome/Duplex
Cooling Scaling Factor	100%	100%	35%	64%
Heating Scaling Factor	100%	100%	15%	52%

Changes from Recent Filing:

None

17.7 Saver Switch

Algorithms

$$Customer\ kWh = Quantity\ Equipment\ * Equipment\ kWh\ Savings\ * \text{Cooling Scaling Factor}$$

$$Customer\ kW = Quantity\ Equipment\ * Equipment\ kW\ Savings\ * \text{Cooling Scaling Factor}$$

$$Customer\ Coincident\ kW = Quantity\ Equipment\ * Equipment\ PCkW\ Savings\ * \text{Cooling Scaling Factor}$$

Variables

Quantity Equipment	Customer Input	Quantity of smart saver switches installed.
Equipment kW Savings	See Table 17.8.1	Customer kW savings per unit with a smart switch or smart thermostat.
Equipment kWh Savings	See Table 17.8.1	Annual kWh savings per unit with a smart switch or smart thermostat (Reference 20 & Reference 21).
Equipment PCkW Savings	See Table 17.8.1	Peak Coincident kW savings perunit with a smart switch or smart thermostat (Reference 20 & Reference 22)
Lifetime	See Table 17.8.1	Length of time the switch will be operational
Cooling Scaling Factor	See Table 17.8.2	Cooling Scaling factor based on home type

Customer Inputs	**M&V Verified**	
Number of units with switch installed.	Yes	

Table 17.8.1	AC Saver's Switch	Water Heater Switch	Smart Thermostat DR
Eq.kW_Savings (kW)	0.984	0.200	1.109
Eq.kWh_Savings (kWh)	1.365	2	2
Eq.PC_kW_Customer_AC (PC_kW)	0.984	0.200	1.109
Lifetime (years)	15	15	5

Table 17.8.2 (Reference 28)

Smart Thermostat Type	Saver Switch	Single Family	Multi-Family	Townhome/Duplex
Cooling Scaling Factor	100%	100%	35%	64%
Heating Scaling Factor	100%	100%	15%	52%

Changes from Recent Filing:

None

17.9 ENERGY STAR Radon Fans

Algorithms:

$$Customer\ kWh = (1 - \%EE\ Fans\ Installed) \times (kWB_{aseline}\ - kWENERGYSTAR)\ \times Hours$$

$$Customer\ kW = \frac{Customer\ kWh}{Hours}$$

$$Customer\ Coincident\ kW = \frac{Customer\ kWh}{Hours}\ \times Coincidence\ Factor$$

Variables:	Value	Description
Measure Life	10	Life of an energy star Radon Fan (Reference 24)
Hours	8,760	Assumed Hours of operation for a radon fan
% EE Fans Installed	15%	Assumed percentage of Energy Star Radon Fans being sized correctly and installed currently based on contractor feedback (Reference 23)
Incremental Cost	$0.00	Incremental cost of RP140 as compared to RP145 (Reference 25)
Pipe Diameter (in)	4.00	Assumption based on contractor feedback (Reference 24)
Pipe Length (ft)	25.00	Assumption based on contractor feedback (Reference 24)
Efficient Radon Fan Operating Pressure	0.68	Operating Pressure in "WC (Reference 24)
Baseline Radon Fan Operating Pressure	1.30	Operating Pressure in "WC (Reference 24)
Coincidence Factor	100%	Fans run 24x7x365

Table 1

kW_{base}	0.054	Reference 23
kW_{ES}	0.017	Reference 23
Efficient Radon Fan Airflow	33.30	Reference 23
Baseline Radon Fan Airflow	63.20	Reference 23

Changes from Recent Filing:

None

17.9 Eco+

Algorithms

$$Customer\ kW = \left(Cooling\ kW\ -\ Cooling\ kW \times ES\ Reduction_{cooling}\right) \times Eco{+}\ Reduction$$

$$Customer\ kWh = \left(Baseline\ Cooling\ kWh -\ Baseline\ Cooling\ kWh \times ES\ Reduction_{cooling}\right) \times\ Eco{+}\ Reduction\ \times\ Hours_{cooling}$$

$$Customer\ Coincident\ kW = \left(Cooling\ kW\ -\ Cooling\ kW \times ES\ Reduction_{cooling}\right)\ \times\ Eco{+}\ Reduction \times Coincidence\ Factor$$

Variables

ES Reduction Cooling	10%	Energy Star Connected Thermostat criteria for annual cooling equipment runtime reduction (Reference 15)
Average Home Cooling capacity	2.250	Avgerage Home model capacity for Res Cooling (Tons)
Average Home Cooling efficiency SEER	13.400	Avgerage Home model SEER rating
Average Home Cooling efficiency EER	11.417	Avgerage Home model EER rating (converted from SEER)
Cooling kW	2.365	Avgerage Home model kW for Res Cooling - 2.25 ton unit
Baseline Cooling kWh	760	Average cooling kWh input in baseline home (Reference 5)
Hours Cooling	See Table 17.0.1	Cooling Equivalent Full Load Hours
Baseline Dth	69.0	Average Heating Input Dtherms (Reference 5)
EnergyStar_CF	76%	Calculated using an assumed 3.1 hours away from home during peak coincident period
Lifetime	10	See Smart Thermostat Measure Life
Incremental Cost	$0.00	Existing Smart Thermostats and therefore no Incremental cost
Eco+ Reduction	2%	Assumed percent savings from Eco+ product

Customer Inputs	M&V Verified	
Certified Energy Star Connected Thermostat	Yes	

Changes from Recent Filing:

None

17.11 Room AC

Algorithms

$$Customer\ kWh = Customer\ kW\ * EFLH\_Cool$$

$$Customer\ kW = Size\_Cool * (1 / CEER\_Base - 1 / CEER\_Eff) / 1000$$

$$Customer\ Coincident\ kW = Customer\ kW\ * \ CF$$

Variables

CF	0.75	Coincidence Factor
EFLH_Cool	See Table 17.0.1	Equivalent full load hours
CEER_Base	See Table 17.11.1	Combined Energy Efficiency Ratio for federal minimum Room AC unit based on size
CEER_Eff	See Table 17.11.1	Combined Energy Efficiency Ratio for Energy Star qualified Room AC unit based on size
Incremental Cost	See Table 17.11.2	Cost of new Room AC and Recycling of Room AC for the Home Energy Savings Program (HESP).
Incremental Cost	See Table 17.11.3	Cost of new Room AC and Recycling of Room AC for the Low Income Multi-Family Savings Program (MESP).
Lifetime New Room AC	9	lifetime of a new room window or wall AC unit
Lifetime Recycled Room AC	4.5	lifetime for a removed room window or wall AC unit

Customer Inputs	**M&V Verified**	
Size_Cool	Yes	BTUH size rating of new room AC unit
CEER_Eff	Yes	efficient rating of new room AC unit
Louvered Sides	Yes	configuration of new Room AC unit. The housing is constructed with or without louvered sides.
Without Louvered sides	Yes	configuration of new Room AC unit. The housing is constructed with or without louvered sides.
Landlord Paid Utility?	No	For Home Energy Savings Program - Half of the incremental cost will be rebated if the landlord pays utilities

Table 17.11.1: Combined Energy Efficiency Ratio (Reference 29)	CEER_Base	CEER_Eff
Window AC Louvered Sides < 6000 BTUH	11.000	12.100
Window AC Louvered Sides >= 6000 to < 8000 BTUH	11.000	12.100
Window AC Louvered Sides >= 8000 to < 11000 BTUH	10.900	12.000
Window AC Louvered Sides >= 11000 to < 14000 BTUH	10.900	12.000
Window AC Louvered Sides >= 14000 to < 20000 BTUH	10.700	11.800
Window AC Louvered Sides >= 20000 to < 28000 BTUH	9.400	10.300
Window AC Louvered Sides >= 28000 BTUH	9.000	9.900
Wall AC w/o Louvered Sides < 6000 BTUH	10.000	11.000
Wall AC w/o Louvered Sides >= 6000 to < 8000 BTUH	10.000	11.000
Wall AC w/o Louvered Sides >= 8000 to < 11000 BTUH	9.600	10.600
Wall AC w/o Louvered Sides >= 11000 to < 14000 BTUH	9.500	10.500
Wall AC w/o Louvered Sides >= 14000 to < 20000 BTUH	9.300	10.200
Wall AC w/o Louvered Sides >= 20000 to < 28000 BTUH	9.400	10.300
Wall AC w/o Louvered Sides >= 28000 BTUH	9.400	10.300

Table 17.11.2. Incremental Capital Costs - Home Energy Savings Program

	Cost per Unit
Wall AC Unit	$540.00
Window AC Unit	$492.50
Window / Wall Air Conditioner Recycling	$82.00

Table 17.11.3. Incremental Capital Costs - Low Income Multi-Family Savings Program

	Cost per Unit
Wall AC Unit	$706.69
Window AC Unit	$443.12
Window / Wall Air Conditioner Recycling	$40.75

Changes from Recent Filing:

None

18.13 Residential Cold Climate Air Source Heat Pumps

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{EqCooling} + Customer\ kW_{QICooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment} + Customer\ Coincident\ kW_{QI}$

ASHP Baseline Cooling Only:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling}$

Electric Resistance Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling} + Customer\ kWh_{EQHeating} + Customer\ kWh_{QIHeating}$

Dual Fuel Gas Heat Baseline

Customer kWh Savings = $Customer\ kWh_{EqCooling} + Customer\ kWh_{QICooling}$ *+ Customer kWh_Heating Penalty*

Customer Dtherm Savings = Customer DTherms_EQ Heating + Customer DTherm_QI Heating

$$Customer\ kW_{Cooling} = \frac{Full\ Load\ Cool}{12{,}000} \times \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{proposed} * (1 - Loss_{Uncorr})}\right)\right)$$

$$Customer\ kWh_{Cooling} = \frac{Full\ Load\ Cool}{12{,}000} * EFLH_{cooling} * \left(\left(\frac{12}{SEER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{SEER_{proposed} * (1 - Loss_{Uncorr})}\right)\right)$$

$$Customer\ Coincident\ kW_{\square} = Coincidence\ Factor * \frac{Full\ Load\ Cool}{12{,}000} * \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{Proposed} * (1 - Loss_{Uncorr})}\right)\right)$$

$Incremental\ Capital\ Cost_{Equipment} = ASHP\ Cost\ per\ Ton_{EQ} * \frac{Size\_Cool}{12{,}000}$ *- Cost Per Ton Baseline ** $\frac{Full\_Load\_Cool}{12{,}000}$ *- Cost per kBTUH heat * (Full_Load_Heat/COP_Baseline)/1000 - Baseline_Air_Handler*

$Incremental\ Capital\ Cost_{QI}\ New\ Home = Inc\ Cost_{QI}$

$$Incremental\ Capital\ Cost_{QI}\ E\ Home = MAX\left(75, Inc\ Cost_{QI} - \frac{Size\_Cool}{12{,}000} * \left(\left(\frac{1}{1 - Sizing\ Loss}\right) - 1\right) * Cost\ per\ Ton_{baseline}\right)$$

Note: All formulas using SEER, EER, and HSPF are valid with SEER2, EER2, HSPF2 substitutions.

ccASHP Heating Energy Savings

*Load_Heat = -1 * Size_Heat_5 * 1/(1 + Oversize_Factor)*

m_load_profile = (balance pt load - Load_Heat) / (balance pt temp - Des_OAT)

*b_load_profile = Load_Heat - (m_load_profile * Des_OAT)*

*Full Load Cool = m_load_profile * Max_OAT + b_load_profile*

*Full_Load_Heat = m_load_profile * Min_OAT + b_load_profile*

Electric Resistance Heat Baseline:

$Customer\ kWh_{EQHeating}$ *= -1 * Full_Load_Heat * EFLH_Heating_HP * (1 / (HSPF_Baseline * HSPF_Adj_Factor) - 1 / (HSPF_Proposed * HSPF_Adj_Factor)) / 1000*

Dual Fuel Gas Heat Baseline

*Customer kWh_Heating Penalty = Furnace_Fan_kW * EFLH_cc_HP_Heat - Full_Load_Heat * EFLH_cc_HP_Heat * (0 - (1 / (HPSF_Proposed*HSPF_Adj_Factor * (1 - Uncorr_Loss)))) / 1000*

*Customer DTherms = (-1 * Full_Load_Heat * EFLH_Heat / (Furnace_Eff_Baseline * (1 - Loss_DuctLeakage)) - -1 * Full_Load_Heat * (EFLH_Heat - EFLH_cc_HP_Heat) / (Furnace_Eff _Proposed * (1 - Uncorr_Loss))) / 1,000,000*

Variables

ASHP Cost per Ton_EQ	See Table 17.12.1	Capital Cost per Ton of new ccASHP.
Cost per Ton_baseline	See Table 17.12.1	Baseline capital cost per ton for new AC equipment.
EER baseline	See Table 17.0.4	Baseline EER as calculated for residential equipment from the code required SEER baseline AC unit.
SEER baseline	See Table 17.0.4	IECC 2021 identified code minimum AC unit SEER
COP_Baseline	See Table 17.0.4	Baseline heating efficiency. A COP of 1 and does not require climate zone correction.
Sizing Loss	See Table 17.0.6	
Loss_NoQI	See Table 17.0.6	
Loss_Uncorr	See Table 17.0.6	
Inc Cost_QI	See Table 17.0.6	
Coincidence Factor_EQ	See Table 17.0.5	
Coincidence Factor_QI	See Table 17.0.5	
Oversize_Factor__c	15%	Deemed Oversize Safety Factor for Heat Pump heating equipment selected to operate at 5 F.
EFLH cooling	See Table 17.0.1	Effective Full Load Hours for cooling load energy savings
EFLH_Heat	See Table 17.0.1	Effective Full Load Hours for heating load QI energy savings
EFLH_ccHP_Heat	See Table 17.0.2	Effective Full Load Hours for Cold Climate Heat Pump at and above customer provided Operating Cutover Temperature.
Balance Pt Temp	See Table 17.0.8	Outdoor Ambient Temperature at which residential cooling and heating loads are zero BTUH
Max_OAT	See Table 17.0.8	Maximum Outdoor Ambient Temperature used in building load profile
Min_OAT	See Table 17.0.8	Minimum Outdoor Ambient Temperature used in building load profile
Des OAT	5	Low Outdoor Ambient Temperature for caluclating heating load Profile. Based on Low Temp Rating from NEEP QPL Data Sheets. Deemed to be 5 F.
Electric Resistance Heat HSPF	3.412	Electric resistance heat assumed heating season performance factor based on a COP of 1. no climate zone correction required.
Balance Pt Load	See Table 17.0.8	Heating and cooling loads are zero at the balance point outdoor ambient temperature
Furnace_Fan_kW	0.257	Furnace Fan EC Motor kW demand for baseline energy calculations for ASHP and MSHP measures. (Reference 19)
Furnace Eff Baseline	See Table 17.0.4	The existing furnace efficiency will be assumed to be a high efficiency condensing furnace. If the Proposed Case furnace is a new non-condensing furnace, the baseline Efficinecy will be adjusted to match the Furnace Eff Proposed
Furnace Eff Proposed	See Table 17.0.4	The proposed case furnace efficinecy will be collected as a customer input. If it is not provided, it will be assumed to be a new and high efficiency condensing furnace. A cold climate heat pump requires communicating controls between the heat pump and the furnace to achieve the maximum efficiency. However, the furnace combustion efficiency is not a part of that requirement. the customer may choose any efficiency that is most cost effective.
Cost / kBTUh Heat - Baseline Furnace	$ 59.72	Average High Efficiency Furnace Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Boiler	$ 89.77	Average High Efficiency Boiler Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Electric Resistance	$ 40.00	Average Cost for air handler and electric duct heater / kBTUH; installed costs
Baseline Air Handler	$ 1,200.00	Average Cost for Baseline Air Handler for use with ER Heat or Boiler Heat associated with Air Conditioning; installed costs
HSPF_Adj_Factor	See Table 17.0.1	Adjustment factor for correcting HSPF from published data in AHRI's Climate Zone IV to AHRI's Climate Zone V. The HSPF_Adjustment_Factor for Electric Resistance Heat will be 1.
HSPF_Basline	See Table 17.0.4	Heating season performance factor of baseline equipment. For electric resistance heat baseline, a COP of 1 is assumed with no climate zone correction required.
Measure Life - Matched Split-System Air -Source Heat Pump	See Table 17.0.5	Lifetime assumptions from Reference 17
Measure Life - Quality Installation	18	Lifetime assumptions from Reference 17
Conversion Factors	See Table 17.0.7	

Customer Inputs	M&V Verified	
Size_Cool	Yes	NEEP QPL Data Sheet Rated Cooling Capacity at 95 F
Size_Heat_5	Yes	NEEP QPL Data Sheet Max Heating Capacity at 5 F
Size_Heat_47	Yes	NEEP QPL Data Sheet Rated Heating Capacity at 47 F
EER proposed	Yes	NEEP QPL Data Sheet rated full load Cooling Efficiency
SEER proposed	Yes	NEEP QPL Data Sheet rated part load Cooling Efficiency
HSPF Proposed	Yes	NEEP QPL Data Sheet rated Heating HSPF
EER2 proposed	Yes	AHRI Certification for units manufactured after 1/1/2023
SEER2 proposed	Yes	AHRI Certification for units manufactured after 1/1/2023
HSPF2 Proposed	Yes	AHRI Certification for units manufactured after 1/1/2023
Furnace Eff Proposed	Yes	Proposed heating type; Condsensing or Non-Condensing gas furnace, Condensing or Non-Condensing gas boiler, or electric resistance backup heat
Home Type	Yes	Single Family or Multi-Family home
County	Yes	Location of the home for determining weather zones.
Home Category	Yes	New Home or Existing Home
Operating Cutover Temperature	Yes	Outdoor Ambient Temperature below which heat pump operation ceases and electric resistance heating begins

Table 17.12.1. Incremental Capital Costs - New Construction (Plan A) - Reference 6

SEER	ccASHP Cost per Ton	Baseline Cost per Ton (Res AC) Installed
13 SEER	N/A	$ 2,507.42
18+ SEER with Gas Furnace	$ 8,717.48	N/A
18+ SEER with Elect Resistance	$ 5,912.94	N/A

Changes from Recent Filing:

New Efficient Fuel Switching measure for MN.

18.14 Cold Climate Mini-Split Heat Pumps

Algorithms

$Customer\ kW\ Savings = Customer\ kW_{EqCooling}$

$Customer\ Coincident\ kW\ Savings = Customer\ Coincident\ kW_{Equipment}$

Electric Resistance Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh_{EQHeating}$

Dual Fuel Gas Heat Baseline:

$Customer\ kWh\ Savings = Customer\ kWh_{EqCooling} + Customer\ kWh\_Heating\ Penalty$

Customer Dtherm Savings = Customer DTherms_EQ Heating

$$Customer\ kW_{EqCooling} = \frac{Full\_Load\_Cool}{12{,}000} * \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{proposed}}\right)\right)$$

$$Customer\ kWh_{EqCooling} = \frac{Full\_Load\_Cool}{12{,}000} * EFLH_{cooling} * \left(\left(\frac{12}{SEER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{SEER_{proposed}}\right)\right)$$

$$Customer\ Coincident\ kW_{equipment} = Coincidence\ Factor * \frac{Full\_Load\_Cool}{12{,}000} * \left(\left(\frac{12}{EER_{baseline} * (1 - Loss_{NoQI})}\right) - \left(\frac{12}{EER_{Proposed}}\right)\right)$$

$Incremental\ Capital\ Cost_{Equipment} = Qty\_Indoor\_Heads * Cost/Eff\_Indoor\_Head$ - Cost Per Ton Baseline $* \frac{Size\_Cool}{12{,}000}$ - Cost per kBTUh heat * (Full_Load_Heat/COP_Baseline)/1000 - Baseline_Air_Handler

cc*MSHP Heating Energy Savings*

*Load_Heat = -1 * Size_Heat_5 * 1/(1 + Oversize_Factor)*

m_load_profile = (balance pt load - Load_Heat) / (balance pt temp - Des_OAT)

*b_load_profile = Load_Heat - (m_load_profile * Des_OAT)*

*Full Load Heat = m_load_profile * Min OAT + b_load_profile*

*Full Load Cool = m_load_profile * Max OAT + b_load_profile*

*HSPF_Baseline_Adj = HSPF_Baseline * HSPF_Adjustment_Factor*

*HSPF_Proposed_Adj = HSPF_Proposed * HSPF_Adjustment_Factor*

$Customer\ kWh_{EQHeating} = Qty_{Prop}$ * (-1 * Full_Load_Heat * EFLH_ccHP_Heat * (1 / HSPF_Baseline_Adj - 1 / HSPF_Proposed_Adj) / 1000

*Customer DTherms_EQ Saved = (-1 * Full_Load_Heat * EFLH_ccHP_Heat)/ COP_Baseline/ 1,000,000*

*Customer kWh_Heating Penalty = - 1 * Full_Load_Heat * EFLH_ccHP_Heat * (0 - (1 / (HPSF_Proposed*HSPF_Adj_Factor))) / 1000*

Note: All formulas using SEER, EER, and HSPF are valid with SEER2, EER2, HSPF2 substitutions.

Variables

$Cost/Eff\_Indoor\_Head$	See Table 17.13.1	Deemed Cost per Indoor Head or Coil, Based On Mini-Split vs. Multi-Split
$Cost\ per\ Ton\_baseline$	See Table 17.13.1	Baseline capital cost per ton for new AC equipment
EER baseline	See Table 17.0.4	Baseline EER2 as calculated for residential equipment from the code required SEER2.
SEER baseline	See Table 17.0.4	Federal minimum SEER2
HSPF_Baseline	See Table 17.0.4	Baseline heating season performance factor for code minimum MSHP. For Electric Resistance Heat Baseline the HSPF will be 3.412 based on a COP of 1 and does not require climate zone correction.
COP_Baseline	See Table 17.0.4 and Customer Input	Baseline heating efficiency. For Efficient Fuel Switching the baseline COP is the furnace or Boiler efficiency. This will be collected as a customer input Condensing Furnace or Boiler = 96%, Non-Condensing Furnace = 80%, and Non-Condensing Boiler = 84%. For electric resistance baseline heating the baseline COP of 1 does not require climate zone correction.
Coincidence Factor	See Table 17.0.5	
EFLH_Cooling	See Table 17.0.1	Effective Full Load Hours for cooling load energy savings
EFLH_Heating_HP	See Table 17.0.1	Effective Full Load Hours for Heat Pump impacted energy savings
EFLH_ccHP_Heat	See Table 17.0.2	Effective Full Load Hours for Cold Climate Heat Pump at and above customer provided cutover temperature.
Balance Pt Temp	See Table 17.0.8	Outdoor Ambient Temperature at which residential cooling and heating load profiles equal zero BTUH
Max OAT	See Table 17.0.8	Maximum Outdoor Ambient Temperature used in building ASHP load profile; TMY3 basis
Min OAT	See Table 17.0.8	Minimum Outdoor Ambient Temperature for caluclating full load heating; TMY3 Basis.
Des OAT	5	Low Outdoor Ambient Temperature for caluclating heating load Profile. Based on Low Temp Rating from NEEP QPL Data Sheets. Deemed to be 5 F.
Furnace_Fan_kW	0.257	Furnace Fan EC Motor kW demand for baseline energy calculations for ASHP and MSHP measures. (Reference 19)
HSPF_Adj_Factor	See Table 17.0.1	Adjustment factor for correcting HSPF from published data in climate zone IV to Minnesota Climate zone V. The HSPF_Adjustment_Factor for Electric Resistance Heat will be 1.
Balance Point Load	See Table 17.0.8	BTUH - Heating and cooling loads are zero at the balance point outdoor ambient
m_load_profile	Calculated	load profile slope (m)
b_load_profile	Calculated	load profile y intercept (b)

Full Load Heat	Calculated	Calculated full load heating BTUH based on the calculated load profile using the minimum Outside Air Temperature for the selected ccMSHP equipment. The load served is assumed to not be the whole load for the home.
Full Load Cool	Calculated	Calculated full load cooling BTUH based on the calculated load profile using the maximum Outside Air Temperature for the selected ccMSHP equipment. The load served is assumed to not be the whole load for the home.
Cold Climate Heat Maintenace Ratio	70%	The Max Heating Capacity at 5 ºF must be at least 70% of the Rated Heating Capacity at 47 ºF
Oversize_Factor__c	15%	Deemed Oversize Safety Factor for heating equipment.
Cost / kBTUh Heat - Baseline Furnace	$ 59.72	Average High Efficiency Furnace Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Boiler	$ 89.77	Average High Efficiency Boiler Cost / kBTUH; installed costs
Cost / kBTUh Heat - Baseline Electric Resistance	$ 40.00	Average Cost for air handler and electric duct heater / kBTUH; installed costs
Baseline Air Handler	$ 1,200.00	Average Cost for Baseline Air Handler for use with ER Heat or Boiler Heat associated with
Lifetime	See Table 17.0.5	Measure Lifetime for ccMSHPs are the same as for MSHPs found in referenced table.
Minimum Qualifying Efficiency	See Table 17.0.3	

Customer Inputs	M&V Verified	
Size_Cool	Yes	NEEP QPL Data Sheet Rated Cooling Capacity at 95 ºF
Size_Heat_5	Yes	NEEP QPL Data Sheet Max Heating Capacity at 5 ºF
Size_Heat_47	Yes	NEEP QPL Data Sheet Rated Heating Capacity at 47 ºF
EER2 proposed	Yes	AHRI Certificate or NEEP QPL Data Sheet rated full load Cooling Efficiency
SEER2 proposed	Yes	AHRI Certificate or NEEP QPL Data Sheet rated part load Cooling Efficiency
HSPF2 Proposed	Yes	AHRI Certificate or NEEP QPL Data Sheet rated Heating HSPF2 for climate region IV
Quantity Indoor Heads	Yes	The Quantity of Indoor Heads + Coils served by a single Outdoor Unit.
Home Type	Yes	Single Family or Multi-Family home
Baseline Heat Type	Yes	Baseline heating type; Condensing or non-condensing gas furnace, Condensing or non-Condensing gas boiler, or electric resistance backup heat. This is used to determine the COP_Baseline
Operating Cutover Temperature	Yes	Outdoor Ambient Temperature below which backup heating is expected to begin operating. This is either the cutover temperature or the temperature where supplemental heating comes on.
Heat Pump Size Basis	Yes	The equipment selection made by the trade partern is based on serving cooling load or sized based on the heating load. Picklist for "Cooling Load Basis" or "Heating Load Basis"

Table 17.13.1: Baseline and Proposed Capital Costs - Cold Climate Mini-Split Heat Pump (Reference 10)

	Baseline AC cost / ton	Cost/Efficient Indoor Head or Coil
ccMSHP Single Head System Costs	$ 2,599.55	$ 6,670.00
ccMSHP Multi-Head System Costs	$ 2,599.55	$ 6,010.00

Changes from Recent Filing:

New Efficient Fuel Switching measure for MN.

Table 18.1.1: Lifetime Assumptions

Years	Measure Group
20	Lighting Redesign

19.1 Showerheads & Aerators

Algorithms

$$\Delta T_{WH} = T_{WH} - T_{city}$$

$$Gas\ Savings\ (Gross\ Dth) = \frac{GPY_{saved} * \Delta T_{WH} * H_{water} * Split\ Factor}{EFF_{WH,gas} * 1{,}000{,}000}$$

$$Energy\ Savings\ (Customer\ kWh) = \frac{GPY_{saved} * \Delta T_{WH} * H_{water} * (1 - Split\ Factor)}{EFF_{WH,electric} * 3{,}412}$$

$$Demand\ Savings\ (Customer\ kW) = \frac{Customer\ kWh}{8760}$$

$$Demand\ Savings\ (Customer\ PCkW) = Customer\ kW * CF$$

Variables

T_{WH}	120	Water heater setpoint temperature °F. (Reference 1)
T_{city}	51.9	Water temperature of city water entering the water heater °F. (Reference 2)
GPY_{saved}	See Table 19.1.2	Gallons per year of hot water saved with high-efficiency showerhead or aerator.
ρ_w	8.34	Density of water in lb/gal
c_w	1	Specific heat of water in BTU/(lb·°F)
H_{water}	8.34	Heat content of 1 gallon of water in BTU/(gal·°F)
$EFF_{WH,gas}$	80%	Assumed gas water heater efficiency without standby losses. This only includes combustion efficiency.
$EFF_{WH,electric}$	100%	Assumed electric water heater efficiency without standby loses.
Split Factor	See Table 19.1.1	Gas/electric split factor is based on customer response to showerhead post card. The customer selects from three options for water heating fuel.
Conversion from Dth to BTH	1,000,000	1 Dth = 1,000,000 Btu
Conversion from kWh to BTU	3,412	1 kWh = 3,412 Btu
CF	See Table 19.1.2	Amount of Customer kW demand that will coincide with peak utility system demand.
Baseline Showerhead Flowrate	2.5	Baseline showerhead flowrate in gallons/minute per federal minimum standards
Baseline Faucet Aerator Flowrate	2.2	Baseline kitchen/bath faucet aerator flowrate in gallons/minute per federal minimum standards
Incremental Costs	See Table 19.1.3	Actual costs provided by vendor; cost per showerhead is assumed for the material costs for cost/benefit calculation purposes.
Measure Life	10	Lifetime in years of showerhead and aerator measures. (Reference 3)
Water Rate	$4.97	$ / 1000 Gallons
Sewer Rate	$6.63	$ / 1000 Gallons

Customer Inputs	M&V Verified
Showerhead received by customer	Yes
Showerhead installed by customer	Yes
Water Heating Fuel provided by Customer	Yes

Table 19.1.1	Gas_Split_Factor
Gas Water Heater	100%
Electric Water Heater	0%
Unknown Water Heater	88%

Table 19.1.2.A - Single Family	Primary Showerhead			Secondary Showerhead			Kitchen Aerator	Primary Bath Faucet Aerator		Secondary Bath Faucet Aerator	
	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	(1.5 GPM)	(1.0 GPM)	(0.5 GPM)	(1.0 GPM)	(0.5 GPM)
GPY_{saved}	3,070	3,070	3,070	2,064	2,064	2,064	444	385	546	385	546
Hours	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Total Water Savings/Year - Gallons	3,937	3,937	3,937	2,647	2,647	2,647	492	494	700	494	700
CF	64%	64%	64%	64%	64%	64%	124%	124%	124%	124%	124%
O&M Savings	$45.66	$45.66	$45.66	$30.70	$30.70	$30.70	$5.71	$5.73	$8.12	$5.73	$8.12

Table 19.1.2.B - Multi-Family	Primary Showerhead			Secondary Showerhead			Kitchen Aerator	Primary Bath Faucet Aerator		Secondary Bath Faucet Aerator	
	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	(1.5 GPM)	(1.0 GPM)	(0.5 GPM)	(1.0 GPM)	(0.5 GPM)
GPYsaved	3,630	3,630	3,630	474	474	474	588	437	619	437	619
Hours	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Total Water Savings/Year - Gallons	4,656	4,656	4,656	607	607	607	637	560	794	560	794
CF	64%	64%	64%	64%	64%	64%	124%	124%	124%	124%	124%
O&M Savings	$54.00	$54.00	$54.00	$7.04	$7.04	$7.04	$7.38	$6.50	$9.20	$6.50	$9.20

Table 19.1.3 - Incremental Costs	Primary Showerhead			Secondary Showerhead			Kitchen Aerator	Primary Bath Faucet Aerator		Secondary Bath Faucet Aerator	
	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	Standard (1.5 GPM)	Handheld (1.5 GPM)	Styled (1.5 GPM)	(1.5 GPM)	(1.0 GPM)	(0.5 GPM)	(1.0 GPM)	(0.5 GPM)
	Showerhead	Showerhead	Showerhead	Showerhead	Showerhead	Showerhead	Aerators - 1.5	Aerators - 1.0	Aerators - 0.5	Aerators - 1.0	Aerators - 0.5
Energy Efficient Showerhead - 2021	$3.75	$9.25	$5.00	$3.75	$9.25	$5.00	$1.99	$0.65	-	$0.65	-
Energy Efficient Showerhead - 2022	$3.75	$9.25	$5.00	$3.75	$9.25	$5.00	$1.99	$0.65	-	$0.65	-
Energy Efficient Showerhead - 2023	$3.75	$9.25	$5.00	$3.75	$9.25	$5.00	$1.99	$0.65	-	$0.65	-
Home Energy Squad	$3.50	$9.50	-	$3.50	$9.50	-	$1.25	-	$1.50	-	$1.50
Low Income Home Energy Squad	$3.50	$9.50	-	$3.50	$9.50	-	$1.25	-	$1.50	-	-
Multifamily Building Efficiency	$5.60	$16.25	-	$5.60	$16.25	-	$2.86	$1.48	$4.00	$1.48	$4.00
Low Income Multifamily Building Efficiency	$5.60	$16.25	-	$5.60	$16.25	-	$2.86	$1.48	$4.00	$1.48	$4.00
Multifamily Building Efficiency Renter Kits	$5.60	-	-	-	-	-	$2.86	$1.48	-	-	-
Home Energy Savings Program	$15.00	$47.00	-	$15.00	$47.00	-	$5.20	-	$5.20	-	$5.20
School Education Kits, Home Energy Savings Program Renter Kits, Low Income Multi-Family Renter Kits	$3.22	-	-	-	-	-	$1.22	$0.48	$0.48	-	-
Nonprofit Energy Savings Program	$5.60	$16.25	-	$5.60	$16.25	-	$2.86	$1.48	$4.00	$1.48	$4.00
Foodbank Energy Efficiency Distribution	$6.22	-	-	-	-	-	-	$0.65	-	-	-

*Note that these incremental costs are estimates. Actual incremental costs will be used when they are known.

References:

1. Development of Standardized Deomestic Hot Water Event Schedules for Residential Buildings; R. Hendron and J. Burch; NREL/CP-550-40874
2. United States Department of Energy. DHW Event Schedule Generator. (365 day average water main temperature for Minneapolis-St Paul Intl AP, MN). http://energy.gov/eere/buildings/downloads/dhw-event-schedule-generator
3. DEER Database for Energy Efficient Resources version 2014; www.deeresources.com
4. Water and sewer rates from https://www.stpaul.gov/departments/saint-paul-regional-water-services/billing-and-payment/rates-and-fees#rates-and-fees-by-city
5. Xcel Energy New Mexico Residential Shower Use Study
6. The Effect of Efficiency Standards on Water Use and Water Heating Energy Use in the U.S.: A Detailed End-use Treatment; J Koomey, C Dunham, J Lutz; LBL-35475
7. Residential Energy Consumption Survey 2009; http://www.eia.gov/consumption/residential/

Changes from Recent Filing:

Foodbank Energy Efficiency Distribution Program measures added

19.2 Water Heaters

Algorithms

Customer_Dth = Baseline_Dth - Proposed_Dth

Baseline_Dth = Hot_Water_Energy / Baseline_Eff_Gas / 1,000,000

Proposed_Dth = Hot_Water_Energy / Proposed_Eff / 1,000,000

$Hot_{Water_{Energy}} = Qty\ x\ Hot\_Water\_Consumption * C_p * Water\_Heater\_Delta\_T * Days\_Per\_Year * Water_{Density}$

Water Heater Delta T = Water_Heater_Temperature - City_Mains_Temperature

For Storage Water Heaters:

Baseline_Efficiency_Gas= coef1 - (coef2 x Proposed_Tank_Size)

For Instantaneous and Indirect Water Heaters:

Baseline_Efficiency_Gas= coef1 - (coef2 x Baseline_Tank_Size)

For Indirect Water Heaters:

$Proposed\_Dth = (Hot\_Water\_Energy / Eff_{P,Boiler} + \frac{UA_{P,DHW}}{Eff_{P,Boiler}} \times Ambient\_dT \times HoursPerYear) / 1{,}000{,}000$

$Ambient\_dT = Water\_Heater\_Temperature - Ambient\_Temperature$

$UA_{P,DHW} = \frac{SL_{P,DHW}}{70} \times Proposed\ Tank\ Size \times Water\_Density \times SpecificHeat_{Water}$

Incremental Cost = Proposed Cost - Baseline Cost

Heat Pump Water Heater with Gas Water Heater Baseline:

Customer kWh = ~~Zero~~ Cooling_Benefit_kWh - Customer Water Heating kWh

Customer PCkW = ~~Zero~~ (Cooling_Benefit_kWh - Customer Water Heating kWh) / 8760

Note: Fuel Switching with HPWH will target predominant use of renewable energy. Therefore generator impact will be set to zero.

Customer_Dth = Baseline_Dth + Heating_Penalty_Dth

Baseline_Dth = Hot_Water_Energy / Baseline_Eff_Gas / 1,000,000

*Heating_Penalty_Dth = -1 * (Hot Water Energy / Proposed_Eff) / Heating_Eff * Heating Hours / 8760 / 1,000,000*

Baseline_Efficiency_Gas= coef1 - coef2 x Baseline_Tank_Size

*Cooling_Benefit_kWh = (Hot Water Energy / Proposed_Eff) / (Cooling_SEER * 1000 / 3412) * Cooling_Hrs / 8760 / 3412*

Customer Water Heating kWh = Hot_Water_Energy / Proposed Eff /3,412

Heat Pump Water Heater with Electric Resistance Water Heater Baseline:

Customer kWh = Baseline_kWh - Proposed kWh + Cooling_Benefit kWh + Heating_Penalty kWh

Baseline_kWh = Hot_Water_Energy / Baseline_Eff_Electric / 3,412

Proposed_kWh = Hot_Water_Energy / Proposed_Eff / 3,412

Baseline_Eff_Electric = coef1 - (coef2 x Basline_Tank_Size)

Customer kW = Baseline_kW - Proposed_kW

Baseline_kW = Baseline_kWh / 8760 + Cooling_Benefit_kWh / Cooling_Hrs

Proposed_kW = Proposed_kWh / 8760

Customer_PCkW = Customer_kW x Coincidence_Factor

*Heating_Penalty_kWh = -1 * (Hot Water Energy / Proposed_Eff) / Heating_Eff * Heating Hours / 8760 / 3,412*

*Heating_Penalty_Dth = -1 * (Hot Water Energy / Proposed_Eff) / Heating_Eff * Heating Hours / 8760 / 1,000,000*

*Cooling_Benefit_kWh = (Hot Water Energy / Proposed_Eff) / (Cooling_SEER * 1000 / 3412) * Cooling_Hrs / 8760 / 3412*

*Heat Penalty Energy O&M = Heating_Penalty_Dth * Heating Energy O&M Rate*

Variables

Hot Water Consumption	See Table 19.2.4	Gallons of Water per day based on number of Bedrooms and Home Type
Water Heater Temperature	120.0	Water Heater Tank Temperature
City Mains Temperature	51.3	Water Main temperature average over the year
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh
Conversion from Btu to Therm	100,000	1 Therm = 100,000 Btuh
1 Therm = 100,000 Btuh	1,000	1 kW = 1,000 Watts
Conversion from Btu to kWh	3,412	1 kW = 3,412 Btuh
Specific Heat of Water	1	Btu/lb/°F
Water_Density	8.34	lb/gal H20
Days_Per_Year	365	Days per Year
Coeff1	See Table 19.2.1	Code based forumula for calculation of Baseline efficiency based on water heater type and draw pattern provided by customer
Coeff2	See Table 19.2.1	Code based forumula for calculation of Baseline efficiency based on water heater type and draw pattern provided by customer

Baseline_Tank_Size - ERWH	See Table 19.2.3	Heat Pump Water Heater's Baseline Electric Resistance Water Heater Tank Size and Quantity determined by number of bedrooms. Tank Size used in baseline efficiency equation.
Baseline_Tank_Size - Gas Storage WH	See Table 19.2.3	Heat Pump Water Heater's Baseline Gas Storage Water Heater Tank Size determined by number of bedrooms. Tank Size used in baseline efficiency equation.
Gas Heating System Efficiency	80%	For homes with Gas heating systems the assumed efficiency for calculating HPWH O&M heating penalty
Air Source Heat Pump Heating System Efficiency	1.92	For homes with ASHP heating systems the assumed efficiency for calculating HPWH O&M heating penalty in COP (corrected for MN climate region V)
Electric Resistance Heating Efficiency	100%	for homes with electric resistance heat the assumed heating efficiency
Cooling System Efficiency	13.4	SEER of the typical home cooling system for calculating HPWH Cooling benefit
Coincidence_Factor	100%	We are using the average water heater savings over the summer hours.
Hours per Year	8760	total hours in a year
Heating Hours	6253	Hours in the year at or below the heating enable temp of 62 F
Cooling Hours	663	Hours in the year at or above the cooling enable temp of 77 F
Water Heater Self-Installation Rate	52%	Percent of Water Heaters that self-installed after retail purchase (Reference 9)
ERWH DR kWh Savings	0.728	kWh savings per year for averge number of annual events called in residential demand response Electric Resistance WH Unit with a smart switch and no load shifting preparation.
ERWH DR PCkW @ Customer Savings	0.213	Peak Coincident kW savings per average residential ERWH Unit with a smart switch (Reference 3) and no load shifting preparation.
HPWH DR kWh Savings	0.303	kWh savings per year per event Residential Heat Pump WH Unit with a smart switch and no load shifting preparation.
HPWH DR PCkW @ Customer Savings	0.059	Peak Coincident kW savings for averge number of annual events for average Residential HPWH Unit with a smart switch (Reference 3) and no load shifting preparation.
HPWH Load Shifting & DR kWh Savings	151.521	kWh savings per year for daily load shifting in Residential Heat Pump WH Unit with a smart switch.
HPWH Load Shifting & DR PCkW @ Customer Savings	0.071	Peak Coincident kW savings per year for daily load shifting in Residential HPWH Unit with a smart switch (Reference 3).
Ambient_Temperature	70	Deemed ambient air temperature of the space where the Indirect Water Heater is installed.
SL_P,DHW	See Table 20.1.7	Standby loss factor for the proposed Indirect Water Heater, in °F/h. Deemed from Averages of AHRI database.
Indirect Water Heater Baseline Cost	See Table 20.1.6	Baseline cost of Indirect Water Heater, based on number of bedrooms
Indirect Water Heater Draw Pattern	See Table 20.1.6	Draw Pattern of baseline water heater for Indirect Water Heater measure based on number of bedrooms
Indirect Water Heater Proposed Cost	See Table 20.1.7	Proposed cost of Indirect Water Heater based on the proposed nominal tank size.
Measure Life for Indirect Water Heater	13	Indirect Water Heater measure life is equivalent to a gas fired storage water heater.

Customer Inputs	**M&V Verified**	
Number of Bedrooms	Yes	total number of bedrooms in the home where a new water heater is being installed
Proposed Tank Size	Yes	Storage Water Heater tank size for gas fired water heaters.
Proposed Eff	Yes	Proposed water heater efficinecy as a UEF
Quantity Proposed Equipment	Yes	
Instantaneous Water Heater Max GPM Rating	Yes	
Landlord Paid Utility	No	Home Energy Services Program requires identification of Landlord Paid Utilities vs.
Vendor Water Heater Cost	No	Home Energy Services Program costs are Vendor Provided
Water Heater Draw Pattern	No	
$Eff\_P,Boiler$	Yes	Proposed Boiler Percent AFUE for boiler equipment associated with operation of the

Table 19.2.1 Gas Fired Storage Water Heater and Heat Pump Water Heater Baseline Efficiency Calculation Parameters (Reference 8)

	First Hour Rating to Define Draw Pattern		**Electric Storage Water Heater >=20 Gallon and <=55 Gallon Baseline Efficiency Coefficients**		**Gas Storage Water Heater ≥20 gal and ≤55 gal Baseline Efficiency**		**Gas Storage WH >55 Gallon and <=100 Gallon Baseline Efficiency**	
Draw Pattern	min (>=Gallons)	max (< Gallons)	coef1	coef2	coef1	coef2	coef1	coef2
Very Small	1	18	0.8808	0.0008	0.3456	0.0020	0.6470	0.0006
Low	18	51	0.9254	0.0003	0.5982	0.0019	0.7689	0.0005
Medium	51	75	0.9307	0.0002	0.6483	0.0017	0.7897	0.0004
High	75	No Upper Limit	0.9349	0.0001	0.6920	0.0013	0.8072	0.0003

Table 19.2.2 Instantaneous Gas Fired Water Heater baseline Efficiency calculation parameters (Reference 8)

	Instantaneous Gas-Fired Water Heater <2 gal and >50,000 Btu/h GPM Drawn		**Instantaneous Water Heater Baseline Efficiency Coefficients**	
Draw Pattern	**Minimum (>=GPM)**	**Maximum (< GPM)**	coef1	coef2
Very Small	0	1.7	0.8000	0.0000
Low	1.7	2.8	0.8100	0.0000
Medium	2.8	4	0.8100	0.0000
High	4	No Upper Limit	0.8100	0.0000

Table 19.2.3 2019 ASHRAE HVAC Applications Chapter 51 Service Water Heating: Table 4 HUD-FHA Minimum Water Heater Capacities for One- and Two-Family Living Units (Reference 13)

Water Heater Type	**1**	**2**	**3**	**4**	**5**	**6**
Average Electric Storage First Hour Draw	30	51	67	80	88	102
Baseline Quantity Electric Storage Tanks	1	1	1	2	2	2
Baseline Tank Volume Electric Storage Tanks	30	40	55	30	30	40
Baseline Wattage per Electric Storage Tank	3.8	4.5	4.5	4.5	4.5	4.5
Average Gas Storage First Hour Draw	43	60	67	77	90	92
Average Baseline tank size for gas tankless WH & HPWH with Gas Storage WH Baseline	20	30	35	40	50	50

Table 19.2.4 Water Usage per Day by Number of Bedrooms (Reference 12)

Home Type	1	2	3	4	5	6
Single Family total HW usage per day	34	48	60	72	84	96
Multi-Family total HW usage per day	41	53	63	73	83	92

Table 19.2.5 - Incremental Cost, Lifetime - References 3, 10

Water Heater Type	Storage Tank Size	Manufacturer's Draw Pattern	Baseline Cost	Incremental Cost	Lifetime
High Efficiency Storage Water Heater	Volume <= 40 Gallon	MEDIUM	$ 906.99	$ 126.88	13
High Efficiency Storage Water Heater	Volume <= 40 Gallon	HIGH	$ 833.02	$ 260.86	13
High Efficiency Storage Water Heater	Volume > 40 Gallon	MEDIUM	$ 714.09	$ 119.30	13
High Efficiency Storage Water Heater	Volume > 40 Gallon	HIGH	$ 958.42	$ 384.34	13
High Efficiency Tankless Water Heater	N/A	MEDIUM	$ 975.06	$ 541.99	20
High Efficiency Tankless Water Heater	N/A	HIGH	$ 1,071.37	$ 861.92	20
Air Source Heat Pump Water Heater	N/A	Any	$ 958.62	$ 784.00	13
Air Source Heat Pump Water Heater - Gas WH Baseline	N/A	Any	$ 714.09	$ 1,359.04	13

Table 19.2.6: Home Energy Savings Program Measure Incremental Costs	Estimated Incremental Cost
68% UEF Storage Water Heater Replacement *	$1,770.20
New Heat Pump Water Heater	$4,850.00
New High Efficiency Storage Water heater - High Draw	$3,325.00
New High Efficiency Storage Water heater - Medium Draw	$3,325.00

* Vendors provide actual cost data

Table 19.2.7: Water Heater DR Incremental costs	Incremental Cost
Cost of connectivity and mixing valve	$325.00

Table 20.1.6: Baseline Water Heater Deemed Information

No. of Bedrooms \ Cost & Draw Pattern	Baseline Cost	Deemed Draw Pattern
1	$719.04	Low
2	$719.04	Medium
3	$719.04	Medium
4	$719.04	High
5	$773.07	High
6	$773.07	High

References:

1. Energy Conservation Program for Consumer Products: Test Procedure for Water Heaters; United States Department of Energy; http://www.gpo.gov/fdsys/pkg/FR-1998-05-11/pdf/98-12296.pdf
2. United States Department of Energy. DHW Scheduler. Value is average water main temperature MSP Intl AP. http://energy.gov/eere/buildings/downloads/building-america-standard-dhw-schedules
3. ENERGY STAR Residential Water Heaters Final Criteria Analysis. https://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/water_heaters/WaterHeaterAnalysis_Final.pdf
4. US Department of Energy; Residential Water Heater Standards; http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/27
5. 2010 - 2012 W0017 Ex Ante Measure Cost Study Final Report. http://www.energydataweb.com/cpucFiles/pdaDocs/1100/2010-2012%20WO017%20Ex%20Ante%20Measure%20Cost%20Study%20-%20Final%20Report.pdf
8.US Department of Energy,Energy and water conservation standards and their compliance dates: 10 CFR 430.32(d): https://www.ecfr.gov/cgi-bin/text-idx?SID=80dfa785ea350ebeee184bb0ae03e7f0&mc=true&node=se10.3.430_132&rgn=div8
9. Making ENERGY STAR® Water Heaters a National Early Replacement Priority - dated Feb 23,2016
11. NREL's National Residential Efficiency Measure Database https://remdb.nrel.gov/measures.php?gId=6&ctId=270
12. Florida Solar Energy Center - "Estimating Daily Domestic Hot-Water Use in North American Homes" dated June 30,2015: Table 5 Climate-Normalized Fixture (nFgpd) and Waste (nWgpd) Gallons per Day as a Function of the Number of Bedrooms (BR) in a Home
13. 2019 ASHRAE HVAC Applications Chapter 51 Service Water Heating.

Changes from Recent Filing:

Added Efficient Fuel Switching - Heat Pump Water Heater replacing a gas storage water heater.

19.3 Commercial Aerators

Algorithms

$$\Delta T_{WH} = T_{WH} - T_{city}$$

$$Gas\ Savings\ (Gross\ Dth) = Quantity * \frac{\rho_w * c_w * WtrSave * \Delta T_{WH}}{EFF_{WH,gas} * 1{,}000{,}000}$$

$$Energy\ Savings\ (Customer\ kWh) = Quantity * \frac{GPY_{saved} * \Delta T_{WH} * H_{water}}{EFF_{WH,electric} * 3{,}412}$$

$$Demand\ Savings\ (Customer\ kW) = \frac{Customer\ kWh}{8760}$$

$$Demand\ Savings\ (Customer\ PCkW) = Customer\ kW * CF$$

$$GPYsaved = (Baseline_{GPM} - Proposed_{GPM}) * Runtime_{Hours} * Facility_{Days} * 60$$

$$O\&M\ Savings = Quantity * GPY_{saved} * (Water_{Rate} + Sewer_{Rate})/1000$$

Variables

T_{WH}	See Table 19.3.1	Water heater setpoint temperature °F.
T_{city}	51.9	Water temperature of city water entering the water heater °F. (Reference 12)
ρ_w	8.34	Density of water in lb/gal
c_w	1	Specific heat of water in BTU/(lb·°F)
Hwater	8.34	Heat content of 1 gallon of water in BTU/(gal·°F)
$EFF_{WH,gas}$	80%	Assumed gas water heater efficiency
$EFF_{WH,electric}$	98%	Assumed electric water heater efficiency
Conversion from Dth to BTH	1,000,000	1 Dth = 1,000,000 Btu
Conversion from kWh to BTU	3,412	1 kWh = 3,412 Btu
CF	See Table 19.3.2	Amount of Customer kW demand that will coincide with peak utility system demand.
Baseline GPM	See Table 19.3.2	Baseline flowrate in gallons/minute per federal minimum standards
Proposed GPM	See Table 19.3.2	Nameplate flow rate of proposed equipment
Runtime Hours	See Table 19.3.2	Number of hours per day equipment is used
Facility Days	See Table 19.3.3	Number of days per year the equipment is operated based on building type
Incremental Costs	See Table 19.3.4	Actual costs provided by vendor; cost per showerhead is assumed for the material costs for cost/benefit calculation purposes.
Measure Life	See Table 19.3.4	Lifetime in years of pre-rinse sprayer and aerator measures.
Water Rate	$4.97	$ / 1000 Gallons (Reference 11)
Sewer Rate	$6.63	$ / 1000 Gallons (Reference 11)

Customer Inputs	**M&V Verified**	
Quantity	Yes	Number of units to be installed
Building Type	Yes	Building type in which the equipment is to be installed
Water Heating Fuel	Yes	Electric or gas water heater

Table 19.3.1 Hot Water Set Point Temp (F)

Equipment	Degrees F
Kitchen Aerator	125
Restroom Aerator	105
Pre-Rinse Sprayer	125

Table 19.3.2 Aerator Information

	Baseline GPM	Proposed GPM	Runtime Hours	CF
Kitchen Aerator	2.2	1.5	0.167	1%
Restroom Aerator	2.2	0.6	0.500	2%
Pre-Rinse Sprayer	1.6	1.3	0.605	3%

Table 19.3.3 Deemed Annual Hot Water Use by Building Type (Ref. 5)

Building Type	Facility Days
Large Office	250
Fast Food Restaurant	365
Sit-Down Restaurant	365
Grocery Store	365
Elementary School	200
Jr/Sr High School or College	200
Healthcare	365
Hotel	365
Other Commercial	250
Average	**303**

Table 19.3.4 Incremental Cost and Lifetime

	Lifetime in Years	Incremental Cost
Kitchen Aerator	9	$8.00
Restroom Aerator	9	$8.00
Pre-Rinse Sprayer	5	$45.00

References:

1. 2008 Database for Energy-Efficient Resources, EUL/RUL (Effective/Remaining Useful Life) Values. http://www.deeresources.com/deer2008exante/downloads/DEER%200607%20Measure%20Update%20Report.pdf. Accessed on 7/31/12.

2. Franklin Energy Services, LLC Engineering Estimate (10 min) and US Department of Energy. Federal Energy Management Program. Energy Cost Calculator for Faucets and Showerheads. Typical use for commercial aerator = 30min. http://www1.eere.energy.gov/fem

3. Franklin Energy Services, LLC Engineering Estimate (10 min) and US Department of Energy. Federal Energy Management Program. Energy Cost Calculator for Faucets and Showerheads. Typical use for commercial aerator = 30min. http://www1.eere.energy.gov/fem

4. Efficiency Vermont Technical Reference User Manual, 2/19/2010.

5. US DOE Building America Program. Building America Analysis Spreadsheet, Standard Benchmark DHW Schedules http://www1.eere.energy.gov/buildings/building_america/analysis_spreadsheets.html

6. State of Illinois Energy Efficiency Technical Reference Manual, Page 131. July 18, 2012.

7. State of Illinois Energy Efficiency Technical Reference Manual, Pages 60-63 & Pages 90-97. February 8th, 2017.

8. IMPACT AND PROCESS EVALUATION FINAL REPORT for CALIFORNIA URBAN WATER CONSERVATION COUNCIL 2004-5 PRE-RINSE SPRAY VALVE INSTALLATION PROGRAM (PHASE 2)

9. Title 10, Code of Federal Regulations, Part 431 - Energy Efficiency Program for Certain Commercial and Industrial Equipment, Subpart O - Commercial Prerinse Spray Valves. January 1, 2010.

10. Data from Table 2 in Technology Data Characterizing Water Heating in Commercial Buildings: Application to End-Use Forecasting, Osman Sezgen and Jonathan G. Koomey, Lawrence Berkeley National Laboratory, December 1995.

11. Water and sewer rates from https://www.stpaul.gov/sites/default/files/Media%20Root/Water%20Services/SPRWS_2020_SaintPaulRates.pdf

12. United States Department of Energy. DHW Event Schedule Generator. (365 day average water main temperature for Minneapolis-St Paul Intl AP, MN). http://energy.gov/eere/buildings/downloads/dhw-event-schedule-generator

Changes from Recent Filing:

Water Rate update

19.4 Water Heater Treatments

Algorithms

Customer Dth Water Heater Setback = (WH_S_Baseline - WH_S_Proposed) / 1,000,000

Customer kWh Water Heater Setback = (WH_S_Baseline - WH_S_Proposed) / 3412

Customer kW Water Heater Setback = Customer kWh / Hours

*Customer PCkW Water Heater Setback = Customer kW * Coincidence Factor*

*WH_S_Baseline = U_WaterHeater * A_WaterHeater * (T_Base_WH - T_City) * Hours / Eff_Recovery*

*WH_S_Proposed = U_WaterHeater * A_WaterHeater * (T_Proposed_WH - T_City) * Hours / Eff_Recovery*

Variables

BTU-kWh Conversion	3412	Number of BTUs in one kWh of electric energy
Hours	8760	Annual Hours for Water Heater Skin Loss
Measure Life	2	Water Heater Setback measure life (Reference 2)
T_Base_WH	130	Temperature of the baseline Water Heater before set back.
T_Proposed_WH	120	Temperature of the adjusted Water Heater after set back.
T_City	51.9	Water temperature of city water entering the water heater °F. (Reference 1)
Eff_Recovery_Gas	80%	The recovery efficiency of a standard gas fired water heater.
Eff_Recovery_Elect	100%	The recovery efficiency of an electric resistance water heater.
A_WaterHeater	29.4	Square Feet of the outer surface of the average water heater, including top and bottom of tank.
U_WaterHeater	0.125	the average effecitve U-Value of the tank insulation derived from 1 / effective R-value of water heater insulation with a k-factor of 0.277 and an effective insulation thickness of 2.22 inches on a 21 inch diameter tank.
Coincidence Factor	100%	The calculated Customer kW rating for the water heater is assumed to be an implied kW or average at any hour in the year. So the coincidence factor with the system peak is 100%.

Customer Inputs	M&V Verified	
Quantity Proposed Equipment	Yes	
Type of Water Heater	Yes	Type of water heater, i.e. Gas or Electric Resistance

Table 20.6.1: Inc Costs for Various Program Water Heater Treatments

Treatments	Incrmental Cost
Water Heater Setback Incremental Cost	$0.00

References:

1. United States Department of Energy. DHW Scheduler. Value is average water main temperature MSP Intl AP. http://energy.gov/eere/buildings/downloads/building-america-standard-dhw-schedules

2. Minnesota TRM version 3.1 2021, which references Efficiency Vermont Technical Reference User Manual (TRM), 2/19/2010. Page 409 and the Illinois Technical Reference User Manual, 2012.

Changes from Recent Filing:

Add calculation methodology for Water Heater Setback Skin losses.

19.5 Water Heater Pipe Insulation

Algorithms

$$\text{Unit kWh Savings per Year} = \left(Q_{Loss,Base} - Q_{Loss,Insul}\right) * \frac{Hours*Length}{3412*Eff}$$

$$\text{Unit kW Savings per Year} = \frac{Unit\ kWh\ Savings\ per\ Year}{8760\ Hours}$$

$$\text{Unit Therms Savings per Year} = \left(Q_{Loss,Base} - Q_{Loss,Insul}\right) * \frac{Hours*Length}{100{,}000*Eff}$$

Variables

Q_Loss Base	Table 19.5.1	Heat Loss (BTU/ft) from bare piping
Q_Loss Insul	Table 19.5.1	Heat Loss (BTU/ft) from insulated piping
Eff	0.92	Deemed UEF for Electric Resistence Water Heater
	0.59	Deemed UEF for Natural Gas Water Heater
Length	Customer Input	Length of pipe to be treated adjacent to Water Heater. Maximum length allowed is 6 feet.
Hours	4823	Hours when outside air temperature is above building thermal balance point
Lifetime	Table 19.5.2	
Incremental Cost	Table 19.5.2	

Customer Inputs	M&V Verified	
Length	Yes	Length of pipe insulated - maximum of 6 feet from water heater
Water Heater Type	Yes	Gas or Electric water heater

Table 19.5.1 Average Heat Loss

Location	Avg Heat Loss of Bare Pipe (BTU/ft)	Avg Heat Loss of Insulated Pipe (Btu/ft)
Zone 1, 2, 3	36.9	6.9

Table 19.5.2 Incremental Cost and Lifetime

Lifetime	13	Years
Unit Incremental Cost	$3.63	$ per Foot

Assumptions

1. Pipes are assumed to be equal mix of 1/2" , 3/4" and 1" sizes
2. Insulation assumed to be R-2 pipe insulation
3. Water Heater temperature assumed to be 120 degF
4. Ambient temperature assumed to be 60 degF

References

1. State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs Version 4.0 January 20, 2023

Changes from Recent Filing:

New measure for 2024 filing

Appliances

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
1.5 Advanced Power Strips	No	Yes				
1.6 Energy Star Clothes Dryer	No	No			X	MN TRM 4.0 deems an incremental cost of $152 opposed to $75
1.7 Energy Star Clothes Washer	No	No			X	MN TRM 4.0 deems incremental cost varying by loading style, as opposed to $50
1.8 Energy Star Dehumidifier	No					
1.9 Energy Star Refrigerator	No	No			X	MN TRM 4.0 deems an incremental cost as opposed to using vendor cost data
1.10 Dehumidifier Recycling	No		X			
1.11 Refrigerator Recycling	No	No		X	X	Xcel evaluates energy savings based on the manufactured year of the recycled unit, as well as provides savings for primary units. MN TRM 4.0 deems constant energy savings independent of manufactured year and only provides savings for secondary units
1.12 Res Mowers	No	Yes				
1.13 Comm Mowers	No	Yes				
1.15 Small Lawn Equipment	No		X			
1.16 E-Snowblower	No		X			

Behavioral
TRM Version **4.0**

For DER

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Behavioral Changes	X		X			
Behavioral Residential	X		X			
High Bill Alerts	X		X			

Business New Construction
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
3.1 All EDA Measures			X			
3.2 All EEB Measures			X			Energy Efficient Buildings (EEB) is a holistic program including electric and gas measures. Third-party consultants work with customer design teams to identify prescriptive measures from all utility programs for new commercial buildings or retrofits of existing commercial buildings. Custom measures are used for energy savings opportunities not currently available in the prescriptive programs.
3.3 Commercial Code Compliance			X			

Commerical DR
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Electric Rate Savings			X			Not in MN TRM, specific DR measure created
Business Saver's Switch			X			Not in MN TRM, specific DR measure created
Smart Thermostat			X			Not in MN TRM, specific DR measure created
Peak Partner Rewards			X			Not in MN TRM, specific DR measure created
Critical Peak Pricing			X			Not in MN TRM, specific DR measure created

Compressed Air

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Energy Conservation Opportunity	X		X			Not in TRM, custom calculations done each time
Supply Side Study				X	X	Similar to Air Leak Detection, savings adjustments are done in following Custom analysis
Cycling Dryers				X	X	Using our historical participation in studies for each dryer size
Dryer Purge Demand Controls			X			
Mist Eliminators				X	X	Similar to "Low Pressure Drop Filters", using our historical participation in studies for each filter size
No Air Loss Drain				X	X	Similar end result, we have more in-depth calculations to get there
New VFD Compressor				X	X	We are only looking at new-to-new comparison, and more in-depth calculations
Demand Side Study	X		X			Not in TRM, no energy savings associated for this study
Pressure/Flow Controller		X			X	Only Assumed Hours & CF are different, otherwise matches MN TRM
Storage Tanks		X		X		Slight variation on formula approach, but modeled after MN TRM
Leak Fixes					X	Assumptions are from different sources than MN TRM
High Frequency Battery Charger		X				Added formula and assmptions to establish kW
Forklift Electrification			X			

Computer Efficiency
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
VDI			X			

Custom
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Custom	X					

EMS

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Pneumatic to DDC			X			
GREM		X				
DCV		X				

Envelope

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
Attic Insulation				X	X	Our calculation for the R-value of an uninsulated attic structure considers more details and hence, is more conservative. We do not apply the framing factor to the insulation area. We used the TRM's published heating and cooling degree days but do not apply the correction factor or discretionary use adjustment factor. We assume a higher cooling efficiency for our cooling savings calculations. Our peak coincident kW savings assume a 100% coincidence factor.
Wall Insulation				X	X	Our calculation for the R-value of a wall structure with no cavity insulation considers more details and is therefore more conservative. Our pre/post-treatment R-values take framing area into consideration, so we do not apply the framing factor. We use the TRM's published heating and cooling degree days but do not apply the correction factor or discretionary use adjustment factor. We assume a higher cooling efficiency for our cooling savings calculations. Our peak coincident kW savings assume a 100% coincidence factor.
Air Sealing				X		Our N-factors are based on wind speed from TMY3 data and stack and wind coefficients from 2017 ASHRAE Fundamentals. We use the TRM's published heating and cooling degree days but do not apply the correction factor or discretionary use adjustment factor. We assume a higher cooling efficiency and do not apply a latent heat multiplier to our cooling savings calculations. Our peak coincident kW savings assume a 100% coincidence factor
Door Weatherstripping			X			Door weatherstripping is not a measure in the TRM.
Window Film			X			Window films are not a measure in the TRM.

Holistic

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Holistic			X			

Home Lighting
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
Home Lighting		X	X		X	Incremental costs differ from those stated in the TRM. Incremental costs are based on historical data and are significantly different from those stated in the TRM.

HVAC Cooling
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
DX		X				
WSHP		X				
PTAC		X				
Scroll-Screw Chiller		X				
Centrifugal Chillers		X				
Air Cooled Chillers		X				
Chiller VFD Retrofit		X				
MN ERV				X	X	Using custom bin analysis for baseline cooling load and formulas that are slightly different to work with that assumption
Mini-Split Heat Pump		X				
Minisplit AC		X				
CRAC units						
Plate & Frame HX			X			
Commercial AC Switch			X			
DX ACCU		X				

HVAC Heating

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
Water Heater					X	We use higher setpoint and groundwater temperature from different references. Also costs are deemed per Btuh at each facility type
Boiler					X	Use the TRM to derive a single EFLH value using historical participation in Boiler measures. Use equipment costs supplied by vendors to deem incremental costs
Furnace					X	Different methodology used to calculate EFLH using weather Bin Data
Unit Heater					X	Similar methodologies but EFLH value deemed based on historical participation
Boiler Tune-up					X	Uses a single EFLH value based on historical boiler participation and a slightly more conservative 2% efficiency improvement
Steam Traps				X	X	Different methodology using deemed leak rates in lbs of steam and BTU and heat los in btu per pound. Annual Leak hours from AHRI directory used instead of system EFLH
Pipe Insulation			X			
Demand Control Ventilation				X	X	Different methodology using data from historical custom DCV projects
Destratification Fans				X	X	Used better method compiling data from multiple TRM's other references, and historical custom project data
Boiler Controls					X	Uses more conservative savings estimates from a variety of sources for all boiler controls measures to align with root data sources, while taking TRM methodology where aligned with root data.
Heat Pump Water Heater				X	X	Methodology includes consideration for specific features of Commercial heat pump applications, diverging from Canadian residential study basis referenced by TRM for penalty on heating. Portfolio adds fuel switching analysis.
Dual Fuel RTU			X			

Lighting

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
13.1 Lighting Controls					X	PAF assumptions in TRM are less conservative. We combine controls measure savings factor into single value vs facility based values in TRM. We deem incremental cost per controlled watt while TRM deems cost per sensor.
13.2 Lighting Retrofit			X		X	Linear Ambient Fixtures, LED Mogul Based Lamps, LED High-bay fixtures with HID baseline. We have a lower heating penalty factor and slightly higher cooling savings factors. We deem 20 year lifetime for LED fixtures, and lamp lifetimes based on historical participation in program.
13.3 Lighting Midstream			X			Midstream is a different channel
13.4 Lighting New Construction				X		We use deemed baseline equipment model pairings while TRM lists LPD requirements.
13.5 Lighting DI			X			Direct install is just a different distribution channel.
13.6 Grow Lighting			X			Uses IL TRM and historical participation

Motors

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference
				Formula	Assumptions	
Motors				X	X	Included a refrigeration factor for refrigerated applications and minor differences in operating hours
VFDs				X	X	Types of equipment that VFDs can be installed on are limited and typical operating hours are assumed. A referenced Energy Savings factor is used to calculate deemed energy savings.
Refrigeration Fans				X	X	Assumptions are based on Xcel Energy metered data and Q-sync motor data from IL TRM.
FEI				X	X	Includes associated VFD savings.
Well Pump VFDs			X			
PEI				X	X	Includes associated VFD savings.
Fractional HP Circ Pumps				X	X	A more recent reference was used for the cost data. Operating hours were simplified due to updates to the MN energy code.
Fractional HP fan motors				X	X	A more recent reference was used for the cost data. Based on projects we've seen these motors are generally small and have negligible heating impacts.
Integrated Drives			X			

New Homes
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Modeled Residential New Construction	X		X			This is a custom measure and is not included in the MN TRM
Affordable New Construction	X		X			This is a custom measure and is not included in the MN TRM

Refrigeration

TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Anti-Sweat Heater Controls					X	Assumptions are from different sources
No Heat Case Doors					X	Assumptions are from different sources
Evaporator Fan Motor Controller				X	X	We have simpler calculations, and assumptions from past metering
Medium-temp Enclosed Reach-In Case			X			
Retrofit of open multi-deck cases with solid glass doors					X	Assumptions are from different sources
Walk-in Freezer Defrost Controls				X	X	Different sources for assumptions, and similar but different formula approach.
Floating Head Pressure Controls				X	X	Different application, for larger systems & based on past projects
Strip Curtains for Walk-in Freezers and Coolers		X				
Auto Close Doors for Walk-ins			X			
Refrigeration Recommissioning	X					

Res Codes Standards
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Codes Residential	X		X			This is a custom measure and is not included in the MN TRM

Res HVAC
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
17.1 Res AC - QI				X	X	QI is combined with the equipment savings calculation in the XE Formulas. use QI factors to adjust baseline SEER/EER by No_QI loss factors and the proposed SEER/EER by Uncorrectable QI loss factor. The loss factors used by Xcel are different than the single values in the TRM. Apply oversize factor to reduce nameplate rating to an expected max load. More conservative SEER to EER conversion formula for use in baseline EER. Include QI duct sealing benefit to existing furnace gas savings. Calculation combines Equipment & QI savings into single measure. EFLH derived from TMY3 data.
17.1 Res AC - Equipment				X	X	More conservative SEER to EER conversion formula for use in baseline EER. Xcel does not provide an early replacement option. EFLH derived from TMY3 data. Equipment and QI formulas are merged into a single measure and formula set.
17.2 Res GSHP				X	X	Size of unit is based on heating load plus oversize factor. Cooling load is derived from assumed balance point and load profile based on weather. Xcel doesn't blend average baseline electric heating types. Xcel offers a gas heating split system AC baseline. Xcel measure is based on closed loop brine to air. EFLH derived from TMY3 data and is consistent with EFLH used in furnaces and boilers.
17.3 Res ASHP				X	X	Same cooling methodology as Xcel AC measures including QI. Adopted TRM 3.1 HSPF adjustment for AHRI climate region. EFLH for both heating and cooling derived from TMY3 data and is consistent with the furnace and boiler EFLH. Measure has calculation for ASHP heating down to cutover temperature and backup below cutoff temperature is ignored Assumes cooling load is basis for equipment sizing and selection. Resulting load profile used to determine heating full load value and is used in the heat pump full load calculations. Baseline gas heat assumed to be high efficiency so that stacking of a furnace or boiler rebate can occur without overlap.
17.4 Res MSHP				X	X	Same cooling methodology as AC measure with "No QI" assumed in the baseline. Adopted TRM 3.1 HSPF adjustment for AHRI climate region. EFLH for both heating and cooling derived from TMY3 data. Measure has calculation for MSHP heating down to cutover temperature and backup below cutoff temperature is ignored. treating like a full home solution like the AC/ASHP. No-QI-loss factor is associated only with the baseline AC for this measure, i.e. baseline is a non-quality install of an air conditioner. Sizing and selection are based on the cooling load requirements and the heating savings are based on the calculated heating full load value in the same manner as the ASHP methodology. Baseline gas heat assumed to be high efficiency so that stacking of a furnace or boiler rebate can occur without overlap.
17.5 Furnace & Boiler				X	X	Boiler baseline is 84% per federal standard. Xcel's oversize factor is 30% per the older MN TRM v3.3. Basic formulas match TRM, but oversize factor converts nameplate into max heating load. Heating EFLH derived from TMY3 data (same as for cooling EFLH) and is consistent with the EFLH used in our Heat Pump measures. Measure is independent from heat pump measures so that a separate rebate can be offered.
17.5 Furnace & Boiler - Tuneups				X	X	Xcel uses the same formula sets as the furnace and boiler replacements. The Xcel had assumed a delta in improved efficiency of 2.5% vs. 2%. Xcel applies oversize factors from the MN TRM 3.3 furnace and boiler measure.
17.5 Furnace & Boiler - ECM Retrofits for Low Income				X	X	TRM's deemed savings for seasonal usage don't match the Xcel derived values. The TRMs implied ECM EFLH is less than 1/2 of the EFLH total from the TRM's own heating and cooling measures. Xcel's heating penalty presented as an O&M cost increase to keep all the costs / savings within the electric fuel for CBAs.
17.6 Programable T-Stat				X	X	Xcel model of typical home with weighted average programmable t-stat settings. Savings per degree average set back / set up temperatures.
17.7 Smart T-Stat - EE savings				X	X	Energy star 95% confidence limit savings percentages from key criteria. Deem average cooling and heating loads MN TRM 3.3.
17.7 Smart T-Stat - DR Savings			X			Demand response capable Energy Star Smart Thermostat.
17.8 Saver's Switch				X	X	Formula's are different to allow for scaling of different building types Savings values are derived from recorded event data
17.9E Star Radon Fan			X			
17.10 Eco+			X			Manufacturer offers optimization algorithms specific to their equipment. This savings is in addition to the tier II or tier III Energy Star Smart Thermostat savings.
17.11 Room AC		X				
17.12 Res ccASHP				X	X	Size and Selection based on Heating requirements. Assumption is that the unit is sized to deliver at 5 F (coldest AHRI rating). EFLH for heating is presented in 5 F bins to allow customer selection of cutover temperature between zero and 20 F. EFLH is based on TMY3 data and matches up to the furnace EFLH at full load to ensure consistency between the two measures. Cooling load is derived from the load profile rather than using the oversized cooling nameplate rating. QI is combined with the equipment savings calculation in the XE Formulas. use QI factors to adjust baseline SEER/EER by No_QI loss factors and the proposed SEER/EER by Uncorrectable QI loss factor. The loss factors used by Xcel are different than the single values in the TRM.
17.13 Res ccMSHP				X	X	Size and Selection based on Heating requirements. Assumption is that the unit is sized to deliver at 5 F (coldest AHRI rating). EFLH for heating is presented in 5 F bins to allow customer selection of cutover temperature between zero and 20 F. EFLH is based on TMY3 data and matches up to the furnace EFLH at full load to ensure consistency between the two measures. Cooling load is derived from the load profile rather than using the oversized cooling nameplate rating. QI is combined with the equipment savings calculation in the XE Formulas. use QI factors to adjust baseline SEER/EER by No_QI loss factors for the baseline case and no QI adjustment of the proposed SEER/EER. The loss factors used by Xcel are different than the single values in the TRM.

Study & Non-Achievement
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
Study & Non-Achievement			X			

Water Heaters
TRM Version **4.0**

Measure Name (Deemed Sheet Name)	Custom Measure?	Matches TRM?	Measure NOT in TRM?	Different from TRM		If it differs from TRM, explain the difference (general explanation)
				Formula	Assumptions	
19.1 Showerheads				X	X	Deem gallons hot water per year saved regardless of home type. Address secondary showerhead with lower usage. Xcel's average hot water saved is lower than the average presented in the TRM, but weights the savings towards the primary showerhead.
19.1 Aerators				X	X	Deem gallons hot water per year saved regardless of home type
19.2 Water Heaters - Gas				X	X	Hot water usage based on number of bedrooms. Different values for single family vs. multi-family similar to TRM.
19.2 Water Heaters - HPWH				X	X	Methodology is the same for all water heaters and allows cross over baseline (gas water heater baseline for new heat pump water heater). Heat Pump water heaters greater than 55 gallons use Electric resistance storage baseline via multiple water heaters rather than heat pump water heaters. Code minimum HPWH's are not available in the market.
19.3 Commercial Aerators						

Appendices

This section provides further details regarding cost analysis activities conducted by the Company as part of the 2024-2026 Minnesota Triennial. In addition, we provide other documentation that may be helpful in reviewing our Plan.

Included as part of the Appendix:

- Appendix 1: Electric Utility System Impacts
- Appendix 2: General Inputs for the 2024-2026 Gas CIP BENCOST Model
- Appendix 3: Efficient Fuel Switching Screening
- Appendix 4: Budget Categories
- Appendix 5: Compliance Matrix
- Appendix 6: Low Income Segment Programs: Future Experience Concepts
- Appendix 7: Minnesota Low-Income Segment Process Evaluation

APPENDIX 1: ELECTRIC UTILITY SYSTEM IMPACTS

The Deputy Commissioner has required several items new to the Triennial Plan regarding cost-effectiveness. These requirements are outlined in the Deputy Commissioner's *Cost- Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities Decision* issued on March 21, 2023, in Docket No. E,G999/CIP-23-46 (further noted as Cost-Effectiveness Decision). The Company generally followed the guidance laid out in Appendix K of this decision. We provide further details as to our analysis below.

This section is broken into two parts: static impacts and dynamic impacts. The Company defines static impacts as those that are based on fixed conditions and are the same for all measures. Dynamic impacts are those based on hourly modeling and change for each measure. As an example, the cost per kW of transmission and distribution is the same for any given measure and thus is a static impact, while a particular measure's marginal energy impact will vary, making that a dynamic impact.

This section is intended as a reading aid while exploring the Company's avoided cost documentation in Attachment A: MN 24-26 Avoided Costs.

Static Impacts

Ancillary Services & Market Effect

Ancillary services and market effects are incorporated into the cost-benefit analysis as a single two percent adder. This represents one percent for ancillary services and one percent for market effects as described in Appendix K. This adder only applies to the generation capacity, transmission and distribution capacity, and marginal energy benefits. The Company felt that this was the simplest and most accurate way to account for these impacts.

Transmission and Distribution

For transmission and distribution, the Company continued to use the Approved Discrete approach approved for use in prior Plans.[1] The nominal stream of benefits has been extended from the original time horizon of the study out to 2045 using the same escalation rate that was used in the study. From there the Company discounted and accumulated the nominal stream, year over year, to develop a present dollar per kW value that represents the lifetime transmission and distribution impact that can be applied to a measure given its lifetime and starting year.

Generating Capacity

The Company based our Generating Capacity Benefit on the Midwest Independent System Operator's (MISO) Local Resource Zone 1 Cost of New Entry for 2023/2024. Using this value of $104.17/kW in our base year the company escalated this value using the Company's standard, non-labor, inflation assumption of 1.65 percent per year to develop the nominal benefit stream for each year from 2023 to 2045. From there the Company discounted (using both the societal and utility

[1] September 29, 2017 Decision in the Matter of Avoided Transmission and Distribution Cost Study for Electric 2017-2019 CIP Triennial Plans (Docket No. E999/CIP-16-541).

discount rate) and accumulated the nominal stream, year over year, to develop a present-dollar-per-kW value that represents the lifetime generation capacity impact, which can be applied to a measure given its lifetime and starting year.

Criterial Pollutants
A standard output from the Company's Midwest Integrated Resource Plan (IRP) modeling is the cost for criteria pollutants (NOx, PM 2.5, and SOx) based on the different regions the pollutants occur in. These are calculated using the high externality case from the Minnesota Public Utility Commission's January 3, 2018 Order regarding externality costs.[2] The externality costs were escalated to 2018 nominal dollars for the first modeling year of the IRP. These annual values are then divided by the annual energy production excluding energy efficiency to determine a nominal dollar per kWh stream. From there the Company discounted (using the societal discount rate) present-dollar-per-kWh value that represented the lifetime criteria pollutant impact that can be applied to a measure given its lifetime and starting year.

Other Fuels
In connection with our electrification efforts the Company also proposes avoided cost values for other fuels. Specifically, the Company included values for propane, gasoline, and diesel since they are expected to be the most common non-natural-gas fuels displaced. To develop these values the Company averaged the weekly average prices for Minnesota from 2021 and 2022 using data from the Energy Information Administration to create an annual average price for each fuel. Prices in 2020 were excluded since they were artificially low due to the COVID-19 pandemic. These annual average prices were escalated using the Company's 1.65 percent general inflation assumption and then discounted using the societal discount rate. This results in a lifetime present-dollar-per-gallon impact that can be applied to a measure given its lifetime and starting year.

Other Fuels Carbon Benefit
To develop a dollar per gallon metric for greenhouse gas impacts the company used the high externality values provided on page 98 of the Cost-Effectiveness Decision. These values were considered a nominal stream, so the Company discounted them using the societal discount rate and applied them (with appropriate conversions) year by year to a pound per gallon factor from the Environmental Protection Agency. This resulting stream was then accumulated year over year to develop a lifetime present-dollar-per-gallon metric for a given fuel and lifetime.

Dynamic Impacts

Given the time-varying nature of marginal energy prices, electric CO_2 intensity, and electric source energy conversions, the Company has developed a method to convert hourly outputs to a single weighted average annual value based on different energy savings profiles. This process starts with defining an hourly energy savings profile for a particular energy efficiency measure. These profiles are based on weighted averages of the different customer types we expect to participate in a measure.

[2] Docket No. E-999/CI-14-643, Ordering Point 2.

Energy generation impacts were developed using the Company's most recently approved Integrated Resource Plan (IRP). Using the capacity expansion plan developed in the IRP, the Company generated a production costing run using the Company's most recent natural gas price forecast to determine hourly impacts from 2023 to 2045. In addition to hourly generation costs, this process also identifies the emissions and heat rate (in BTU) for each hour from 2023 to 2045.

Next, both the savings profile and the hourly outputs from the production costing run are re-formatted into 48 day-types. The day-type method creates an hourly profile for four different day types for each month of the year (resulting in 48 total hourly day-type profiles for each measure). The four-day types are defined based on the electric system load as described below.

- High Day: The highest-load weekday of each month;
- Medium Day: Represents the next three highest-load weekdays;
- Low Days: The rest of the weekdays; and
- Weekend: weekends.

The day-typing approach facilitates combining the single-year savings profiles with the generation impacts which span multiple years.

After the energy savings profiles are day-typed they are converted to represent the percent of annual energy savings that occurs in each hour of each day type. From there the load profiles are applied hour by hour, month by month, and day type by day type to the day-typed outputs from the production costing run. This produces a single value that represents the weighted average impact per kWh for a particular energy savings profile for the impact of interest (cost, emissions, or BTU).

In the Avoided Costs Attachment, the Company provides the load shapes in both the percent of annual savings day type format and the unadjusted "Scalar" day type load shape. The document also includes the nominal stream of annual values for these load shapes.

Marginal Energy

Following the process described above to combine day types with hourly data, the Company developed nominal dollar-per-kWh marginal cost figures for each year. These nominal costs were then discounted, and the present values summed to result in a single dollar-per-kWh value representing the lifetime marginal energy cost impact for a measure based on its lifetime and year of installation.

Greenhouse Gases

Given limitations in the modeling software the Company could not develop a true marginal emissions metric so hourly system average emissions were used since it is the best hourly metric the modeling software could provide. Following the process above the Company described above, a lifetime greenhouse gas intensity for a given load shape and lifetime was developed. Additionally, to account for the global warming potential of other gases (CH_4 and N_2O) a 0.553 percent adder was applied to the annual CO_2 intensity. This value represents the annual percent of CO_2e that is attributable to other gases. These values are used to help screen Efficient Fuel Switching measures.

To develop a dollar per kWh metric for greenhouse gas impacts the company used the high externality values provided on page 98 the Cost-Effectiveness Decision. These values, in 2015 dollars, were assumed to be a good proxy for the future nominal stream of costs and converted from short tons to pounds, This resulting stream was then accumulated and discounted year over year to develop a lifetime dollar per kWh metric for a given load shape and lifetime.

Source Energy Conversion

Given limitations in the modeling software the company could not develop a true marginal heat rate metric so a system average heat rate was used since it is the best hourly figure the company could develop with the modeling software. A few adjustments were made to the outputs from the modeling software. First the heat rate for nuclear power was converted to 3,412 BTU/kWh.[3] Additionally, a heat rate of 3,412 BTU/kWh was used for wind, solar, and hydro resources. Batteries were assumed to be charged using excess carbon-free energy and to have a round trip efficiency of 86 percent (Used by NREL in their 2022 Annual Technology Baseline Repot) which results in a 3,967 BTU/kWh factor. After these adjustments were made, an hourly BTU/kWh factor taking a weighted average of the different resources heat rates based on the total generation for each resource. following the process described above an estimated BTU per kWh metric for each year was calculated. These annual values were accumulated year over year to develop a lifetime source energy factor for a given load shape and lifetime. These values are used to help screen Efficient Fuel Switching measures.

[3] Decision, In the Matter of Technical Guidance for the Inclusion of Efficient Fuel-Switching, Load Management, and Pre-weatherization Measures in CIP, Docket E,G999/CIP-21-837 (pg. 41).

Appendix 2: General Inputs for the 2024-2026 Gas CIP BENCOST Model

Description
The margins, rates and "costs included in rates" used in the General Inputs of the Gas CIP BENCOST model were approved as part of Xcel Energy's most recent gas rate case (Docket No. G002/GR-21-678). This includes interim rates that went into effect in January 2022. The Company has updated these rates according to the guidelines provided in the Department of Commerce Decision (Decision) filled on March 31, 2023 (Docket No. G999/CIP-23-46).

BENCOST Input 1 (Retail Rate)
The Retail Rate represents the sum of the Company's currently approved tariff rate for each customer class, the Commodity Cost of $4.52 per Dth and a Demand Cost for firm non-demand billed customers of $1.36 per Dth. This value does not include the annual true-up adjustment, the annual CIP Adjustment Factor, or any other riders.

Retail Rate ($/Dth)

Customer Class	Tariff Rate	Commodity Cost	Demand Cost	BENCOST Retail Rate
Residential	$1.76/Dth	$4.52/Dth	$1.36/Dth	$7.64/Dth
Small Commercial Firm	$1.17/Dth	$4.52/Dth	$1.36/Dth	$7.05/Dth
Large Commercial Firm	$1.17/Dth	$4.52/Dth	$1.36/Dth	$7.05/Dth
Small Commercial Demand Billed[4]	$2.01/Dth	$4.52/Dth	$1.56/Dth	$8.09/Dth
Large Commercial Demand Billed[1]	$1.36/Dth	$4.52/Dth	$0.91/Dth	$6.79/Dth
Small Interruptible	$0.91/Dth	$4.52/Dth	N/A	$5.44/Dth
Medium Interruptible	$0.45/Dth	$4.52/Dth	N/A	$4.97/Dth
Large Interruptible	$0.41/Dth	$4.52/Dth	N/A	$4.94/Dth

The rate for Small Commercial Firm / Large Commercial Firm of $7.05/Dth was applied to all Business programs as it is expected that the vast majority of participants would be from these customer classes.

[4] The Demand Billed classes' rates include both the commodity and demand components of their rates. The demand portion was calculated by dividing annual demand revenue by commodity sales.

Variable Annual Escalation Rate

The variable escalation rates between 2023 and 2043, averaging 2.61 percent, was provided in the Decision. This value was calculated by Department Staff using the projected average percentage changes in the price of natural gas from 2023 through 2043 (20-year period) to all users in the West North Central Region as estimated in the Energy Information Administration's 2022 *Annual Energy Outlook*.

BENCOST Input 2 (Non-Gas Fuel Retail Rate)
The Non-Gas Fuel Retail Rate represents the non-gas (normally electricity) retail rate paid by a customer or customer class. This value would be used to account for electric savings associated with gas conservation programs. Because the Company has separate electric conservation programs, we did not include any electric benefits in the BENCOST model. Therefore, the Non-Gas Fuel Retail Rate is zero for all of our analyses.

BENCOST Input 3 (Commodity Cost)
The Commodity Cost, $4.52 per Dth, was provided in the Decision. This value is the weighted average of CenterPoint Energy, Great Plains Gas, Greater Minnesota Gas, Minnesota Energy Resources Corporation, and Xcel Energy's purchased gas adjustments (i.e. weighted average cost of gas) from November 2020 through October 2022, weighted by each utility's gas sales to non-exempt customers. The Commodity Cost input is also multiplied by the Variable Annual Escalation Rate, which is described above in Input No. 1.

BENCOST Input 4 (Demand Cost)
The Demand Cost equals the Minnesota Total Demand (line 1) divided by the MN State Design Day (line 4) in Schedule A, Page 3 of the Company's March 1, 2023 Derivation of Current PGA Costs. Interruptible customers do not have demand costs. The Demand Cost is multiplied by the Variable Annual Escalation Rate discussed in Input 1 above. The resulting 2023 demand cost is $111.31.

BENCOST Input 5 (Peak Reduction Factor)
The Peak Reduction Conversion Factor, 1 percent, was provided in the Decision. This value represents an estimate of the percent of energy savings occurring on system peak. The Decision allows for utilities to propose alternative values for specific programs or segments. The Company has not proposed alternative values and uses the 1 percent factor in all of our analysis.

BENCOST Input 6 (Variable O&M)
The Variable O&M input is the Company's estimate of its variable Operations and Maintenance (O&M) costs and is generally equal to its minimum transportation flexible rate for the Large Firm Transportation class. This Variable O&M input is multiplied by the Variable Annual Escalation Rate discussed in Input 1 above. The resulting 2023 Variable O&M is $0.03924/Dth.

BENCOST Input 7 (Non-Gas Fuel Cost)

The Non-Gas Fuel Cost represents the added or avoided costs of non-natural gas fuel associated with the Conservation Improvement Program. Because the Company has separate electric conservation programs that include electric benefits, we did not include any electric benefits in the BENCOST model. Therefore, the Non-Gas Fuel Cost is zero for all of our analyses.

BENCOST Input 8 (Non-Gas Fuel Loss Factor)

The Non-Gas Fuel Loss Factor represents the transmission and distribution line losses associated with non-natural gas (electric) fuels associated with the Conservation Improvement Program. Because the Company has separate electric conservation programs that include the electric benefits, we did not include any electric benefits in the BENCOST model and no loss factor was needed. Therefore, the Non-Gas Fuel Loss Factor is zero for all of our analyses.

BENCOST Input 9 (Gas Environmental Damage Factor)

The Environmental Damage Factor, $3.83 per Dth saved, was provided in the DOC decision filing. This value represents the long-term "external" cost to society and the environment of burning natural gas. The factor includes damage factors associated with both criteria air emissions and greenhouse gases (GHGs). The value for criteria emissions is calculated using the high range of the final metropolitan fringe environmental cost values approved by the Minnesota Public Utilities Commission (January 3, 2018 Order Updating Environmental Cost Values, Docket No. E-999/CI-14-643). It includes the costs of emissions (SO_2, $PM_{2.5}$, CO, NO_X, and Pb), along with the estimated natural gas emission factor (or factors) for each emission provided by the Environmental Protection Agency (AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources). For CO_2, Staff used as the starting point the high externality value of $45.16/ton in 2023 from the Commission's January 3, 2018 Order Updating Environmental Cost Values. The Gas Environmental Damage Factor is multiplied by escalation rates built into the PUC's Environmental Cost Values for CO_2. This escalation rate averages 1.69 percent annual from 2023 to 2043.

BENCOST Input 10 (Non-Gas Fuel Environmental Damage Factor)

The Non-Gas Fuel Environmental Damage Factor represents the cost to society and the environment for generating electricity. Because the Company has separate electric conservation programs which include the cost to society and the environment for generating electricity, we did not include this cost in the BENCOST model. Therefore, the Non-Gas Fuel Environmental Damage Factor is zero for all of our analyses.

BENCOST Input 11 (Participant Discount Rate)

The Participant Discount Rate for business customers is represented by the Xcel Energy Gas CIP Utility Discount rate, discussed in Input 12, or 5.34 percent. For residential customers, it is represented by the Societal Discount Rate of 3.30 percent, discussed in Input 13.

BENCOST Input 12 (MN CIP Utility Discount Rate)
The CIP Utility Discount Rate is used in the Utility Cost Test to value, in current dollars, the future stream of utility system benefits and costs (excluding benefits resulting from avoided environmental data as discussed above in Input 9) resulting from a conservation investment. The MN CIP Utility Discount Rate of 5.34 percent was established in the *Deputy Commissioner's Decision – In the Matter of CIP Gas and Electric Utilities 2021-2023 Cost-Effectiveness Review.* February 11, 2020. Docket Nos. G999/CIP-18-782, E999/CIP-18-783. The Deputy Commissioner's *Decision* establishing inputs for the 2024-2026 Triennium made no change to this discount rate.

BENCOST Input 13 (Societal Discount Rate)
The Social Discount Rate, 3.30 percent, was provided in the Decision.

BENCOST Input 14 (General Input Data Year)
The General Input Data Year for the 2024-2026 ECO Triennial Plan, 2023, was provided in the Decision.

BENCOST Input 15, 15a, and 15b (Project Analysis Years 1, 2, and 3)
The Project Analysis Years are the years over which the Company's ECO Triennial Plan will be effective, 2024, 2025, and 2026, respectively.

BENCOST Input 26 (Environmental Compliance)
Environmental Compliance is used to value Current and future environmental compliance requirements that impact utility rates; environmental compliance impacts already included in the cost of the relevant energy resource should not be included in this category of impacts to avoid double-counting. The required value for Environmental Compliance Impacts for the 2024-2026 Triennium is 1.40% of the $/MCF commodity cost. The value is based on impacts from proposed federal methane emissions standards that the U.S. EPA anticipates finalizing in 2024.

BENCOST Input 27 (Market Price Effects)
Market Price Effects quantifies the estimated impact on market prices from ECO programs. The Decision set this values to zero for the 2024-2026 Triennium period.

BENCOST Input 28 (Other Environmental)
Other Environmental quantifies all other environmental impacts including other air emissions, solid waste, land, water, and other environmental impacts not accounted for in other criteria. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 29 (Economic and Jobs (Macroeconomic))
Economic and Jobs quantifies the incremental economic development and job impacts resulting from ECO programs. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 30 (Energy Security)
Energy Security quantifies the impact of ECO programs on advancing the goals of energy independence and security. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 31 (Energy Equity)
Energy Equity quantifies the impact of ECO programs to mitigate the concerns about equity. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 33 (Credit and Collection Costs)
Credit and Collection Costs quantifies the impact of reduced utility costs associated with arrearages, disconnections and reconnections resulting from ECO programs. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 34 (Risk)
Risk quantifies the reduction in operational, technology, cybersecurity, financial, legal, reputational and regulatory risks to the utility resulting from ECO programs. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 35 (Reliability)
Reliability quantifies the reduction in utility system requirements and helping the system withstand instability, uncontrolled events, cascading failures or unanticipated losses of system components resulting from ECO programs. The Decision set this value to zero for the 2024-2026 Triennium period.

BENCOST Input 36 (Resilience)
Resilience quantifies the impact from ECO programs in improving utility resilience. The Decision set this value to zero for the 2024-2026 Triennium period.

APPENDIX 3: EFFICIENT FUEL SWITCHING SCREENING

Department of Commerce Technical Guidance

On March 15, 2022, the Department of Commerce issued a *Decision* finalizing the Department's Technical Guidance for the Inclusion of Efficient Fuel-Switching, Load Management, and Pre-Weatherization Measures in CIP[5] (Technical Guidance). This Technical Guidance approves methods to determine whether individual Efficient Fuel Switching (EFS) measures meet certain criteria for inclusion in utility CIP Plans.[6] The Technical Guidance was later supplemented with the Efficient Fuel-Switching and Load Management Cost-Effectiveness Technical Guidance (CE Technical Guidance or Appendix J) The chart below summarizes the statutory criteria for Efficient Fuel-Switching and describes the evaluation methods applied in this Plan to determine that the criteria are met and how those methods conform to the Technical Guidance.

Criteria	**Analysis Method**
Results in a net reduction in the amount of source energy consumed for a particular use, measured on a fuel-neutral basis.	Lifetime Source Energy Savings (in BTU) were calculated by comparing BTU consumption for the base and EFS measures. Electric source energy was calculated following the method described within the "Electric Utility System Impacts" section of this filing. Baseline fuel BTU consumption was calculated using the fuel heat rates provided in the Technical Guidance.
Results in a net reduction of statewide greenhouse gas emissions as defined in section 261H.01 subdivision 2, over the lifetime of the improvement. For an EFS improvement installed by an electric utility, the reduction in emissions must be measures based on the hourly emission profile of the electric utility, using the hourly emissions profile in the most recent resource plan approved by the commission under section 216B.2422.	Greenhouse gas emissions from electricity were calculated following the method described in the "Electric Utility System Impacts," which includes calculation of an hourly electric load shape and hourly electric emissions rate. Baseline fuel greenhouse gas calculations used the 145.86 lb/Dth figure specified in the Technical Guidance for natural gas[7] and used standard emissions rates published by the Environmental Protection Agency for other fuels.

[5] Docket No. E,G999/CIP-21-837

[6] Minn. Stat. 216B.241 subds. 11 and 12.

[7] Technical Guidance, p. 43.

Criteria	Analysis Method
Is cost-effective, considering the costs and benefits from the perspective of the utility, participants, and society	Based on Minnesota Test as established by the Department of Commerce in the March 31, 2023 Decision on CIP Cost-Effectiveness Methodologies.[8] This Decision stated that cost-effectiveness screening be applied at the segment level, with results also presented at the portfolio and program levels.[9] For this reason, the Company considered measures that failed. this test individually could be included in the portfolio provided the program and segment remained cost-effective.
Is installed in a manner that improves the utility's system load factor	Load factors for individual measures are compared to the utility system load factor calculated for 2023 from the Company's most recently approved Integrated Resource Plan (IRP) of 54.24 percent. Measure level load factors were calculated using the following formula: (Annual kWh/8760)/PC kW. This formula compares the average kW impact to the peak kW impact which is how the Utility system load factor is calculated.
Operated in a manner that facilitates the integration of variable renewable energy into the electric system.	Higher load factor measures add energy load at a higher rate than demand load which allows for the addition of more variable renewable energy generation to be added to the system.

The below chart shows the screening of all the EFS measures proposed in this Plan and the resulting metrics. Notes are included for measures that these metrics show that the measures fail the screening but are expected to pass the screening or are included for some other reason.

[8] Decision in the Matter of 2024-2026 CIP Cost-Effectiveness Methodologies for Electric and Gas Investor-Owned Utilities (Docket. No. E,G999/CIP-23-46).
[9] Appendix J, p. 220.

Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Lifetime	Rebate Amount ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth or Gallons)	Loadshape	Loss Factor Segment	Savings Type	2024 Minnesota Test Net Benefits	2024 Lifetime Carbon Savings (Lbs.)	2024 Lifetime Source Energy Savings (BTU)	2025 Minnesota Test Net Benefits	2025 Lifetime Carbon Savings (Lbs.)	2025 Lifetime Source Energy Savings (BTU)	2026 Minnesota Test Net Benefits	2026 Lifetime Carbon Savings (Lbs.)	2026 Lifetime Source Energy Savings (BTU)	Load Factor	Notes
Business Energy Assessments - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	98.6	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 11,330.85	252,441	1,426,915,197	$ 11,718.39	254,977	1,431,987,395	$ 12,171.64	256,392	1,435,599,393	INF	
Business Energy Assessments - MN	In-Depth Study	Beneficial Electrification Studies	0	0	0.0	$8,680.00	0	0.000	0.0	0.0	BUS	Beneficial Electrification	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	INF	
Business New Construction - MN	EDA	Energy Design Assistance for Efficient Fuel Switching, Gas to Electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	20.0	$7,806.75	-41,046	-8.550	376.6	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 4,420.21	864,420	3,903,738,544	$ 5,493.85	881,301	3,937,508,732	$ 6,939.61	890,726	3,961,557,053	54.80%	
Business New Construction - MN	EDA	Energy Design Assistance for Low Income efficient fuel switching projects, gas to electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	20.0	$7,806.75	-41,046	-8.550	376.6	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 4,420.21	864,420	3,903,738,544	$ 5,493.85	881,301	3,937,508,732	$ 6,939.61	890,726	3,961,557,053	54.80%	
Business New Construction - MN	EEB	Energy Efficient Buildings for Efficient Fuel Switching, Gas to Electric	More Efficient than Code Building	Code-Compliant Building	17.5	$720.17	-3,425	-0.710	58.1	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 4,325.28	130,494	750,644,028	$ 4,514.26	131,893	753,532,378	$ 4,741.03	132,644	755,346,024	55.08%	
Business New Construction - MN	LI EEB	Energy Efficient Buildings for Low Income efficient fuel switching projects, gas to electric	Building with better-than Code-Compliant building electric equipment	Building with code-compliant gas fired equipment	17.5	$1,056.45	-2,647	-0.409	34.1	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 1,414.84	73,201	390,575,611	$ 1,524.05	74,281	392,807,505	$ 1,660.16	74,862	394,208,949	73.95%	
Compressed Air Efficiency - MN	Forklift Electrification	Lithium-Ion battery forklift	Electric forklift with lithium-ion battery	Propane forklift	15.0	$4,000.00	-34,620	-4.083	4,158.0	MN-BUS-Forklift	Bus	Electrification - Propane	$ 48,226.16	594,922	3,363,016,779	$ 49,318.67	608,063	3,386,479,578	$ 50,654.73	613,428	3,399,234,124	96.79%	
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	98.6	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 11,330.85	252,441	1,426,915,197	$ 11,718.39	254,977	1,431,987,395	$ 12,171.64	256,392	1,435,599,393	INF	
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gasoline Equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	820.0	MN-BUS-CUSTOM	BUS	Electrification - Gasoline	$ 48,504.84	286,138	1,427,702,435	$ 49,382.68	288,673	1,432,774,634	$ 50,318.39	290,089	1,436,386,632	INF	
Custom Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Propane Equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	1,077.6	MN-BUS-CUSTOM	BUS	Electrification - Propane	$ 21,628.74	230,651	1,427,777,254	$ 22,062.80	233,186	1,432,849,453	$ 22,547.71	234,602	1,436,461,451	INF	
Custom Efficiency - MN	In-Depth Study	Beneficial Electrification Studies	0	0	0.0	$8,680.00	0	0.000	0.0	0.0	BUS	Beneficial Electrification	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	INF	
Home Energy Savings Program - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$5,373.17	-6,171	0.000	51.9	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (1,328.21)	106,624	461,109,914	$ (1,132.70)	108,785	464,890,757	$ (879.98)	109,839	467,377,926	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Home Energy Savings Program - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$9,741.82	-7,201	0.000	57.5	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (6,545.78)	107,596	460,552,814	$ (6,388.94)	110,509	465,279,089	$ (6,192.12)	111,635	466,229,505	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Home Energy Savings Program - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15.0	$5,393.09	-4,402	0.000	39.6	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (3,184.62)	63,931	302,919,206	$ (3,085.90)	65,610	305,405,028	$ (2,958.66)	66,015	305,402,139	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Home Energy Savings Program - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15.0	$4,500.00	-2,591	0.000	30.0	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (1,997.76)	54,841	284,259,695	$ (1,902.08)	55,688	285,592,142	$ (1,780.49)	56,021	286,408,450	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs < 5.4 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20.0	$79.64	-2,072	0.000	12.1	MN-BUS-DFRTX	Bus	Beneficial Electrification	$ 91.88	21,533	57,585,973	$ 116.87	22,454	59,171,817	$ 151.67	22,762	59,226,839	INF	
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 5.4 - 11.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20.0	$139.76	-4,109	0.000	22.2	MN-BUS-DFRTX	Bus	Beneficial Electrification	$ (122.57)	37,402	77,895,636	$ (80.65)	39,228	81,040,042	$ (19.66)	39,841	81,149,139	INF	The company understands that these measures are not cost effective, however they are important for small and medium sized business as they are currently one of the only options for electrification.
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 11.4 - 19.9 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20.0	$196.14	-6,185	0.000	32.0	MN-BUS-DFRTX	Bus	Beneficial Electrification	$ (423.58)	52,146	88,783,672	$ (366.46)	54,895	93,516,696	$ (280.95)	55,817	93,680,912	INF	The company understands that these measures are not cost effective, however they are important for small and medium sized business as they are currently one of the only options for electrification.
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs 20 - 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20.0	$351.97	-11,421	0.000	58.0	MN-BUS-DFRTX	Bus	Beneficial Electrification	$ (954.00)	93,310	143,492,278	$ (852.83)	98,386	152,232,338	$ (699.42)	100,089	152,535,580	INF	The company understands that these measures are not cost effective, however they are important for small and medium sized business as they are currently one of the only options for electrification.
HVAC+R - MN	Dual Fuel RTUs	Dual Fuel RTUs >= 63.3 tons	Dual Fuel Packaged Rooftop Unit With ASHP (cooling/heating) and Gas-fired Backup Heating	Packaged Rooftop Unit With DX Cooling and Gas Heating	20.0	$956.51	-29,945	0.000	155.5	MN-BUS-DFRTX	Bus	Beneficial Electrification	$ (1,935.67)	254,477	443,578,099	$ (1,656.24)	267,787	466,493,953	$ (1,239.16)	272,249	467,289,034	INF	The company understands that these measures are not cost effective, however they are important for small and medium sized business as they are currently one of the only options for electrification.

													2024			2025			2026				
Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Lifetime	Rebate Amount ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth or Gallons)	Loadshape	Loss Factor Segment	Savings Type	Minnesota Test Net Benefits	Lifetime Carbon Savings (Lbs.)	Lifetime Source Energy Savings (BTU)	Minnesota Test Net Benefits	Lifetime Carbon Savings (Lbs.)	Lifetime Source Energy Savings (BTU)	Minnesota Test Net Benefits	Lifetime Carbon Savings (Lbs.)	Lifetime Source Energy Savings (BTU)	Load Factor	Notes
HVAC+R - MN	Heat Pump Water Heater	Commercial Size Heat Pump Water Heater EFS	50 MBH Capacity Heat Pump Water Heater	Baseline Gas Water Heater	10.0	$600.00	-10,209	-1.165	102.9	MN-BUS-HPWH	Bus	Beneficial Electrification	$ 2,502.69	116,946	578,618,602	$ 2,745.72	120,748	585,907,759	$ 3,043.21	122,189	588,897,240	100.04%	
HVAC+R - MN	Heat Pump Water Heater	Residential Style Heat Pump Water Heater EFS	15 MBH Capacity Heat Pump Water Heater	Baseline Gas Water Heater	10.0	$400.00	-3,063	-0.350	30.9	MN-BUS-HPWH	Bus	Beneficial Electrification	$ 532.84	35,127	173,872,346	$ 605.81	36,267	176,059,307	$ 695.13	36,700	176,956,239	99.90%	
HVAC+R - MN	In-Depth Study	Beneficial Electrification Studies	0	0	0.0	$8,680.00	0	0.000	0.0	0.0	BUS	Beneficial Electrification	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	INF	
Indirect Impact EFS (Market Transformation) - MN	Panel Upgrade	Panel Upgrade	Upgraded panel to handle electrification load	As built panel	0.0	$2,000.00	0	0.000	0.0	0.0	RES	Beneficial Electrification	$ (2,000.00)	N/A	N/A	$ (2,000.00)	N/A	N/A	$ (2,000.00)	N/A	N/A	INF	
Low Income Multi-Family Building Efficiency - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$5,373.17	-4,768	0.000	40.1	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (2,247.99)	82,381	356,258,296	$ (2,096.94)	84,050	359,179,601	$ (1,901.68)	84,865	361,101,336	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15.0	$5,393.09	-4,402	0.000	39.6	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (3,184.62)	63,931	302,919,206	$ (3,085.90)	65,610	305,405,028	$ (2,958.66)	66,015	305,402,139	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Low Income Multi-Family Building Efficiency - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 18.9 SEER2 & 11.5 EER2 & 10.3 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	15.0	$3,427.65	-2,002	0.000	23.2	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (1,494.27)	42,373	219,636,020	$ (1,420.34)	43,028	220,665,548	$ (1,326.40)	43,285	221,296,277	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Low Income Multi-Family Building Efficiency - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$9,741.82	-5,559	0.000	44.4	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (7,274.35)	83,068	355,565,333	$ (7,153.26)	85,317	359,214,209	$ (7,001.31)	86,187	359,947,968	INF	To help drive customer savings the rebate is tied to the incremetnal cost and not to the net benefits of the MCT. This is part of a low income program.
Outdoor Equipment - MN	Electric Lawn Mower	Push Lawn Mower - EFS between electric and gasoline fuel	Electric Push Lawn Mower	Gasoline Powered Push Lawn Mower	10.0	$75.00	-26	0.000	6.9	MN-RES-Lawn Mower	Res	Electrification - Gasoline	$ 161.63	1,274	7,137,882	$ 166.05	1,286	7,166,956	$ 170.58	1,292	7,185,735	INF	
Outdoor Equipment - MN	Electric Lawn Mower	Riding Lawn Mower - EFS between electric and gasoline fuel	Electric Riding Lawn Mower	Gasoline Powered Riding Lawn Mower	10.0	$200.00	-140	0.000	20.0	MN-RES-Lawn Mower	Res	Electrification - Gasoline	$ 455.72	3,498	17,783,201	$ 469.21	3,563	17,940,200	$ 483.14	3,596	18,041,606	INF	
Outdoor Equipment - MN	Electric Lawn Mower	Electric Commercial Lawn Mower	Electric Commercial Lawn Mower, Push	Gas Lawn Mower	10.0	$300.00	-500	-0.050	150.0	MN-BUS-Lawn Mower	BUS	Electrification - Gasoline	$ 4,774.10	27,400	156,339,836	$ 4,863.94	27,595	156,801,723	$ 4,956.80	27,669	157,045,361	114.16%	
Outdoor Equipment - MN	Electric Lawn Mower	Electric Commercial Lawn Mower	Electric Commercial Lawn Mower, Riding	Gas Lawn Mower	10.0	$800.00	-1,750	-0.233	250.0	MN-BUS-Lawn Mower	BUS	Electrification - Gasoline	$ 6,977.63	42,021	216,402,924	$ 7,125.49	42,704	218,019,531	$ 7,281.53	42,963	218,872,263	85.62%	
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gas equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	98.6	MN-BUS-CUSTOM	BUS	Beneficial Electrification	$ 11,330.85	252,441	1,426,915,197	$ 11,718.39	254,977	1,431,987,395	$ 12,171.64	256,392	1,435,599,393	INF	
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Gasoline Equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	820.0	MN-BUS-CUSTOM	BUS	Electrification - Gasoline	$ 48,504.84	286,138	1,427,702,435	$ 49,382.68	288,673	1,432,774,634	$ 50,318.39	290,089	1,436,386,632	INF	
Process & Commercial Efficiency - MN	Custom Electrification Equipment	Custom Efficient Fuel Switching	Propane Equipment	Efficient electric equipment	20.0	$862.70	-6,165	0.000	1,077.6	MN-BUS-CUSTOM	BUS	Electrification - Propane	$ 21,628.74	230,651	1,427,777,254	$ 22,062.80	233,186	1,432,849,453	$ 22,547.71	234,602	1,436,461,451	INF	
Process & Commercial Efficiency - MN	In-Depth Study	Beneficial Electrification Studies	0	0	0.0	$8,680.00	0	0.000	0.0	0.0	BUS	Beneficial Electrification	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	$ (8,680.00)	N/A	N/A	INF	
Residential HVAC - MN	EFS - Res GSHP Heating	Heating Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20.0	$895.83	-6,550	0.000	110.3	MN-EFS-RES GSHP	RES	Beneficial Electrification	$ 12,645.18	278,749	1,623,880,344	$ 13,023.10	281,462	1,628,145,662	$ 13,458.56	282,397	1,628,688,784	INF	
Residential HVAC - MN	EFS - Res GSHP Heating	Heating Portion - GSHP replacing Gas Furnace & AC	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20.0	$895.83	0	0.000	0.0	MN-EFS-RES GSHP	RES	Beneficial Electrification	$ (895.83)	0	0	$ (895.83)	0	0	$ (895.83)	0	0	INF	This is indirect rebate provided to electric only customers to help drive heat pump adoption
Residential HVAC - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$1,100.00	-4,597	0.000	39.0	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ 1,971.55	80,374	349,986,280	$ 2,118.61	81,984	352,802,727	$ 2,308.36	82,769	354,655,484	INF	
Residential HVAC - MN	EFS - Res ASHP Heating	Centerally ducted dual fuel ASHP	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2 Ton 16 SEER2 & 9.6 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$600.00	0	0.000	0.0	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (600.00)	0	0	$ (600.00)	0	0	$ (600.00)	0	0	INF	This is indirect rebate provided to electric only customers to help drive heat pump adoption
Residential HVAC - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$1,500.00	-7,201	0.000	54.2	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ 1,173.14	99,109	402,368,227	$ 1,317.32	102,022	407,094,503	$ 1,500.72	103,148	408,044,918	INF	
Residential HVAC - MN	EFS - Res ccASHP Heating	Centerally ducted dual fuel cold climate ASHP	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$1,500.00	0	0.000	0.0	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (1,500.00)	0	0	$ (1,500.00)	0	0	$ (1,500.00)	0	0	INF	This is indirect rebate provided to electric only customers to help drive heat pump adoption
Residential HVAC - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15.0	$1,500.00	-5,782	0.000	52.1	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ 1,400.79	83,972	397,878,990	$ 1,530.45	86,178	401,144,074	$ 1,697.58	86,710	401,140,278	INF	
Residential HVAC - MN	EFS - Res ccMSHP Heating	Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15.0	$1,500.00	0	0.000	0.0	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ (1,500.00)	0	0	$ (1,500.00)	0	0	$ (1,500.00)	0	0	INF	This is indirect rebate provided to electric only customers to help drive heat pump adoption
Residential HVAC - MN	EFS - Res MSHP Heating	Non-ducted dual fuel MSHP w/ gas furnace backup	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15.0	$1,100.00	-2,782	0.000	29.5	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ 1,227.97	53,140	265,833,465	$ 1,321.74	54,050	267,264,206	$ 1,442.71	54,407	268,140,732	INF	

Program	Measure Group	Measure Description	Efficient Product Description / Rating	Baseline Product Description / Rating	Lifetime	Rebate Amount ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth or Gallons)	Loadshape	Loss Factor Segment	Savings Type	2024 Minnesota Test Net Benefits	2024 Lifetime Carbon Savings (Lbs.)	2024 Lifetime Source Energy Savings (BTU)	2025 Minnesota Test Net Benefits	2025 Lifetime Carbon Savings (Lbs.)	2025 Lifetime Source Energy Savings (BTU)	2026 Minnesota Test Net Benefits	2026 Lifetime Carbon Savings (Lbs.)	2026 Lifetime Source Energy Savings (BTU)	Load Factor	Notes
Residential HVAC - MN	**EFS - Res MSHP Heating**	**Non-ducted dual fuel MSHP w/ gas furnace backup**	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19 SEER2 & 9.3 EER2 & 9.5 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15.0	$1,100.00	0	0.000	0.0	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ (1,100.00)	0	0	$ (1,100.00)	0	0	$ (1,100.00)	0	0	INF	This is indirect rebate provided to electric only customers to help drive heat pump adoption
Residential HVAC - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$400.00	-941	-0.107	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 884.50	28,324	167,295,615	$ 931.51	28,674	167,957,358	$ 987.86	28,831	168,310,637	100.00%	
Residential HVAC - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$400.00	-959	-0.110	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 869.78	28,246	166,230,902	$ 916.69	28,602	166,905,647	$ 973.04	28,762	167,265,869	100.00%	
Residential HVAC - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$500.00	-941	-0.107	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 784.50	28,324	167,295,615	$ 831.51	28,674	167,957,358	$ 887.86	28,831	168,310,637	100.00%	
Residential HVAC - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$500.00	-959	-0.110	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 769.78	28,246	166,230,902	$ 816.69	28,602	166,905,647	$ 873.04	28,762	167,265,869	100.00%	
Whole Home Efficiency - MN	**EFS - Res GSHP Heating**	**Heating Portion - GSHP replacing Gas Furnace & AC**	Quality Installation of closed loop GSHP with 43,000 BTUH heating capcity and 16 EER cooling	Non-Quality Installation of 1.5 Ton 13.4 SEER2 AC and 80% AFUE gas fired furnace heating	20.0	$895.83	-6,550	0.000	110.3	MN-EFS-RES GSHP	RES	Beneficial Electrification	$ 12,645.18	278,749	1,623,880,344	$ 13,023.10	281,462	1,628,145,662	$ 13,458.56	282,397	1,628,688,784	INF	
Whole Home Efficiency - MN	**EFS - Res ASHP Heating**	**Centerally ducted dual fuel ASHP**	Heating Portion of Quality Installation of High Efficiency Residential Air Source Heat Pump - 2.75 Ton 16 SEER2 & 10 EER2 & 7.8 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$1,100.00	-6,171	0.000	51.9	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ 2,944.96	106,624	461,109,914	$ 3,140.47	108,785	464,890,757	$ 3,393.19	109,839	467,377,926	INF	
Whole Home Efficiency - MN	**EFS - Res ccASHP Heating**	**Centerally ducted dual fuel cold climate ASHP**	Heating Portion of Quality Installation of High Efficiency cold climate Residential Air Source Heat Pump - 3 Ton 16 SEER2 & 10 EER2 & 9 HSPF2	Non-Quality Installation of comparable size code minimum AC with Gas Furnace	18.0	$1,500.00	-7,201	0.000	57.5	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ 1,696.04	107,596	460,552,814	$ 1,852.88	110,509	465,279,089	$ 2,049.70	111,635	466,229,505	INF	
Whole Home Efficiency - MN	**EFS - Res ccMSHP Heating**	**Non-ducted cold climate Multi-Split Heat Pump w/ Gas Furance backup**	Heating Portion of Installation of Cold Climate Mini-Split Heat Pump (2 Tons 22 SEER2, 9.3 EER2, 9.5 HSPF2) with 3 indoor heads and Gas Furnace heat backup	Non-Quality Installation of comparable size code minimum AC and Gas Furnace	15.0	$1,500.00	-4,402	0.000	39.6	MN-EFS-RES ccASHP	RES	Beneficial Electrification	$ 708.47	63,931	302,919,206	$ 807.19	65,610	305,405,028	$ 934.43	66,015	305,402,139	INF	
Whole Home Efficiency - MN	**EFS - Res MSHP Heating**	**Non-ducted dual fuel MSHP w/ gas furnace backup**	Heating Portion of Installation of Residential Mini-Split Heat Pump Equipment - 2 Ton 19.8 SEER2 & 12.7 EER2 & 10.3 HSPF2	Installation of comparable size code minimum AC with Gas Furnace	15.0	$1,100.00	-2,552	0.000	29.5	MN-EFS-RES ASHP	RES	Beneficial Electrification	$ 1,368.97	54,089	280,464,806	$ 1,463.32	54,924	281,777,512	$ 1,583.21	55,252	282,581,726	INF	
Whole Home Efficiency - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$450.00	-941	-0.107	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 834.50	28,324	167,295,615	$ 881.51	28,674	167,957,358	$ 937.86	28,831	168,310,637	100.00%	
Whole Home Efficiency - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$450.00	-959	-0.110	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 819.78	28,246	166,230,902	$ 866.69	28,602	166,905,647	$ 923.04	28,762	167,265,869	100.00%	
Whole Home Efficiency - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$550.00	-941	-0.107	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 734.50	28,324	167,295,615	$ 781.51	28,674	167,957,358	$ 837.86	28,831	168,310,637	100.00%	
Whole Home Efficiency - MN	**HP Water Heater - Gas Baseline**	**Heat Pump Water Heater - Gas Water Heater Baseline Non-Refrigerant Based Cooling Natural Gas Heat + CEA/ANSI Communications Port**	High Efficiency Heat Pump Water Heater with Communications Port	Minimum Efficiency Gas Storage Water Heater	13.0	$550.00	-959	-0.110	17.0	MN-EFS-RES HPWH	RES	Beneficial Electrification	$ 719.78	28,246	166,230,902	$ 766.69	28,602	166,905,647	$ 823.04	28,762	167,265,869	100.00%	

APPENDIX 4: BUDGET CATEGORIES

Description
The following chart indicates which expenses are attributed to each CIP budget category in this filing.

Budget Category	**Components**
Customer Services	• Consulting costs for customer scoping and project management, subsidies for assessments and engineering studies. • Costs to purchase EE equipment and to install efficient equipment at the customer site.
Utility Administration	• Project planning, development and implementation. Marketing and support staff including program managers, marketing assistants, developers, technical support staff, rebate processing, sales and call center representatives, inside contract labor, and other fulfillment associated with delivering a product directly to the customer. • Auditors, installation contractors, vendors, technical consultants, fulfillment contractors and alternative providers that Xcel Energy contracts with to provide DSM services. • Equipment purchase costs and repair; hardware and software; supplies; and other employee expenses.
Advertising & Promotion	• TV, radio, newspaper and print media; direct promotion and sales support materials; postage, promotional events; contracted outbound telephone sales. • Customer education through seminars, pamphlets, videos and computer games. • Communication staff and other supporting labor.
Measurement & Verification (M&V)	• Program evaluation expenses and consultants performing M&V.
Participant Incentives	• Customer rebates and incentives given in the form of subsidized products or equipment.
Other	• Vendor and trade incentives. • Direct and indirect regulatory fees.

APPENDIX 5: COMPLIANCE MATRIX

The 2024-2026 ECO Triennial Plan fulfills the Company's compliance with Minn. Stat. § 216B.241, subd. 2(b), requires public utilities to file an energy conservation and optimization plan once every three years and by June 1, of the applicable year. Additionally, the Company was granted a variance to submit a combined electric and natural gas Plan in 2009.[10] We continue with this approach in this Plan.

Statutory Requirements
Minnesota Statute §216B.241 & §216B.2411

Statute/Subdivision	Information Required by Statute	Location of Required Content
Minnesota Statute §216B.241		
Subd. 1c (b)	A public utility providing electric service has an annual energy-savings goal equivalent to 1.75 percent of gross annual retail energy sales unless modified by the commissioner under paragraph (c). A public utility providing natural gas service has an annual energy-savings goal equivalent to one percent of gross annual retail energy sales, which cannot be lowered by the commissioner.	Compliance Requirements
Subd. 1c (g)	Notwithstanding any provision to the contrary, until July 1, 2026, spending by a public utility subject to this section on efficient fuel-switching improvements to meet energy savings goals under this section must not exceed 0.35 percent per year, averaged over three years of the public utility's gross annual retail energy sales.	Compliance Requirements
Subd. 1 (f)	all utilities to include in their conservation plans programs that facilitate professional engineering verification to qualify a building as ENERGY STAR-labeled, Leadership in Energy and Environmental Design ("LEED") certified, or Green Globes-certified.	Compliance Requirements
Subd. 2 (e)	Each public utility may spend and invest up to ten percent of the total amount spent and invested on energy conservation improvements, on research and development (R&D) projects. CIP R&D identifies, assesses, and develops new load management and energy efficiency products and services. This work allows the Company to identify and promote promising new energy saving opportunities for its customers. Market potential studies fall into this category.	Compliance Requirements
Subd. 2 (i)	The energy conservation and optimization plan of each public utility subject to this section must include activities to improve energy efficiency in public schools served by the utility. As applicable to each public utility, at a minimum the activities must include programs to increase the efficiency of the school's lighting and heating and cooling systems, and to provide for building recommissioning, building operator training, and opportunities to educate students, teachers, and staff regarding energy efficiency measures implemented at the school	Compliance Requirements

[10] This variance was originally granted in the Commission's Decision in Docket Nos. E002/CIP-99-1057.03 and G002/98-723.02 dated December 21, 2001. On March 2, 2009, in Docket No. E, G002/CIP-09-198 we filed a variance request to submit a combined electric and natural gas plan on June 1, 2009 as well as with each subsequent annual status report. On May 13, 2009, the Director approved our request for all future Triennial Plans and Status Reports.

Statute/Subdivision	Information Required by Statute	Location of Required Content
Subd. 2 (k)	A public utility filing a conservation and optimization plan that includes an efficient fuel-switching program to achieve the utility's energy savings goal must, as part of the filing, demonstrate by a comparison of greenhouse gas emissions between the fuels that the requirements of subdivisions 11 or 12 are met, as applicable, using a full fuel-cycle energy analysis.	Compliance Requirements
Subd. 5	Each public utility and consumer-owned utility that provides electric service to retail customers and is subject to subdivision 1c or section 216B.2403 shall include as part of its conservation improvement activities a program to strongly encourage the use of LEDs. The program must include at least a public information campaign to encourage use of LEDs and proper management of spent lamps and LEDs by all customer classifications.	Compliance Requirements, Residential Segment (Home Lighting & Lamp Recycling), Business Segment (Lighting Efficiency)
Subd. 7(a)	Beginning in 2024, a public utility that furnishes electric service must spend 0.6 percent of the public utility's gross operating revenue from residential customers in the state on low-income programs, unless otherwise approved by the Commissioner.	Compliance Requirements, Income-Qualified Segment
Subd. 7 (f)	Up to 15 percent of a public utility's spending on low-income programs may be spent on preweatherization measures. A public utility is prohibited from claiming energy savings from preweatherization measures toward the public utility's energy savings goal.	Compliance Requirements, Income-Qualified Segment
Subd. 8	The commission or department may assess public utilities subject to this section to carry out the purposes of subdivisions 1d, 1e, and 1f. An assessment under this subdivision must be proportionate to a public utility's gross operating revenue from sales of gas or electric service within Minnesota during the last calendar year, as applicable. Assessments made under this subdivision are not subject to the cap on assessments provided by section 216B.62, or any other law.	Assessments
Subd. 9 (e)	The commissioner shall require utilities to develop and implement conservation improvement programs that are expressly designed to achieve energy efficiency goals consistent with the Sustainable Building 2030 performance standards. These programs must include offerings of design assistance and modeling, financial incentives, and the verification of the proper installation of energy-efficient design components in new and substantially reconstructed buildings. A utility's design assistance program must consider the strategic planting of trees and shrubs around buildings as an energy conservation strategy for the designed project. A utility making an expenditure under its conservation improvement program that results in a building meeting the Sustainable Building 2030 performance standards may claim the energy savings toward its energy-savings goal established in subdivision 1c.	Compliance Requirements

Statute/Subdivision	Information Required by Statute	Location of Required Content
Subd. 11	*Programs for efficient fuel-switching improvements; electric utilities.* (a) A public utility providing electric service at retail may include in the plan required under subdivision 2 programs to implement efficient fuel-switching improvements or combinations of energy conservation improvements, fuel-switching improvements, and load management. For each program, the public utility must provide a proposed budget, an analysis of the program's cost-effectiveness, and estimated net energy and demand savings. (c) A public utility may file a rate schedule with the commission that provides for annual cost recovery of reasonable and prudent costs to implement and promote efficient fuel-switching programs. The commission may not approve a financial incentive to encourage efficient fuel-switching programs operated by a public utility providing electric service.	Compliance Requirements, EFS Segment, Appendix: EFS Screening
Subd. 12	*Programs for efficient fuel-switching improvements; natural gas utilities.* (a) As part of a public utility's plan filed under subdivision 2, a public utility that provides natural gas service to Minnesota retail customers may propose one or more programs to install electric technologies that reduce the consumption of natural gas by the utility's retail customers as an energy conservation improvement. The commissioner may approve a proposed program if the commissioner, applying the technical criteria developed under section 216B.241, subdivision 1d, paragraph (e), determines that: (1) the electric technology to be installed meets the criteria established under section 216B.241, subdivision 11, paragraph (d), clauses (1) and (2); and (2) the program is cost-effective, considering the costs and benefits to ratepayers, the utility, participants, and society. (b) If a program is approved by the commission under this subdivision, the public utility may count the program's energy savings toward its energy savings goal under section 216B.241, subdivision 1c. Notwithstanding section 216B.2402, subdivision 4, efficient fuel-switching achieved through programs approved under this subdivision is energy conservation. (c) A public utility may file rate schedules with the commission that provide annual cost-recovery for programs approved by the department under this subdivision, including reasonable and prudent costs to implement and promote the programs.	Compliance Requirements, EFS Segment, Appendix: EFS Screening

Statute/Subdivision	Information Required by Statute	Location of Required Content
Subd. 13	*Cost-effective load management programs.* (a) A public utility may include in the utility's plan required under subdivision 2 programs to implement load management activities, or combinations of energy conservation improvements, fuel-switching improvements, and load management activities. For each program the public utility must provide a proposed budget, cost-effectiveness analysis, and estimated net energy and demand savings. (c) A public utility providing retail electric service to Minnesota customers may file rate schedules with the commission that provide for annual cost recovery of reasonable and prudent costs incurred to implement and promote cost-effective load management programs approved by the department under this subdivision. (f) The commission may include the net benefits from a load management activity integrated with an energy efficiency program approved under this section in the net benefits of the energy efficiency program for purposes of a financial incentive program under section 216B.16, subdivision 6c, if the department determines the primary purpose of the load management activity is energy efficiency. (h) The commission may include net benefits from a particular load management activity in an incentive plan under this subdivision or section 216B.16, subdivision 6c, but not both.	
Subd.14 (h)	*Minnesota Efficient Technology Accelerator*: Upon approval, each public utility with over 30,000 customers must participate in the program and contribute to the approved budget of the program by depositing annually in the energy and conservation account under subdivision 2a an amount that is proportional to the utility's gross operating revenue from sales of gas or electric service in Minnesota, excluding revenues from large customer facilities exempted under subdivision 1a. A participating utility must not be required to contribute more than the following percentages of the utility's spending approved by the commission in the plan filed under subdivision 2: (1) two percent in the program's initial two years; (2) 3.5 percent in the program's third and fourth years; and (3) five percent thereafter. Other utilities may elect to participate in the accelerator program. Costs incurred by a public utility under this subdivision are recoverable under subdivision 2b as an assessment to the energy and conservation account. Amounts provided to the account under this subdivision are not subject to the cap on assessments in section 216B.62. The commissioner may make expenditures from the account for the purposes of this subdivision, including amounts necessary to cover administrative costs incurred by the department under this subdivision. Costs for research projects under this subdivision that the commissioner determines may be duplicative to projects that would be eligible for funding under subdivision 1e, paragraph (a), may be deducted from the assessment under subdivision 1e for utilities participating in the accelerator.	Compliance Requirements

Statute/Subdivision	Information Required by Statute	Location of Required Content
Minnesota Statute §216B.2411		
Subd. 1	Public utilities may use five percent of the total amount to be spent on energy conservation improvements under section 216.241 for distributed energy projects.	Compliance Requirements

Minnesota Rules

Minn. R. 7690.0500 and Minn. R. 7690.1200 contains the requirements and procedures for CIP filings. Minn. Stat. §216B.2401, §216B.241, and §216B.2411 contain provisions the Company must meet in its CIP Plan. This section provides all of the compliance order points required therein.

MN Rule Requirements

Subdivision	Information Required by Statute or Rule	Location of Required Content
Minnesota Rule 7690.0500		
Subpart 1	**Time limits.** No later than July 1 of each even-numbered year beginning in 1998, a public natural gas utility required by Minnesota Statutes, section 216B.241, to invest in a conservation improvement program shall file with the department a biennial conservation improvement program. No later than August 1, 1997, and every odd-numbered year afterward, a public electric utility required by Minnesota Statutes, section 216B.241, to invest in a conservation improvement program shall file with the department a conservation improvement program.	The Plan herein was filed in compliance with the Department of Commerce Timeline Modification Filed in Docket No. E,G002/CIP-23-92 Filed on May 10, 2023
Subpart 2A	**Contents.** The biennial conservation improvement program filing must include: a comprehensive description of the proposed program, including a description of each project making up the program;	Segment Write-ups
Subpart 2B	for each individual project, a completed project information sheet that will be provided by the department. The project information sheet can be used to provide the information required in items E and F;	Product Information Sheets are filed a separate attachment to the filing itself
Subpart 2C	for each project making up the program, a description of the expected effect of each project on peak demand and energy consumption with supporting assumptions, including a list of each conservation technology or process to be promoted and the energy- and demand-savings assumptions associated with each identified technology;	Technical Assumptions can be found in the "Technical Assumptions" section of the plan.
Subpart 2D	for each electric utility that must submit an integrated resource plan to the Public Utilities Commission, an explanation of how its overall conservation improvement program enables the utility to meet the long-term demand-side management goals established in its most recent integrated resource plan	Compliance Requirements

Subdivision	Information Required by Statute or Rule	Location of Required Content
Minnesota Rule 7690.0500		
Subpart 2E	an estimate of the expected cost-effectiveness of each project to the utility, to the project's participants, to the utility's ratepayers, and to society;	Compliance Requirements
Subpart 2F	for each project targeted at residential consumers, an estimate of the anticipated percentage of use of each project among: (1) low-income participants; and (2) renters;	Compliance Requirements
Subpart 2G	a detailed budget for each project for the next two years;	Compliance Requirements
Subpart 2H	a description of the utility's ratemaking treatment and cost-recovery method;	Compliance Requirements
Subpart 2I	an estimate of participation in each project;	Product Information Sheets and Executive Summary
Subpart 2J	an explanation of how the proposed projects provide for the involvement of community energy organizations when appropriate;	Segment Write-Ups
Subpart 2K	an outline of the proposed plan for evaluating the effectiveness of each proposed project;	Research, Evaluations and Pilot Segment
Subpart 2L	for each renewable energy project, an estimate of the net energy and capacity to be produced by each project and the projected reliability of the technology that would be used; and	Compliance Requirements
Subpart 2M	additional information that the department determines is necessary as a result of its review or evaluation of previous projects of the particular utility.	The Company previewed proposed changes with the Department on May 1, 2022.
Minnesota Rule 7690.1200		
Subpart 1A	the program's compliance with statutory spending requirements, as specified in Minnesota Statutes, section 216B.241, subdivision 1a, with each utility calculating the required spending level by using the gross operating revenues in the year preceding the calendar year in which the filing is submitted and by defining gross operating revenues as: (1) for electric utilities: the total Minnesota jurisdictional assessable operating revenue as reported in each electric utility's Minnesota jurisdictional report on page E-30, Sales and Degree Days Data, Total Sales to Ultimate Consumer, line (B) Total Revenue Corresponding to Sales; or (2) for gas utilities: the total Minnesota jurisdictional assessable operating revenue as reported in each gas utility's Minnesota jurisdictional report on pages P-38 and P-39, Sales and Revenues (actual data), line (B) Total Revenues Corresponding to Sales Volume;	Compliance Requirements

Subdivision	Information Required by Statute or Rule	Location of Required Content
Subpart 1B	Impact of the program on energy consumption and peak demand;	Executive Summary Tables
Subpart 1C	The cost-effectiveness of the program, as calculated from the utility, ratepayer, participant, and societal perspectives	Compliance Requirements
Subpart 1D	The total number of low-income and rental customers affected by the program	Compliance Requirements
Subpart 1E	The total number of customers within a customer class expected to participate in the program, expressed as a percentage of total number of customers within that customer class in a utilities service area	Compliance Requirements
Subpart 1F	The customer classes expected to participate in the program.	Executive Summary Tables
Subpart 1G	Other facts and circumstances concerning a particular utility that are relevant to determining the overall importance of the investment in energy conservation improvements	Compliance Requirements

APPENDIX 6: LOW INCOME SEGMENT PROGRAMS: FUTURE EXPERIENCE CONCEPTS

LOW INCOME SEGMENT PROGRAMS

FUTURE EXPERIENCE CONCEPTS

Prepared by: XCELab Team

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AGENDA

1. INTRODUCTION TO CONCEPTS

2. CONCEPT REVIEW

- Overview Of Concept
- Efforts To Move Concept Forward
- Questions

3. WRAP UP

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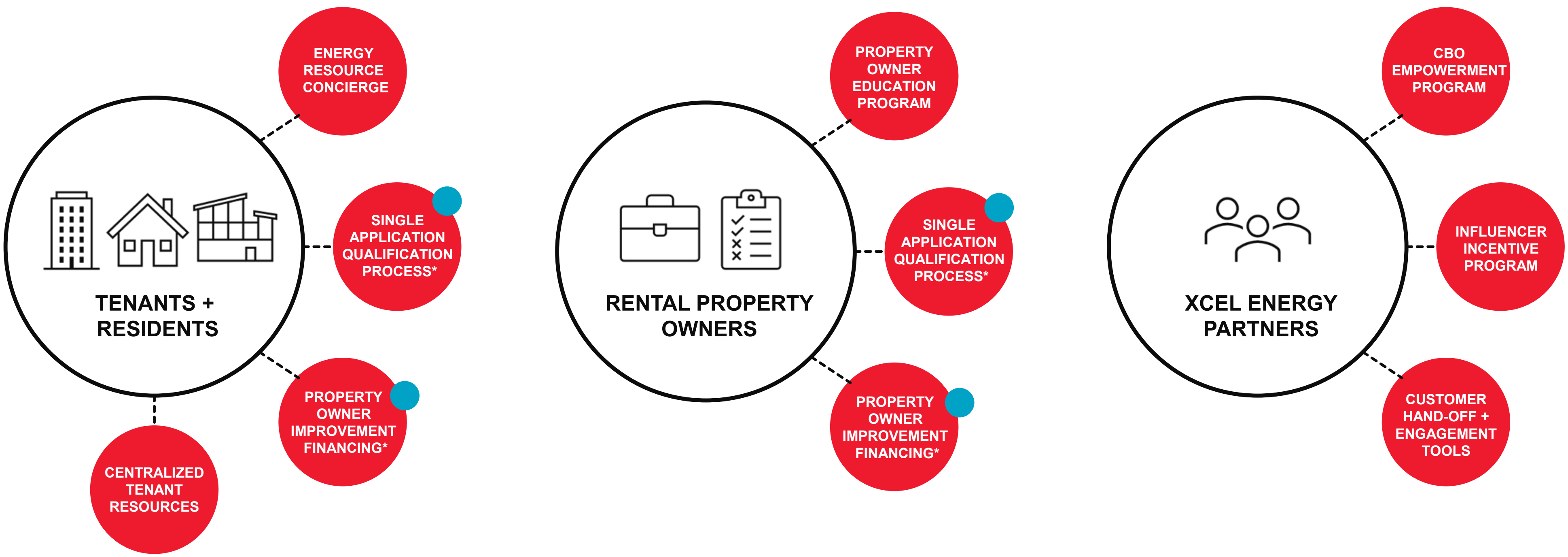
INCOME-QUALIFIED PROGRAMS FUTURE EXPERIENCE CONCEPTS

The future experience enables us to meet key needs of the various people and partners that experience, promote, and deliver income-qualified energy programs



=Concept appears in multiple categories

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TENANTS + RESIDENTS

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II - Internal Information

ENERGY RESOURCE CONCIERGE

Streamlined and customized process for helping customers connect to the income-qualified program that best suits them.

Includes:

- Dedicated contact(s) that communicate with customers to understand current needs and assess program fit
- Assistance applying for and getting started with right-fit programs
- Connection to community social services coordinators equipped to recommend income qualified energy program options or coordinate entry channels into support programs for additional non-energy needs

Designed For

Single-Family Homeowner | 1-4 Unit Resident | 5+ Unit Resident | 1-4 Unit Owner | 5+ Unit Manager | Xcel Energy Partners

Pain Point(s) Addressed

- Unknown or siloed programs that conduct broad outreach to the same customers
- Uncertainty for customers about if and how they qualify for applicable programs
- Lack of clear direction from current program touchpoints

Make-or-Break Assumptions

- This could be a join effort between Xcel Energy and implementer partners.
- There are enough concierge resources to meet the demand.
- There is a technology solution that people can access as part of the process.
- Concierge can do timely and informative follow-up to provide meaningful updates.

Impact + Effort

Efforts to move concept forward

Started:

HESP implementer ongoing community-based outreach

Planned:

Pilot to utilize energy concierge model community-based outreach (guiding customers prioritizing opportunities and addressing barriers, implementation

Coordination with U of M on leveraging energy navigator research + resources

Future Goals:

Annual event with community-based organizations to build relationships/share information

CENTRALIZED TENANT RESOURCES

Tenant-focused awareness-building resources about the cost-saving options that are available to them.

Includes:

- Centralized digital resource library of bundled resources and program information
- Option for physical copies of resources and documentation
- Connection to rental process, with resource library and/or physical resources shared by landlords at time of leasing
- Eligibility documentation that helps tenants understand how programs apply to them and key next steps for qualification

Designed For

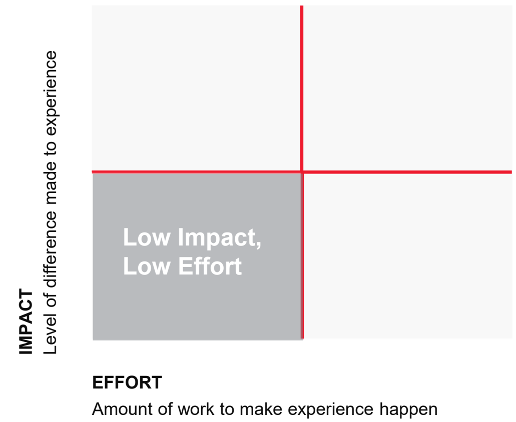
Pain Point(s) Addressed

- Lack of knowledge of programs and services available, as well as value to their situation
- Uncertainty in how to access key resources and information
- Difficulty understanding how and where to apply and enroll in applicable programs

Make-or-Break Assumptions

- There is a reliable channel to deliver the information.
- A mechanism exists to make sure that the information can be maintained in a timely fashion.

Impact + Effort



Efforts to move concept forward

Current:

Development of multi-program information sheet updated with information

RENTAL PROPERTY OWNERS

Xcel Energy

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II - Internal Information

Rental Property Owners
Tenants + Residents

SINGLE APPLICATION QUALIFICATION PROCESS

Simplified process that helps people to gain and prove qualification for any applicable low-income programs with one application.

Includes:

- Automatic qualification based on existing utility programs (Green zones, ACP, etc.)
- Ability to reference enrollment in other public programs (SNAP, WIC, etc) to determine qualification
- Ability to share/send qualification details and documents to begin enrollment process

Designed For

Single-Family Homeowner | 1-4 Unit Resident | 5+ Unit Resident | 1-4 Unit Owner | 5+ Unit Manager | Xcel Energy Partners

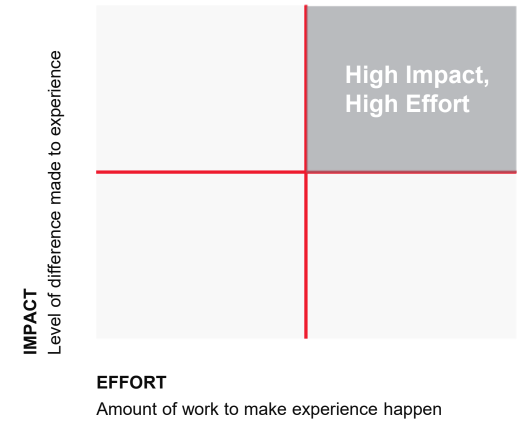
Pain Point(s) Addressed

- Building-focused qualification makes it difficult to continually receive benefits that individuals qualify for when they move
- Uncertainty for customers about if and how they qualify for applicable programs
- Daunting program details and process(es) are hard to navigate

Make-or-Break Assumptions

- Legislative or administrative policy changes that allow single family and small multifamily eligibility criteria to be defined in a process similar to the one currently used for larger multi-family.
- Confidentiality concerns across entities can be managed.

Impact + Effort



Efforts to move concept forward

Planned:

Geographic targeting of low-income areas combined with post-project verification to claim savings

Pilot to utilize energy concierge model—community based outreach to assist customers in prioritizing opportunities and addressing barriers

Omnibus environment, natural resources, climate, and energy finance and policy bill

Rental Property Owners
Tenants + Residents

PROPERTY OWNER IMPROVEMENT FINANCING

Low-to-no interest loans to assist property owners in making energy efficiency improvements to their properties.

Includes:

- Simple application and qualification process with no credit check
- For rental buildings, requires commitment from owner to maintain building affordability
- Possibility of loan forgiveness after certain time period or based on building, home efficiency outcome(s)

Designed For

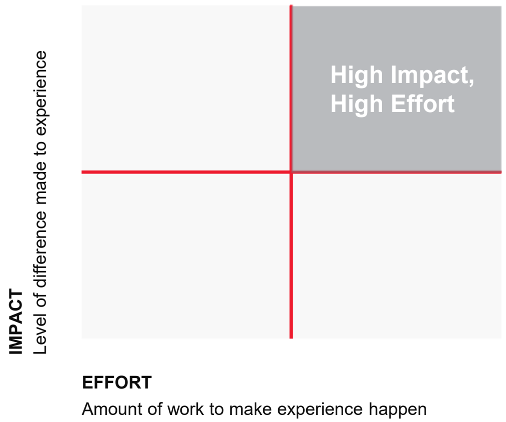
Pain Point(s) Addressed

- Limited up-front capital to make home or building improvements
- Lack of incentive to make repairs that may have limited or no after repair value
- Fear of loan rejection or complicated loan processes

Make-or-Break Assumptions

- There are meaningful rebate options available.
- It is easy to apply, qualify, and access capital that is needed to make improvements.
- Contractors are willing and able to participate.
- There is coordination among implementers and between utilities.
- Regulators will approve a funding mechanism for this financing option.

Impact + Effort



Efforts to move concept forward

Current:

Empower facilities provides loan options to large multi-family buildings

Rental Property Owners

PROPERTY OWNER + MANAGER EDUCATION PROGRAM

Building owner and/or manager-focused education program that builds awareness and connection to available energy-saving programs that best fit their situation.

Includes:

- Customized education based on building type and history
- Digital and physical resources that explain programs and benefits, along with easy access to apply
- Optional connection to energy resource concierge for dedicated assistance
- Targeted advertisement in local and industry publications

Designed For

Single-Family Homeowner | 1-4 Unit Resident | 5+ Unit Resident | **1-4 Unit Owner** | **5+ Unit Manager** | Xcel Energy Partners

Pain Point(s) Addressed

- Lack of awareness of programs that buildings, and their owners, may already qualify for
- Lack of time and energy to try to understand complex program offerings
- Difficulty knowing the best next steps for qualifying and enrolling in beneficial programs

Make-or-Break Assumptions

- Actionable information can be provided to individual owners.
- There is a reliable channel to deliver the information.
- A mechanism exists to make sure that the information can be maintained in a timely fashion.
- A contract exists that allows a building manager to make decisions on behalf of the owner

Impact + Effort

Efforts to move concept forward

Started:

Landlord letter for 1-4 unit (owner occupied and rental) program

Planned:

Update website page for program with landlord-specific information

Multi-program information sheet to be updated with relevant information

XCEL ENERGY PARTNERS

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CBO EMPOWERMENT PROGRAM

Dedicated partnership program focused on equipping community-based organizations to do outreach, provide feedback to Xcel about community needs.

Includes:

- Funding to fill role of dedicated staff member within CBO
- Regular training and information sessions to keep CBO staff informed and up-to-date
- Physical program resources and documentation in multiple languages to share with community members

Designed For

Pain Point(s) Addressed

- Lack of trust in utility among community members making it difficult to make connections to programs
- Uncertainty for customers about if and how they qualify for applicable programs
- Language and/or cultural barriers complicating ability to communicate or share necessary information

Make-or-Break Assumptions

- Incentives and programs are viewed as beneficial for community members.
- CBOs want to participate and find value in promoting energy efficiency.
- A relationship with a trusted messenger to the community can stay intact.
- Community-based connections can be turned into strong customer relationships.

Impact + Effort

Efforts to move concept forward

Started:

Translating materials as relevant

Planned:

Pilot to utilize energy concierge model community-based outreach (guiding customers prioritizing opportunities and addressing barriers, implementation

Coordination with U of M on leveraging energy navigator research + resources

Future Goals:

Annual event with community-based organizations to build relationships/share information

INFLUENCER INCENTIVE PROGRAM

Customer awareness-building program delivered through influencers who can inform or influence participation in energy efficiency projects.

Includes:

- Partnership with schools, churches, trade allies, and other community organizations
- Customized approach and messaging based on customer persona and needs
- Incentives for influencers (relationship-building, social capital, shared information)

Designed For

Single-Family Homeowner | 1-4 Unit Resident | 5+ Unit Resident | 1-4 Unit Owner | 5+ Unit Manager | **Xcel Energy Partners**

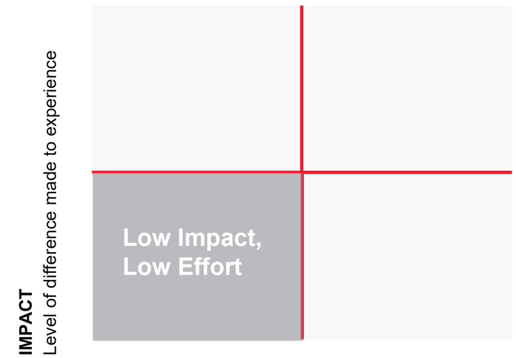
Pain Point(s) Addressed

- Lack of building owner understanding about value of energy efficiency projects that may not directly benefit them
- Lack of urgency to undertake or complete energy efficiency projects
- May be difficult to find or source information about potential energy efficiency improvement options

Make-or-Break Assumptions

- Organizations will have the tools to be successful including time and relevant information from Xcel Energy.
- Individual influencer initiative could address the perverse incentive to recruit people who are ineligible for personal financial gain.

Impact + Effort



EFFORT
Amount of work to make experience happen

Efforts to move concept forward

Future Goals:

Library of pre-written, pre-approved resources to be provided to community organizations for outreach use

Xcel Energy Partners

CUSTOMER HAND-OFF + ENGAGEMENT TOOLS

Customer-focused engagement process + platform to identify and communicate about gaps in service experience and address potential customer drop-off.

Includes:

- Utility-to-implementer feedback loop to share updates on customer status
- Engagement suggestions and options for outreach to help customers take key next steps
- Connection to owner, tenant resource and education programs as necessary

Designed For

Single-Family Homeowner | 1-4 Unit Resident | 5+ Unit Resident | 1-4 Unit Owner | 5+ Unit Manager | **Xcel Energy Partners**

Pain Point(s) Addressed

- Customer drop-off after beginning the program application process
- Challenges in timely, easy-referenced communication between utility and implementers to address customer need

Make-or-Break Assumptions

- This can be done in a way that doesn't create more confusing processes than it solves.
- All parties (utility and implementers) see clear value to providing quality referrals.

Impact + Effort

Efforts to move concept forward

Future Goals:

Annual cross-agency meeting to revisit, refresh on content and plans; post-annual report

System/dashboard for shared communication

Xcel Energy®

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APPENDIX 7: MINNESOTA LOW-INCOME SEGMENT PROCESS EVALUATION

April 12, 2023

Xcel Energy

Minnesota Low-Income Segment Process Evaluation

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EXECUTIVE SUMMARY

2021-2022 Minnesota Low-Income Segment Evaluation

Wilder Research

Introduction

Xcel Energy contracted with TRC Companies (TRC) and Wilder Research (Wilder) to evaluate the 2020-2021 Low-Income Segment (LI Segment) in Minnesota. The LI Segment is designed to engage income-qualified customers who would not participate in an energy-efficient program on their own, due to various barriers to entry. To achieve this objective, the Minnesota LI Segment programs provide free or subsidized services and energy-efficient measures to income-qualified Xcel Energy customers through three main offerings: 1. Low-Income Home Energy Squad (LIHES), 2. Home Energy Savings Program (HESP), and 3. Multifamily Energy Savings Program (MESP). In addition to providing energy-efficient measures, program representatives meet with customers to discuss ways to save energy through adjustments in behavior and future energy efficiency upgrades.

The evaluation team used results from preliminary research conducted in 2020 to inform the evaluation plan. As part of the evaluation, TRC and Wilder assessed customer and market actor experiences with the LI Segment and barriers and opportunities to understand how to increase participation, the number of measures installed, and positive participation experiences. This summary includes the key findings from our evaluation.

Methods

Participating Customer Surveys (n=287): Year 1 and Year 2

Non- / Near-Participating Customer Surveys (n=193): Year 1 and Year 2

In-depth Customer Interviews (n=24): Year 2

Property Owner Survey (n=154): Year 1 and Year 2

Market Actor Interviews (n=14): Year 2

Program Mapping: Year 1 and Year 2

GIS Analysis: Year 1 and Year 2

Summary of Findings

Year 1 and Year 2 **participating customer respondents reported little knowledge of how the LI Segment programs work and what opportunities exist for additional upgrades**, including little to no knowledge of LI Segment offerings and other Xcel Energy offerings. Customers who prefer to speak a language other than English had greater challenges overall. All Year 2 HESP respondents who spoke a language other than English at home reported more difficulty with the program elements.

Wiring and electrical upgrades were the most mentioned health and safety concern by participating customers and near-participating customers. Further, the expansion of qualified health and safety measures for HESP participating customers paired with increased budgets for these measures in the most recent program filing appears to have increased access to these measures.

Customers expressed an interest in hearing about programs through trusted sources, including CAP agencies, implementers, and Xcel Energy representatives to help verify program legitimacy.

A lack of awareness among non-customer stakeholders may be contributing to lower than desired participation in programming.

Benefit program applications for low-income people are often notoriously difficult to navigate, lowering the number of successful applications.

Customers experienced challenges with lack of communication, many of which related to not having the information they needed to contact Xcel Energy and Xcel Energy third-party partners. Year 1 LIHES and HESP respondents reported that getting in touch with implementers was the hardest part of program participation.

No Year 2 customer responded to the participating customer survey or near-participating survey in a language other than English. Just three respondents took the survey in a language other than English in Year 1, all were MESP participating customers.

Social service providers are an important referral source for Xcel programs yet are consistently overwhelmed with high caseloads.

Property owners stated they face financial barriers when participating in weatherization upgrades, and indicated that they needed more assistance with the initial investment before they would consider completing upgrades. Notably, property owners of 1-4 unit rental buildings were less likely to be willing to pay any amount for upgrades than owners with 5 or more rental units across all upgrade types.

EXECUTIVE SUMMARY

2021-2022 Minnesota Low-Income Segment Evaluation

TRC

Amherst H. Wilder Foundation Here for good.

Wilder Research

Key Barriers

LANGUAGE BARRIER

For Y2 HESP participants who indicated they spoke a language other than English at home, **all reported more difficulty with program elements**

- The largest differences were for scheduling an on-site visit, understanding how to use the equipment, contacting a program representative, and providing income verification.

In the Y1 participant survey, **non-English speaking respondents reported difficulties receiving program information**.

PROPERTY OWNER AWARENESS

A lack of awareness of Xcel's program benefits among both property owners and referring organizations may be contributing to **lower than desired participation in programming**. Some had only heard about small upgrades such as appliances and thermostats (N=2)

*As a new property owner **I'm not sure how to find that type of information** about what the costs of upgrades are and what I would qualify for.*

APPLYING FOR PROGRAMS

Interviewees shared that there are systematic barriers to applying for income-qualified programs, including:

- Clients may already be filling out many applications at the same time
- Limited capacity within agencies to support clients
- Transient nature of the population may limit follow-up

*I hear the process to apply for emergency assistance and other benefits is a lot – **we ask for a lot of information.***

Key Opportunities

IMPROVED COMMUNICATION

LIHES, HESP, and MESP interviewees highlighted challenges with communication before, during, and after participation:

- Not knowing how to get their questions answered
- Not knowing what to expect on the day of installation
- Issues scheduling installation

By providing customers with contact information for pre-installation questions and follow-ups, and creating FAQ resources, **Xcel Energy could improve the customer participation experience.**

***Getting someone to come out was just a little stressful.** Getting the appointment was months down the road.*

TRUSTED NETWORK

Respondents expressed that they trusted Xcel Energy and others in their network, including CAP agencies, to get program information.

Some interviewees (n = 9) noted that they **feared the program was too good to be true** prior to participation.

Most interviewees (n = 19) noted that **they trust Xcel Energy as a source for advice on energy efficiency.**

SOCIAL SERVICE PROVIDERS

Social service providers are an important referral source for Xcel Energy programs yet **need additional support from Xcel staff to ensure they have the capacity to conduct outreach** to low-income households that may be eligible for programming.

*The materials need to include **simple, clear, easy messages and application process information** to pass along.*

1 Introduction

To support Xcel Energy's goal of improving its Low-Income Segment programs, TRC collaborated with Wilder Research to conduct a developmental, process, and outcomes evaluation of the programs within the Xcel Energy Minnesota Low-Income Segment. Our research, discussed in this report, spanned three years, beginning with preliminary research conducted in 2020. The introduction to this report includes an overview of the Low-Income Segment programs and the evaluation approach and outlines the organization of the report.

1.1 Program Overview

The Minnesota Low-Income Segment (LI Segment) programs provide free or subsidized services and measures to income-qualified Xcel Energy customers through three main offerings[1]:

- **Low-Income Home Energy Squad (LIHES):** This program includes an in-home audit and direct installation of smaller equipment such as LED bulbs, faucet aerators, low-flow showerheads smart thermostats, exterior door weatherstripping, and dehumidifier installation and recycling. Implementers refer eligible customers to the HESP program for additional upgrades.
- **Home Energy Savings Program (HESP):** Program participation comprises home energy education and improvements, including an in-home assessment2 and installation of larger equipment, pre-weatherization and weatherization measures to help with energy conservation, and appliance replacements, such as refrigerators, freezers, room air conditioners, attic/wall insulation and air sealing, gas furnaces, water heaters, and boilers for eligible customers.
- **Multifamily Energy Savings Program (MESP):** This program is targeted toward property owners and managers of multifamily buildings. It provides electric home energy efficiency measures (both smaller equipment and larger appliances) such as replacements or recycling of refrigerators, freezers, window air conditioning units, in addition to LED bulbs. Tenants also receive energy conservation education.

The LI Segment portfolio has been designed to engage income-qualified customers who would not participate in an energy-efficient program on their own, due to various barriers to entry. To achieve this objective, the programs provide energy-efficient equipment at no cost to the customer, ranging from small measures, such as lightbulbs, to larger measures, such as a refrigerators.[3] In addition to providing energy-efficient equipment, program representatives meet with customers to discuss ways to save energy through adjustments in behavior and future energy efficiency upgrades.

[1] Add footnote explaining that at this was at the time the evaluation was planned in the 2021-2023 Cip Triennial Plan and since then more programs have been added. Also note that there may be offerings for income-qualified individuals outside of these three programs.

[2] Unlike the LIHES audit which looks at the entire unit and provides a complete report, the HESP audit is focused on program-eligible measures.

[3] For full breakdown of measures by program see Appendix A

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LI Segment staff coordinate with various program implementers, who provide energy assessments to income-qualified customers. The implementers are as follows:

- Low-Income Home Energy Squad (LIHES): Center for Energy and Environment (CEE)
- Home Energy Savings Program (HESP): Energy CENTS Coalition (ECC) implements in the St. Paul area (Metroeast), and Sustainable Resources Center, Inc (SRC) implements in Minneapolis (Metrowest) and greater Minnesota
- Multifamily Energy Savings Program (MESP): Franklin Energy

From January 2021 to December 2021[4], 5,900 customers participated in the Xcel Energy LI Segment and the programs claimed over 1.4 GWh and 83,000 therms in energy savings in Minnesota (Table 1-1).

Table 1-1. MN Low-Income Segment Savings, January 2021 – December 2021

Program	Opportunities		kW		kWh		Therms	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total
Low-Income Home Energy Squad	1,467	25%	347	29%	359,665	25%	18,332	22%
Home Energy Savings Program	3,921	66%	740	62%	944,244	66%	65,366	78%
Multifamily Energy Savings Program	525	9%	98	8%	133,900	9%	0	0%
Total	**5,913**	**100%**	**1186**	**100%**	**1,437,809**	**100%**	**83,698**	**100%**

Note: This is the population of participating customers receiving rebates between January 2021 and December 2021.These numbers are based on aggregated data provided to TRC in March 2022.

1.2 Evaluation Overview

From Q3 2020 to Q1 2021, the TRC and Wilder Research evaluation team conducted preliminary research for the Xcel Energy Minnesota LI Segment evaluation. The preliminary research included Xcel Energy staff feedback during the kick-off meeting, Xcel Energy staff

[4] The evaluation team did not receive comprehensive data on customer participation and savings for 2022.

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interviews, peer utility interviews, external stakeholder interviews, and program documentation review.

The evaluation team used the results from the preliminary research to inform the 2021 – 2022 LI Segment evaluation plan, and designed a developmental, process, and outcomes evaluation of the LI Segment offerings to address three primary goals:

1. Understand how to make programmatic changes to reduce barriers and increase participation,
2. Increase the number of measures installed, and
3. Increase positive participation experiences.

The evaluation team then developed ten evaluation objectives based on these three primary evaluation goals. **Error! Reference source not found.** maps the primary LI Segment goals to the ten evaluation objectives and their relevant evaluation tasks.

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Table 1-2. Evaluation Objectives & Research Tasks

Evaluation Objective	Research Task(s)
1-1. Understand how to increase participation in rental housing.	Participating customer survey, near-/nonparticipating customer survey, market actor interviews, Xcel Energy data analysis, in-depth interviews, program mapping, property owner survey
1-2. Determine the benefits and limitations of collective income validation (e.g., geographic or community) in comparison to the existing individual income validation process.	Participating customer survey, near-/nonparticipating customer survey, market actor interviews, program mapping, GIS mapping, property owner survey
1-3. Assess whether the need to remedy health and safety concerns before installing energy efficiency measures reduces participation.	Participating customer survey, near-/nonparticipating customer survey, market actor interviews, program mapping, property owner survey
1-4. Understand what steps can be taken to make service delivery mechanisms more effective.	Participating customer survey, market actor interviews, in-depth interviews, program mapping, property owner survey
2-1. Assess if participating customers are not taking any recommended measures and why.	Participating customer survey, market actor interviews, property owner survey
2-2. Understand impacts of the filing changes on participation or measures taken.	Participating customer survey, Xcel Energy data analysis
2-3. Assess the changes in measures taken over time.	Xcel Energy data analysis, property owner survey
3-1. Assess customer satisfaction and any differences in satisfaction between homeowners, renters with regard to LI Segment offerings.	Participating customer survey, market actor interviews, in-depth interviews, property owner survey
3-2. Understand what motivates participation as well as nonparticipation (barriers) and identify motivation and barrier leverage points to increase participation.	Participating customer survey, near-/nonparticipating customer survey, market actor interviews, in-depth interviews, property owner survey
3-3. Understand how other utilities drive income-qualified customer participation.	Market actor interviews

1.3 Report Organization

We have organized the remainder of this report into the following chapters:

- Chapter 2 presents our research methods for the evaluation, as well as key characteristics of respondents from our data collection efforts.
- Chapter 3 discusses cross-cutting research findings, including program awareness, motivations and barriers, customer satisfaction, impacts of filing changes, and the impacts of collective income validation. Evaluation results not included in this summary can be found in individual research task memos in the appendices.

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- Chapter 4 presents conclusions and recommendations.
- The report's appendices provide supporting documents, such as the evaluation plan, data collection instruments, and task-specific findings.

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2 Research Methods & Respondent Characteristics

To accomplish the objectives for the LI Segment evaluation, the evaluation completed a suite of intersecting and complementary research activities in 2021 and 2022. Detailed information on the sampling approach used for the research can be accessed in the evaluation plan, found in Appendix A, and in the data collection documents found in Appendix B. The following discussion highlights the research topics addressed by each of the following research activities: participating customer surveys, near-participating customer surveys, in-depth customer interviews, market actor interviews, GIS mapping, and program mapping. We provide a high-level summary for each task. This section concludes with findings from the data collection efforts. Table 2-1 summarizes which research activities addressed each objective of the Minnesota LI Segment Evaluation.[5]

[5] The key results summary in Chapter 3 does not include findings from all research activities for all objectives. Rather, the summary focuses on cross-cutting findings and other key findings of interest to the LI Segment programs. A comprehensive overview of findings for each research activity is included in each research activity memo in the appendices.

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Table 2-1. Evaluation Summary Table

Primary Research Objectives	Year 1					Year 2					
	Participant Surveys (n=211)	Non-Participant Survey (n=120)	Property Owner Survey (n=154)	Program Mapping	GIS	HESP Participant Survey (n=76)	Near-Participant Survey (n=73)	In-Depth Interviews (n=24)	Market Actor Interviews: Property Owner Interviews (n=7)	Market Actor Interviews: Social Service Interviews (n=7)	Referral Process Mapping
1-1	X	X	X	X		X	X	X	X	X	X
1-2	X	X	X	X	X	X	X		X	X	
1-3	X	X	X	X		X	X			X	
1-4	X		X	X		X		X	X	X	X
2-1	X		X			X					
2-2	X					X					
2-3			X								
3-1	X		X			X		X			
3-2	X	X	X			X	X	X		X	
3-3									X		

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2.1 Participating Customer Surveys

In 2021, the evaluation team surveyed participating customers from all three LI Segment programs (LIHES, HESP, and MESP). In this first evaluation year, 211 participating customers in total were surveyed (LIHES = 70, HESP = 70, MESP = 71). Just three respondents completed the survey in a language other than English (two Spanish, one Somali).

Given the substantial HESP modification changes that took effect in 2021, in 2022 the evaluation team focused on participants from that program and surveyed 76 participating HESP customers. In addition to following up on the key findings from 2021, the 2022 survey collected 11 perspectives from customers who indicated in the survey that they speak a language other than English at home. However, no respondents completed the survey in a language other than English.[6] The 2022 HESP survey focused on understanding program awareness, motivations and barriers to participation, and specific program experiences.

Additional details on research objectives and respondent characteristics can be found in Appendix B.1 and Appendix B.2.

2.2 Nonparticipating/Near-Participating Customer Surveys

In 2021, the evaluation team conducted phone surveys with nonparticipating customers (i.e., customers who had not participated in LIHES, HESP, or MESP) to meet developmental and process objectives. The evaluation team surveyed 120 nonparticipants; 51% of these respondents were not income-qualified based on criteria from the Minnesota Department of Commerce Energy Assistance Program.[7] Further, only 5% of respondents were aware of at least one LI Segment Program.

Given this low awareness among nonparticipants, the evaluation team conducted near-participating customer web surveys in 2022 to meet developmental and process objectives. For the purposes of this research, we defined near-participating customers as customers who (1) have not participated in LIHES, HESP, or MESP, (2) are aware of at least one program within the LI Segment and/or have tried to participate in one of the programs within the past three years, and (3) would meet the individual income qualifications of the LI Segment programs. The evaluation team distributed these surveys online, which focused on program awareness, as well as motivations and barriers to participation, and received 73 near-participating customer responses. The evaluation team asked near-participating customers about their awareness of LI Segment programs, their rental status, household income, and language spoken at home. No respondents completed the survey in a language other than English.

Additional details on the research objectives and respondent characteristics for this activity can be found in Appendix B.3 and Appendix B.4.

[6] Other language options included Spanish, Somali, and Hmong.
[7] https://mn.gov/commerce/energy/consumer-assistance/energy-assistance-program/

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2.3 Market Actor Interviews

The evaluation team conducted interviews across a variety of groups to meet developmental, process, and outcomes objectives. We conducted these interviews over the phone or through WebEx with seven property owners, including program participants and non-participants. Questions for property owners focused on barriers to energy efficiency upgrades. Interviews were also held with seven social service providers over the phone or through WebEx. Questions for social service providers focused on the clients they serve, barriers for outreach, and how different referral processes work.

2.4 In-Depth Interviews

The evaluation team conducted 26 in-depth phone interviews to meet evaluation objectives. The evaluation team asked interviewees about their program involvement, rental status, housing type, energy, and heating types. Most interview respondents were participants in the LI Segment programs (LIHES, HESP, and MESP), however the evaluation team also interviewed three near-participant and two nonparticipant customers. This research focused on qualitative aspects of the customer experience to inform program model changes. We targeted the following groups for in-depth interviews:

- LIHES participating customers who experienced challenges that were not tied to expected program design[8],
- Participating customers who have experienced multiple programs within the LI Segment, including installing energy-saving measures and exploring the referral process,
- Participating customers and near-participating customers who experienced earlier parts of a LI Segment process but did not install recommended energy-saving measures,
- Near-participating customers who are aware of the LI Segment offerings and initially engaged with the programs but did not continue through the program processes—especially renters—to further explore potential property owner approval process, and
- Participating customers and/or near-participating customers who were interested in exploring ideas being created by the Low-Income New Products Team.

Additional details on research objectives and interviewee characteristics can be found in Appendix B.6.

2.5 Program Mapping

The evaluation team mapped out program offerings and surrounding landscape the help cohesively communicate the offerings goals, outcomes, and processes. This task included developing a logic model as well as a system map.

[8] LIHES respondents reported receiving measures that were not included in the program, difficulties with income verification even though documentation is not required for participation, and barriers related to cost, which should be zero for participating customers. We investigated whether LIHES participating customers were experiencing these barriers and difficulties within the LIHES program, or a different program, such as HESP, that they were recommended to participate in after participating in LIHES.

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- **Logic Model:** The evaluation team developed a logic model to effectively document and communicate the ways in which the LI Segment operates and impacts the market. This model outlined the structure of the LI Segments by detailing the inputs, activities, outputs, outcomes, and impact (or some variation of these concepts). The model also helped to determine where there are opportunities to improve processes to reduce barriers to participation.
- **System Mapping:** The evaluation team worked with Xcel Energy and stakeholders to develop a system map that effectively documents the network of actors across the LI Segment socio-economic landscape and shows how the service mechanisms for the Segment can be more effective. This system map documented where and how Xcel Energy and other stakeholders could work to reduce barriers to participation in the LI Segments. The primary difference between this system map and the logic model described above is that the system map focuses on how the Xcel Energy LI Segment fits within a larger systematic context (i.e., housing providers, government agencies, product venders).

2.6 GIS Mapping

The evaluation team worked on geospatial analysis using GIS to identify appropriate areas for potential income qualification expansion. This included mapping census tract data for 300% Federal Poverty Level (FPL), 200% FPL and State Median Income across to gain a sense of potential areas to target for geographic income qualification. Additional work to explore income qualification expansion, included mapping poverty indicators such as the Areas of Concentrated Poverty and variables from the American Community Survey. To look at areas of low program participation and areas of concentrated poverty, this data was then merged with Xcel customer program participation number as potential geographies to focus expansion efforts.

2.7 Findings from Data Collection Efforts

During customer research activities, the evaluation team attempted to reach customers who prefer a language other than English but were largely unable to do so. The Y1 participating customer research included three respondents who completed the survey in a language other than English – two MESP participants completed the survey in Spanish, and one MESP participant completed the survey in Somali. No respondents took the nonparticipant survey in a language other than English. Additionally, no Y2 respondents took the HESP participating customer survey or near-participating customer survey in a language other than English. Eleven HESP participating customers and eight near-participating customers indicated that they speak a language other than English at home in the Y2 surveys, as shown in Figure 1 below. This question was not included in the Y1 customer research.

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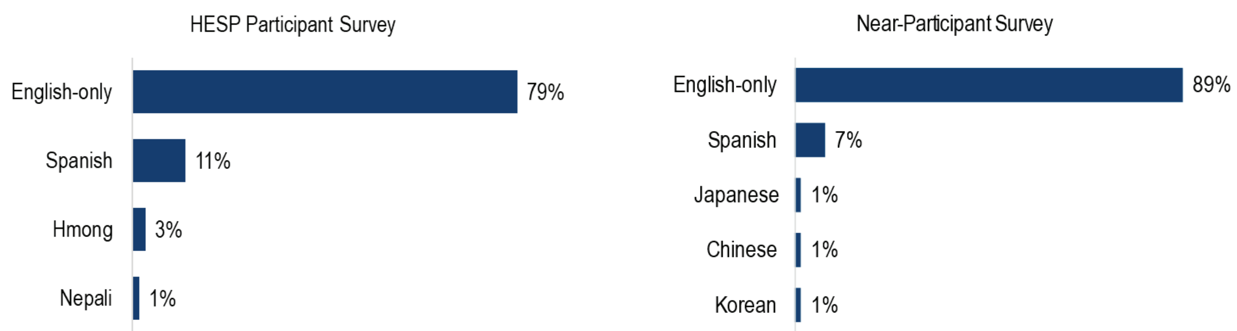
Figure 1. Y2 Respondents Who Speak a Language Other Than English at Home



The evaluation team employed a variety of outreach strategies for reaching customers who prefer a language other than English in Y2 of the customer research. The evaluation team translated the customers surveys, as well as all email outreach into Spanish, Somali, and Hmong. We also conducted outreach through program implementers to try to reach participating customers and near-participating customers known to prefer a language other than English. Program implementers also forwarded email outreach to non-profit partners for distribution to clients known to prefer a language other than English. However, as mentioned earlier, these efforts were largely unsuccessful. Challenges with these outreach strategies suggest that alternative outreach and research methods will likely be needed in future research to gain sufficient representation from these groups.

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3 Cross-Cutting Research Findings

This chapter details cross-cutting findings from Y1 and Y2 of the evaluation research. The evaluation team does not address all research activities and objectives address in this section. Additional detail on all research activities can be found in Appendix C.

3.1 Make Programmatic Changes to Reduce Barriers & Increase Participation

The first goal of the evaluation was to make programmatic changes to reduce barriers and increase participation. This goal includes understanding how to increase participation in rental housing, determining the benefits and limitations of collective income validation, assess the need to remedy health and safety concerns, and understand what steps can be taken to make the service delivery mechanisms more effective. The following sections explore these questions in more detail.

3.1.1 Understand How to Increase Participation in Rental Housing & the Optimal Contribution from Property Owners

To understand how to increase renter participation in the Xcel Energy LI Segment, the evaluation team asked renters about their motivations and barriers regarding participation in the LI Segment offerings. Xcel Energy can use this information as a lever when developing promotional materials, talking to renters about the programs, and/or making changes to the programs. To better understand renter perceptions, the evaluation team explored participating and near-/nonparticipating customer experiences with the property owner approval process to explore whether this process created barriers to participation. The evaluation team found that nonparticipating customers, near-participating customers, and participating customers differed in how they viewed the property owner approval process, a critical piece of renter participation. Nonparticipating customers indicated that the property owner approval process was the biggest barrier to participation. Near-participating customers agreed that the property owner approval process was challenging, but this was not the biggest barrier to participation for this group. Finally, participating customers (i.e., customers who have successfully received approval) did not identify property owner approval as a challenge but did report lower levels of satisfaction with this program element. Taken together, this suggests that there are opportunities for improvement to the property owner approval process.

Nonparticipating renters reported their biggest perceived barrier to program participation to be receiving property owner approval, and over half of renter respondents (60%, n = 53) indicated that they would be likely to very likely to participate if they did not need to ask their property owner for approval. Near-participating customers showed a similar preference for streamlining the property owner approval process nonparticipating customer respondents in the Y2 survey. All near-participating customer renter respondents (n = 24) indicated that they would be likely to participate if they did not need to ask their property owner for approval. Near-participating renters reported their biggest perceived barriers to program participation were the need for assistance to install equipment, upfront cost, and not having the decision-making authority for

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their home. In addition, respondents also reported property owner approval as a barrier to replacing or installing new equipment.

For participating customers of both LIHES and HESP in the Y1 evaluation, receiving property owner approval did not seem to be a major barrier to renters but did slightly lower satisfaction, compared to homeowners, for the HESP program. Participating HESP customers in the Y2 evaluation also did not report that receiving property owner approval was a barrier, but sample sizes were too small to draw conclusions.[9]

When asked directly, renters participating in the HESP Y1 evaluation did not report encountering difficulties with receiving approval from the property owner. However, when asked about their satisfaction with the amount of time it took between receiving property owner approval and completing the installation, participating renters rated their satisfaction a 4.3 on a 1-to-5 scale, where 1 meant "very dissatisfied" and 5 meant "very satisfied." Although this rating indicates satisfaction with the property owner approval process and completing the installation, this rating was the lowest satisfaction of all program elements, indicating that these elements represent an area for improvement. It is possible that participating renters may not see getting property owner approval as a barrier, since they were eventually able to obtain that approval, but that the process was still suboptimal given lower satisfaction levels.

These barriers related to property owner approval for near-participating and nonparticipating customers, and the lower satisfaction with the property owner approval process for participating customers suggests that there may be a knowledge barrier for property owners that is complicating their tenants' relationship to the LI Segment programs. Familiarizing property managers with LI Segment programs could help renter respondents stay informed and ease their decision-making when it comes to determining whether to participate. While targeting property owners and managers in addition to tenant customers could require duplicative efforts from Xcel Energy program representatives, given these unique renter barriers, it may be necessary to target both groups to increase participation. There may also be opportunities for Xcel Energy to provide additional support for renters in discussing programs with their property managers, such as talking points to help explain program benefits from both the property owner and tenant perspectives. Additional detail can be found in Objective 1 of Appendix C.3 and Objective 1 of Appendix C.4.

3.1.2 Determine the Benefits & Limitations of Collective Income Validation (e.g., Geographic or Community), Compared to the Existing Individual Income Validation Process

This evaluation objective identified difficulties within the current individual income verification process and exploring the benefits and limitations of other methods of income verification, such as qualifying a geographic area based on the percentage of qualified residents in that area. Findings suggest that alternative approaches to eligibility, like geographic or community-based

[9] The participating customer survey for Y2 evaluation had a low response rate from renters with only 4% (n = 3) of HESP respondents renting their homes. Therefore, while the evaluation team was able to compare differences in motivations across these groups, these respondents may not be representative of all renters who participate in the program. Among the three renters surveyed in the Y2 evaluation, only one reported it wasn't "very easy" to receive approval from their property owner or manager to participate in the program, rating it a 4 on a 1-to-5 scale, with 1 meaning "very difficult" and 5 meaning "very easy."

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methods (also known as "collective income validation"), could help improve the income validation process. The Y1 and Y2 customer research focused on what difficulties exist within the current individual income verification process, given lack of familiarity with collective income validation, to help identify areas for improvement that alternative forms of verification might address. We explored these difficulties in different ways based on how respondents experienced the LI Segment programs. Both near-/nonparticipating customers reported that they would be more likely to participate if they did not need to provide proof of income. Participating customers, apart from MESP participants, also reported having issues with income verification, indicating that it was the most challenging aspect of program participation. Program eligibility is not an issue for MESP participants, where a form of collective income validation already exists because eligibility is determined at the building level.

Over half of the nonparticipating respondents in the Y1 evaluation (68%, n = 81) reported they would be likely to very likely to participate if proof of income or legal documentation were not required. Nonparticipating customer respondents reported that clear information on eligibility qualifications would encourage them to apply to one of the income-qualified programs. All near-participating respondents in the Y2 evaluation reported they would be likely or very likely to participate if proof of income or legal documentation were not required. Near-participating respondents also reported that a simplified application process would encourage them to apply to one of the income-qualified programs. Additional detail can be found in Objective 2 of Appendix C.3 and Objective 2 of Appendix C.4.

Participating customers in both years of the evaluation reported having issues with providing income verification. Income verification was the most challenging component of the program for Y1 LIHES and HESP respondents. While most HESP Y2 participating customers reported that income verification did not impede participation in the program—54% of HESP respondents (n = 41) reported that it was very easy to provide income verification to qualify to the program—this element was one of the lowest rated program elements regarding its ease. Participating customers in HESP rated the ease of income verification a 4.2 on a 1-to-5 scale, where 1 meant "very difficult" and 5 meant "very easy." This rating was also lower than the rating given in 2021 (4.4 on the same scale).

Income verification was not a challenge for MESP participants, as the program has an income verification system that is based on the building the renter lives in, rather than requiring the renter to provide income verification. This signals that an alternate form of income verification, such as one based on geography, might be helpful for at least LIHES and HESP participating customers. For the MESP Y1 program, getting in touch with an Xcel Energy representative was the most challenging component of the program. Additional detail can be found in Objective 2 of Appendix C.1.

3.1.3 Assess Whether the Need to Remedy Health & Safety Concerns before Installing Energy Efficiency Measures Reduces Participation

This section provides feedback from customers on whether addressing health and safety concerns (e.g., mold) before installing energy efficiency measures reduced participation. Participants in the LIHES, HESP, and MESP programs are required to address health and safety concerns before participation to be able to make upgrades to the premise to ensure contractors can safely complete their work and ensure that the premise will be safe after the

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weatherization work is complete. These health and safety barriers are more likely to be present for gas measures according to Xcel Energy program staff. Overall, Y1 and Y2 participating, nonparticipating, and near-participating customers did not report many health and safety issues that needed to be resolved. Although only a small number of participating, nonparticipating, and near-participating respondents reported health and safety as a barrier to program participation, it is still apparent that some customers could use assistance addressing these costly upgrades. A majority (93%, n = 112) of Y1 nonparticipating customer respondents did not report any health and safety concerns that needed to be addressed before installing energy-efficient measures. Only 5% (n = 6) of respondents mentioned issues pertaining to mold, air filters, knob and tube wiring, etc. The remaining respondents reported that they did not know of any issues at present. A majority of the Y2 near-participating customer respondents (83%, n = 59) did not report any health and safety concerns that needed to be addressed before installing energy-efficient measures as well. Only 11% of respondents (n = 8) mentioned issues such as excessive clutter and knob and tube wiring. The remaining respondents reported that they did not know of any issues at the time of the survey. Additional detail can be found in Objective 3 of Appendix C.3 and Objective 3 of Appendix C.4.

Program staff should look into highlighting opportunities to address health and safety concerns through the expanded health and safety measures budget to ensure that customers in need of these upgrades are aware of participation opportunities. For Y2 HESP survey respondents, the expansion of qualified health and safety measures for HESP participating customers paired with increased budgets for these measures in the most recent program filing appears to have increased the prevalence of these measures within the program and thus the number of participants who were able to participate. This increase in health and safety measures could also be due to the higher number of gas and combination customers surveyed in Y2 of the evaluation; the research team targeted these customers given low response rates in the Y1 survey. Additional detail can be found in Objective 3 of Appendix C.2.

3.1.4 Understand What Steps Can Be Taken to Make the Service Delivery Mechanisms More Effective.

This section provides feedback from participating customers, property owners, and social service providers on effective service delivery mechanisms and how customers and other stakeholders are interacting with Xcel Energy and other energy efficiency programs. Service delivery mechanisms include processes or tools designed to make participation easier for customers. Across research tasks, customers, property owners, and social service providers described unmet needs or provided concrete suggestions for improvement that fell into two main categories:

- **Program Information:** Participating customers, property owners, and social service providers all expressed a need for more or more tailored information on programs, including program eligibility and the participation process.
- **Online Tools:** Y2 HESP respondents highlighted a need for better online tools, including an online application.

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Participating customers across both evaluation years expressed an interest in learning more about mechanisms that can help communicate program information and optimize the application process. Respondents to all Y1 participating customer program surveys reported wanting more knowledge of other opportunities to save money and energy through Xcel Energy programs but reported little to no knowledge of Xcel Energy programs. The most commonly known Xcel Energy program was billing assistance. This points to an opportunity gap where implementation staff and Xcel Energy representatives could provide more information and education on additional energy efficiency programs.

Findings from the property owner and social service provider research underscore that a lack of awareness among stakeholders may be contributing to lower than desired participation in LI Segment offerings. Property owners commenting on barriers to performing upgrades mentioned cost and lack of information, including that they were unaware of what other resources Xcel Energy could provide. Of the three owners who provided detailed responses to a question about what additional resources or information they would need to proceed, all three indicated that they would like information that specifically calls out the benefits and return on investment for various upgrades, without having to track down the information themselves. One also questioned whether there are eligibility limitations relating to income; eligibility criteria was unclear to this property owner. While social service providers are generally aware of LI Segment offerings, they experience a lack of capacity to address the overwhelming need among their clients.

Finally, respondents from the Y2 HESP evaluation expressed a desire for more online tools, such as an online application and a place to check the application status. They felt these tools would make program processes, such as applying for the program and submitting documentation of income, easier. Almost one-fifth of respondents also reported that they found out about the program through the internet. As many income-qualified individuals access online services via their phone, rather than a computer, it will be critical to have these applications, marketing, and tools in a mobile-friendly format. Additional detail can be found in Objective 4 of Appendix C.1 and Objective 4 of Appendix C.2.

3.2 Increase the Number of Energy-Saving Measures Installed

The second goal of the evaluation was to identify opportunities for the LI Segment programs to increase the number of energy-saving measures installed, and to collect feedback from participating customers regarding measure installation. This includes assessing if participating customers are not installing any recommended measures and why, as well as identifying if any approved filing changes increased participation and/or number of measures installed and by how much. The following sections explore why customers are not installing recommended measures in more detail. The impact of approved filing changes is explored in more detail in Appendix C.

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3.2.1 Assess if Participating Customers are Not Taking any Recommended Measures & Why.

This section provides insight into factors that can support or prevent customers from installing recommended measures in their homes. The evaluation team asked participating customers whether they installed all recommended measures and, if they did not, what their reasons were for not doing so.

The evaluation team found that, on average across all programs, a majority of Y1 (LIHES: 63%, HESP: 89%, MESP: 97%) and Y2 (69%, n = 53) evaluation respondents indicated that they installed all the recommended equipment. However, where participating customers did not install recommended measures, they shared concerns that measures were too costly, which could signal a lack of information or a lack of understanding of that information regarding the LI Segment programs across the board.

LIHES had the lowest installation rate of the programs, with 38% (n = 24) of respondents indicating that they did not install one or more measures recommended to them. For LIHES participating customers, of the 24 of those who didn't install the recommended measures, 38% (n = 9) said that the measures were too costly or that they didn't receive enough financial assistance. This could signal lack of information on the financial assistance available through LIHES or through other programs when making recommendations.

For Y1 HESP participating customers, of the seven participating customers who didn't install the recommended equipment, two indicated a lack of follow-up by the contractor, one stated that the cost was too high, and one that the recommended equipment would not fit in well aesthetically with the rest of their fixtures. Of the 12 Y2 HESP respondents who didn't install some of the recommended equipment, three reported that they could not afford the equipment, and three stated that the offered equipment was not better than their current equipment. Two respondents also reported building requirements/compatibility issues. As the program provides equipment to participating customers at no cost, it is likely that the cost barriers mentioned by respondents pertained to additional recommendations made by contractors or program staff, rather than equipment that was qualified by the program. It could also be that participating customers had a misunderstanding of the program offering, thinking that the recommended program would come at a cost to them. This could point to a need for clearer program materials to explain the program to participating customers. Additional detail on the Y1 participating customer surveys can be found in Objective 5 of Appendix C.1. Additional detail on the Y2 HESP respondents can be found in Objective 5 of Appendix C.2.

3.3 Increase Participation & Positive Participation Experiences

The third goal of the evaluation was to identify opportunities to increase participation and positive participation experiences. This includes assessing customer satisfaction and any differences that might exist among groups, understanding what motivates participation and nonparticipation, and investigating customer experiences with outreach and marketing. The following sections explore these topics in more detail.

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3.3.1 Assess Customer Satisfaction & any Differences in Satisfaction between Homeowners, Renters, & LI Segment Programs

This section provides feedback from participating customer experiences with the LIHES, HESP, and MESP programs across the two evaluation years. Overall, participating customers across both evaluation years were satisfied with their program experience, and uniformly expressed especially high satisfaction with the installed equipment and the installation process. These findings were consistent across programs and evaluation years. Y1 respondents did however indicate an opportunity for improvement in this area, expressing lower levels of satisfaction with education on how to operate and maintain installed equipment.

Y1 participating customers were generally very satisfied with the program implementer staff who conducted their assessment or provided the installation of the equipment, rating staff interactions a 4.7 or higher, on a 1-to-5 scale, where 1 meant "very dissatisfied" and 5 meant "very satisfied." This points to high-quality staff interactions. Participating customers across all three of the LI Segment programs were also very satisfied with the equipment installations, with all programs averaging a rating of 4.8 out of 5. This again points to well-trained staff and staff expertise when installing equipment. Participating customers in the Y2 HESP evaluation were also highly satisfied with their installed equipment, in terms of both cost and performance. Respondents reported that they would not have been able to afford the upgrades on their own and that these upgrades greatly improved their quality of life, comfort, and safety.

The evaluation team also conducted in-depth interviews with participating customers who completed Y1 or Y2 surveys from LIHES, HESP and MESP programs in 2022. These interviews confirmed the survey findings that, across all Xcel Energy LI Segment programs, participating customer interviewees were generally more satisfied than dissatisfied with their participation experience and how Xcel Energy was able to meet their wants and needs. Interviewees provided almost three times as many liked aspects of the programs (n = 42) than disliked aspects (n = 15). The aspects of the programs that all participating customer interviewees liked included receiving new equipment and installations (n = 11), interactions with Xcel Energy and implementer staff (n = 11) and receiving advice and tips on energy management (n = 9).

This high satisfaction with equipment and equipment installation by all respondents, and the connection to cost constraints and quality of life improvements made by Y2 respondents, indicates that the free measure installation is a key strength of the program that should be further highlighted and emphasized to potential participants.

Respondents in the Y1 evaluation did express lower levels of satisfaction in a couple of areas, across the programs, which included education on how to operate the installed equipment (4.5 for LIHES, 4.5 for HESP, and 4.6 for MESP). This suggests that there are still specific areas for improvement related to equipment and equipment installation on which the programs should focus to ensure that the equipment received remains a strength for the programs. Additional detail can be found in Objective 7 of Appendix C.1, Objective 7 of Appendix C.2, and Objective 4 of Appendix C.6.

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3.3.2 Understand What Motivates Participation as Well as Nonparticipation (Barriers) & Identify Motivation & Barrier Leverage Points to Increase Participation.

This section provides findings based on feedback from customers and other stakeholders across research efforts on motivations for and barriers to participation. Participating customers across various programs and evaluation years reported they were motivated to participate by financial and bill savings. Given this motivation, it is noteworthy that on average Y1 and Y2 HESP participating customers reported they were least satisfied with bill and energy savings. Nonparticipating customers were similarly interested in the opportunity for energy bill savings, and in-depth interviewees similarly reported that they were motivated to participate in the programs by energy bill savings. Additionally, participating customers spanning both evaluation years reported difficulty with program applications and eligibility information. This aligns with feedback from near-participating customer respondents, who mentioned that a simpler application process and a lower application threshold would encourage them to apply to an income-qualified program. Market actor interviewees underscored this challenge with complex or confusing program applications for their clients. Property owners highlighted financial barriers to program participation. This section also includes a discussion of program awareness to help inform a discussion of motivation and barrier leverage points to increase participation. Additional detail on these motivations and barriers are included in the following sections.

Motivations

Y1 participating customers (LIHES, MESP, HESP) and Y2 HESP participating customers reported financial savings, such as receiving free or reduced-cost equipment, and bill savings to be the main motivators to participate in the programs, followed by the opportunity to replace old, faulty equipment. However, after participating, respondents across both years were least satisfied with their realized bill and energy savings. This may signal marketing and outreach efforts need to emphasize different program benefits to set more realistic expectations for clients. It is unclear, however, whether this dissatisfaction with savings is due in part to the upward pressure on energy costs from a variety of factors, such as rising rates and extreme weather events, and the difficulty of establishing a realistic counterfactual of what energy bills would have been without the measures installed. Additional detail can be found in Objective 8 of Appendix C.1 and Objective 8 of Appendix C.2.

The 2022 in-depth interviews echoed survey findings that customers are motivated by financial and bill savings. Both participating and nonparticipating customer interviewees stated that they were looking for ways to reduce the amount of money that they spend on energy. More than three-quarters (n = 20) mentioned that they were motivated to participate in Xcel Energy LI Segment programs because it would save them money. Additionally, more than one-third (n = 9) noted that the free services they received were motivating factors in their decision to participate. Although interviewees were not asked about their satisfaction with bill or energy savings, the additional emphasis on bill savings supports the notion that realistic messaging around expected bill savings to customers is important.

In addition to bill savings, interviewees were also motivated by the expertise available to them through the LI Segment offerings. Almost two-thirds (n = 16) mentioned their decisions were influenced by advice and tips that they received from energy management experts. A greater

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proportion of homeowners (n = 12) than renters (n = 4) were motivated by advice and tips, which might be attributed to the longer periods of time homeowners tend to live in their homes and the need for more information on how to maintain and maximize the effectiveness of that equipment. Additional details can be found in Objective 1 of Appendix C.6.

Interviewees were motivated to install energy-efficient equipment because they thought it would increase their energy-efficiency (n = 22) and lower their electric and natural gas utility bills (n = 15). They directly linked the improvement in their equipment to a potential savings in their utility bills. Additional details can be found in Objective 5 of Appendix C.6.

Barriers

Several common barriers came up across evaluation years and research efforts, including:

- Unclear program application materials
- Insufficient and/or inconsistent communication
- Lack of program awareness
- Program trust issues
- Upfront cost and other financial barriers

These barriers are described in more detail in the below sections. The section closes with a discussion of barriers unique to respondents who speak a language other than English at home.

Unclear Application Materials

Across the Y1 and Y2 customer research activities, respondents expressed a need for clearer language in program applications and materials, especially for qualifications, and to use language similar to other income-qualified programs. Y1 respondents wanted to be able to easily understand if they qualified for programs and what documents they would need to provide as proof of income. HESP participating customers from the Y2 evaluation echoed the need to use clearer language in program applications and materials, especially for eligibility requirements. Near-participating customers in the Y2 evaluation reported that a simpler application process and a lower application threshold would encourage them to apply to an income-qualified program.

The more difficult an application is to navigate, the lower the number of successful applications there are likely to be. Market actor interviewees shared a number of barriers that their clients have to getting services, including language and communication barriers, and they noted concerns about clients who are unable to fill out forms that are in English or have difficulty understanding lengthy and complex processes. Clients with an undocumented status may experience additional barriers to the application process, such as providing required documents or citizenship status.

Insufficient and/or Inconsistent Communication

Although participating customers expressed that they had favorable interactions with program representatives, Y1 respondents reported difficulty with getting in touch with a representative.

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While this component was still rated highly, Y1 LIHES and HESP respondents reported getting in touch with a representative from the service organization (implementer) as the least easy component of program participation. LIHES, HESP, and MESP interviewees also highlighted challenges with communication before, during, and after their participation.[10] Half of interviewees (n = 13) reported lack of communication from Xcel Energy created a barrier to their participation. Most frequently, interviewees cited issues with scheduling their installations, not having enough information to know what to expect on the day of their installation, or not knowing how to get their questions answered. Additional detail on these barriers can be found in Objective 9 of Appendix C.1 and Objective 9 of Appendix C.6.

Lack of Program Awareness

Although there were differences in reported barriers to participation among Y1 nonparticipating customer respondents and Y2 near-participating customer respondents, one common thread was a lack of program awareness. Nonparticipating customers in the Y1 evaluation reported their largest barriers to participating in income-qualified programs were lack of awareness of and knowledge of LI Segment programs (only 5% of nonparticipating customers reported they were aware of at least one of the LI Segment programs). Near-participating customers in the Y2 evaluation reported the largest barriers to participating in income-qualified programs were the lack of information about LI Segment programs and/or equipment and uncertainty regarding their eligibility to participate. Nonparticipating customers in the Y1 evaluation also reported that they wanted more information on the programs in general, information on bill savings, and a clear understanding of eligibility requirements. The general lack of awareness of and access to program information among participating and near-/nonparticipating customers in all research efforts, as well as the expressed desire for clear and concise application materials, underscores the need for clearer and more accessible program information. Additional information about program requirements and participation processes may be needed to encourage participation. Additional detail can be found in Objective 4 of Appendix C.1 and Objective 4 of Appendix C.2.

Some participating customers also expressed a need for greater program awareness and a desire for additional program education. Y2 HESP respondents reported little knowledge of how HESP works, how to operate their equipment, and what opportunities they may be eligible for to receive additional upgrades. Y2 HESP participating customers expressed a desire to know more about energy efficiency or money-saving opportunities and felt program staff did not provide enough actionable information.

Financial Barriers

The most common barrier to installing energy-efficient equipment reported by interviewees was upfront cost, which impacted more than two-thirds of interviewees (n = 18). Proportionally, fewer renters (n = 5) than homeowners (n = 13) noted upfront cost as a barrier. Although this was a barrier to installation of efficient equipment, and not program participation, and thus participants may be referring to equipment that does not qualify for the program or scenarios where property owner cost sharing was required, it could also point to a lack of understanding of the LI Segment programs, which provide equipment to income-qualified customers at no cost. Interviewees also expressed concerns with other costs related to equipment installation,

[10] MESP implementers interact primarily with property owners. For MESP interviewees, it may be that the program is communicating with property owners, but that property owners are not communicating sufficiently with participants.

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including equipment delivery (n = 5) and removal (n = 3), but these concerns were less widespread. Almost half of all interviewees (n = 11) were worried about their limited financial circumstances and how they would pay for equipment upgrades. Additional details on interviewee barriers can be found in Objective 5 of Appendix C.6.

For property owners, the role of cost and associated benefit was a primary concern for nearly all of the owners interviewed. The only person who indicated that the contribution amount would not prohibit them from participating was one of the two who had already conducted upgrades. Among owners who have not participated, a common theme was that they wanted easily accessible information about expected benefits and payback periods for various upgrades. They said they need to understand the business case for making the decision to conduct upgrades, particularly if they are facing financial pressures or have other property issues that take priority.

Program Trust Issues

Finally, during the in-depth interviews with participating and near-/nonparticipating customers, the evaluation team attempted to understand to what extent program trust is a barrier to participation. One of the top barriers reported by Y2 interviewees was a concern that the LI Segment offerings were a scam when they first heard about them. Nine interviewees first thought that the program was too good to be true, mentioning that they thought there was a hidden payment, bill charge, or loan involved, or that it was not possible that their utility company could provide equipment free of charge. This finding suggests that there may need to be greater clarity when Xcel Energy markets their LI Segment programs to customers that have not heard about the programs previously. Though participant interviewees overcame their lack of program trust, other potential participating customers may not be as persistent. Additionally, interviewees were concerned that they were not able to verify the legitimacy of the program or utility. Identifying a quick and straightforward way for customers to verify program details may help customers more quickly overcome their fears about being scammed. While some interviewees did have doubts about the legitimacy of the LI Segment programs, 19 said that they would trust Xcel Energy for advice. This suggests that customers are more likely to trust an offering's legitimacy if they can verify its connection to Xcel Energy. Additional detail can be found in Objective 6 of Appendix C.6.

Customers Who Prefer to Speak a Language other than English at Home

Y2 HESP respondents who prefer to speak a language other than English also reported a greater difficulty with all program elements. Of the 11 respondents who indicated they spoke a language other than English at home, all reported more difficulty with program elements than those who indicated they only spoke English. The program elements that had the largest differences in ratings between these two respondent groups, were scheduling an on-site visit, understanding how to use the installed equipment, contacting a program representative, and providing income verification. This suggests that while equipment installation, eligibility documentation and marketing mechanisms are difficult for everyone, it is particularly acute for folks who speak a language other than English at home. Additional detail on these barriers can be found in Objective 8 of Appendix C.2.

Sources of Program Awareness

The evaluation team asked customers about how they first heard about LI Segment programs to understand which outreach methods are successful at raising program awareness. We also

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asked how respondents would most prefer to be contacted. Sources of awareness varied across research efforts; however, respondents were consistent in their desire to hear more from Xcel Energy directly. This signals interest in direct outreach from and interaction with Xcel Energy that is not currently being met by LI Segment program design. Further, many Y1 participating LIHES and HESP respondents reported hearing about programs through an Xcel Energy or implementer representative, suggesting that these interactions are meaningful for encouraging participation.

Nonparticipating customers in the Y1 evaluation first heard about LI Segment programs through flyers or advertisements, Xcel Energy program representatives, and through the internet or their own research. Respondents wanted to receive information about the programs through their property owner or an Xcel Energy representative, or from flyers or advertisements. Near-participating customers in the Y2 evaluation first heard about LI Segment programs in-person and by phone through their local Community Action Partnership (CAP) agencies and Xcel Energy third-party partners. Respondents most often wanted to receive information about the programs through Xcel Energy third-party partners (37%, n = 12) and Xcel Energy program representatives (29%, n = 21). Additional detail can be found in Objective 6 of Appendix C.3.

As discussed previously, near-participating customers often heard about LI Segment programs through social service providers. Nearly all social service providers interviewees had something to say about word-of-mouth outreach, or sharing experiences with friends, neighbors, families, and even through other agencies. Many organizations found that clients were able to connect further with other programs or be referred elsewhere within the organization after an initial visit. Other ways that clients hear about services are through advertising via billboards, newspaper ads, social media, targeted mail, bus advertisements, and flyers. Social service providers also mentioned that they were able to learn about other services through in person food pick-ups, or community events. Most of the organizations that we spoke with conducted outreach to specific populations, although two organizations noted broad outreach to all Minnesotans. One culturally specific service provider, Hallie Q. Brown, does outreach to BIPOC populations to promote their services.

Organizations described both client-facing outreach and agency-facing outreach approaches. Client-facing outreach includes door knocking and passive outreach such as ads, mailers, and billboards. Agency-facing outreach for one organization includes visiting agencies that request speakers who can share more information about the community need, services they provide, and ways for them to connect with their agency in the future.

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4 Conclusions & Recommendations

This chapter presents the evaluation team's key findings and associated recommendations regarding the Xcel Energy LI Segment programs in Minnesota. All recommendations are based on key findings from our evaluation research and are designed to reflect the context of future program years, acknowledging expected changes in the market and planned program changes. The remainder of this chapter presents key findings and recommendations.

- **Key Finding 1: Y1 and Y2 participating customer respondents reported little knowledge of how the LI Segment programs work and what opportunities exist for additional upgrades, including little to no knowledge of both LI Segment and other Xcel Energy offerings.** While all customers expressed challenges with program elements, including challenges related to a lack of program knowledge and awareness, customers who prefer to speak a language other than English had greater challenges overall. Of the eleven Y2 HESP respondents who spoke a language other than English at home, all reported more difficulty with the program elements than those who only spoke English.
    - **Recommendation 1: Develop leave-behinds for HESP and LIHES participating customers, translated into Spanish, Somali, and Hmong, that include tips for saving energy, and information on other Xcel Energy programs they may be eligible for.** Include information on other LI Segment programs in existing MESP leave-behinds. In addition to these resources, clarify eligibility requirements and program processes in marketing materials to increase customer understanding of program participation.
        - Include information in marketing collateral about all Xcel Energy programs for income-qualified customers, including where to find additional information and how to apply.
        - Translate all website language linked to marketing collateral into Spanish, Somali, and Hmong to increase the accessibility of these materials.
        - Consider developing short videos with LI Segment program information in Spanish, Somali, and Hmong to address identified knowledge and language barriers, as well as possible literacy barriers.
- **Key Finding 2: Customers experienced challenges with lack of communication, many of which related to not having the information they needed to contact Xcel Energy and Xcel Energy third-party partners.** Y1 LIHES and HESP respondents reported that getting in touch with implementers was the least easy part of program participation. Further, interviewees highlighted challenges with communication before, during, and after their participation. Frequently mentioned challenges included not knowing how to get their questions answered, not knowing what to expect on the day of installation, and issues scheduling installation.
    - **Recommendation 2: Provide customers with contact information for pre-installation questions and follow-ups, and estimated timelines when applications are accepted.** When customers are referred to another program, provide details on the participation process, including where to follow-up for additional information. Consider including additional detail on how to get in touch with

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program representatives on the Xcel Energy website, such as an email or phone number.

- Consider creating a FAQ page to house this information along with other frequently asked questions about LI Segment programs and/or creating pre-installation outreach containing FAQ information.

- **Key Finding 3: Customers expressed an interest in hearing about programs through trusted sources, including CAP agencies, implementers, and Xcel Energy representatives to help verify program legitimacy.** Some interviewees (n = 9) noted that they feared the program was too good to be true prior to participation. However, most interviewees (n = 19) noted that they trust Xcel Energy as a source for advice on energy efficiency.
  - **Recommendation 3: Raise awareness of programs and their legitimacy through direct outreach from Xcel Energy.** Consider additional outreach strategies such as direct outreach through events and marketing through utility bill inserts to select customers (e.g., Energy Assistance customers). Direct outreach from Xcel Energy could be a quick and straightforward way for customers to verify program details and could help customers quickly overcome fears of being scammed. Optimize use of existing Xcel Energy resources to craft simple, positive messaging around why Xcel Energy provides services through the LI Segment programs.
- **Key Finding 4: No Y2 respondents took the HESP participating customer survey or near-participating survey in a language other than English.** Just three respondents took the survey in a language other than English in Y1, all were MESP participating customers.
  - **Recommendation 4: Consider additional outreach in future research, including:**
    - Conduct direct mail recruiting in customers' preferred language for a web survey.
    - Consider conducting in-person outreach in partnership with community groups in customers' preferred language. Compensate these community groups for their time. This approach might also help to overcome possible limited literacy barriers.
    - Consider identifying community groups to conduct interviews and/or focus groups in multiple languages. Provide these groups with basic interview training and include extra time for analysis. Compensate these community groups for their time. This approach might also help to overcome possible limited literacy barriers.
- **Finding 5: Wiring and electrical upgrades were the most mentioned health and safety concern by participating customers and near-participating customers.** Further, the expansion of qualified health and safety measures for HESP participating customers paired with increased budgets for these measures in the most recent program filing appears to have increased access to these measures.
  - **Recommendation 5: Highlight opportunities to address health and safety concerns through program participation, with a particular focus on the ability**

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to address needed electrical upgrades. Optimize use of existing Xcel Energy resources to identify additional ways to highlight these opportunities beyond program collateral.

- Ensure implementers are promoting health and safety upgrades during site visits.
- Discuss the impacts of the expanded health and safety measures budget with implementers to better understand who is benefiting from this change and how it has changed who implementers work with, if at all.

- **Finding 6: A lack of awareness among stakeholders may be contributing to lower than desired participation in programming**.
  - **Recommendation 6a: Because of the unique needs of each stakeholder group, tailored promotional and educational materials will have a greater impact than more generalized material.** Specifically, **materials for property owners should focus on the return on investment of energy-efficient building improvements** and describe the estimated costs and benefits for upgrade options available to them. Xcel should consider clear and concise infographics that could be distributed through targeted marketing to these owners.
  - **Recommendation 6b: Property owner survey respondents who were non-participants indicated that not knowing if they qualify for Xcel Energy programs was a primary reason for not participating.** This suggests a need for **clarification on qualifications**, especially for the HESP program.
  - **Recommendation 6c: Social service providers may be interested in Xcel Energy's ready-made educational materials that could help to alleviate the burden of describing program features and eligibility criteria.** Such materials could also aid providers conducting community outreach; some providers suggested hosting application nights for households who likely qualify for programs as a targeted and efficient way to spread awareness. While Xcel is in the process of updating its existing materials, it would be beneficial to carefully plan a more extensive and targeted distribution, and thoughtful program publicity at community sites such as sandwich boards.
- **Finding 7: Social service providers are an important referral source for Xcel Energy programs yet are consistently overwhelmed with high caseloads.**
  - **Recommendation 7a: In order to ensure that organizations have what they need to increase referrals to Xcel Energy's programs (e.g., staffing, resources, outreach), Xcel Energy should work to build its awareness of the needs of agencies so that Xcel Energy staff members are prepared to provide the support needed.** Additionally, understanding the process of working with social services agencies and how they connect and refer services can help Xcel Energy staff to develop positive working relationships with agencies and increase the number of referrals. Overall, providers would like **deeper support from Xcel Energy around application process questions** and more "face time" with Xcel Energy staff to address these questions or other issues as they arise.
  - **Recommendation 7b: Because word-of-mouth seems to be the most common connection point for eligible households, collaborating with referring organizations on outreach efforts could be an effective strategy to increase**

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awareness of Xcel Energy programs. Collaboration with culturally-specific organizations could also help to reach cultural communities with appropriate messaging and outreach, including outreach conducted in languages other than English. In forming these types of partnerships, it would be important for Xcel Energy to provide incentives or reimbursements to these agencies for staff time, space, and other support. **Using results from GIS mapping** conducted in this evaluation, Xcel Energy can focus on underserved communities that could benefit from low-income programming.

- **Finding 8: Property owners commented on the financial barriers they face in participating in weatherization upgrades, and indicated that they needed more assistance with the initial investment before they would consider completing upgrades.** Notably, property owners of 1-4 unit rental buildings were less likely to be willing to pay any amount for upgrades than owners with 5 or more rental units across all upgrade types. Results from the survey of property owners indicated that a slightly higher percentage of property owners were willing to pay for measures that benefitted residents despite having indicated that their primary motivation for program participation was benefit to property owners.
    - **Recommendation 8: Their financial ability to contribute to energy efficiency upgrades varies significantly, and Xcel Energy may want to explore the viability of additional support, including options such as a tiered owner-contribution program based on income or partnerships with other funding agencies who could work with owners to finance the owner contribution.**
- **Finding 9: Benefit program applications for low-income people are often notoriously difficult to navigate, lowering the number of successful applications.**
    - **Recommendation 9: By smoothing out the application process and helping applicants, Xcel Energy may be able to reach a wider group of eligible households.** One suggestion from social service providers was to explore **automatic program qualification** (categorical eligibility) of new participants based on their qualification for other low-income programs outside of Xcel (I.e. county benefits). This would simplify the paperwork burden for clients.

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