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Xcel Energy

Colorado Residential Heating and Cooling Product Impact and Process Evaluation

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EXECUTIVE SUMMARY

2021 Colorado Residential Heating and Cooling Product

Introduction

Xcel Energy contracted with TRC to evaluate the 2021 Colorado Residential Heating and Cooling Product, which provides prescriptive rebates for a variety of heating, cooling, and ventilation measures. The 2021 evaluation focused on the air conditioning (AC) and heat pump measures offered through the product and included an impact and process evaluation. The product is designed to reduce purchasing costs and encourage quality installation of cooling equipment in the residential market.

For the impact evaluation, TRC assessed the impact of the product on customer decision making. It included researching evidence of free ridership, spillover, and market effects. For the process evaluation, TRC collected feedback on trade partner and customer experiences with the air conditioner and heat pump equipment rebates and Quality Installation (QI) processes, identified motivations and barriers to participate in the products, explored ways to grow the heat pump market, and assess peer utility program practices. This summary includes the key findings and recommendations from our evaluation.

Methods

Participating customer survey (n=100)

Participating customer follow-up interviews (n=8)

Nonparticipating customer survey (n=70)

Participating trade partner interviews (n=18)

Nonparticipating trade partner interview (n=13)

Peer utility interviews (n=6)

Fielding:
September – November 2021

Summary of Findings

- The evaluation team estimated a retrospective **NTGR of 0.73 for air conditioning equipment** (both SEER 13-14 and SEER 15+), and a retrospective **NTGR of 0.57 NTGR for mini-split heat pumps**. The evaluation team did not estimate a NTGR specific to air source heat pumps because that population was too small in 2021 to calculate a representative value.
- Participating customers and trade partners were **satisfied** with product experiences and appreciated product changes that supported heating, ventilation, and air conditioning (HVAC) comprehensive offerings. The product gave customers confidence that their equipment was **installed well** and enabled trade partners the **ability to differentiate themselves** in the market. **Equipment costs** were barriers to customer product participation. Non-participating trade partners also faced barriers in **performing QI** and **becoming eligible** to be a qualified contractor.
- Trade partners highlighted that heat pumps were most applicable to **homes with onsite electric generation**, such as those with solar panels. Trade partners felt that **increased education** and **rebates** for heat pumps would drive further product participation.

Product Influence

The evaluation team estimated product influence by measuring free ridership, spillover, and market effects for **QI practices** and **equipment rebates** and then applied relevant findings to both air conditioners and mini-split heat pumps.

Feedback on Xcel Energy's influence on QI practices

- Participating customer respondents reported they would have used the **same contractor** even if the product didn't exist.
- There was **no evidence** of participating or non-participating spillover.
- Trade partners felt the product increased contractors' **installation quality**.

Feedback on the influence of the Xcel Energy equipment rebate

- Participating customers reported that the rebate was **relatively small** compared to equipment costs.
- There was **no evidence** of participating or non-participating spillover.
- Trade partners felt the product increased the **amount of efficient equipment they installed**; however non-participating trade partners reported **limited impact**.

SEER 13/14 AC NTGR relies only on **QI practice** findings

SEER 15+ AC NTGR relies on **QI practice** and **equipment rebate** findings

Mini-spit heat pump NTGR relies only **equipment rebate** findings

Retrospective NTGR for all air conditioners is estimated at **0.73.**

Xcel Energy influenced trade partners to perform full QI service for customers installing air conditioners. Influence was limited by customers and trade partners reporting that rebates were not high enough to overcome cost barriers.

Retrospective NTGR for mini-split heat pumps is estimated at **0.57.**

While the product helped customers pursue mini-split heat pumps, the Xcel Energy influence on sales was limited due to customers and trade partners concerns over purchasing and operating costs.

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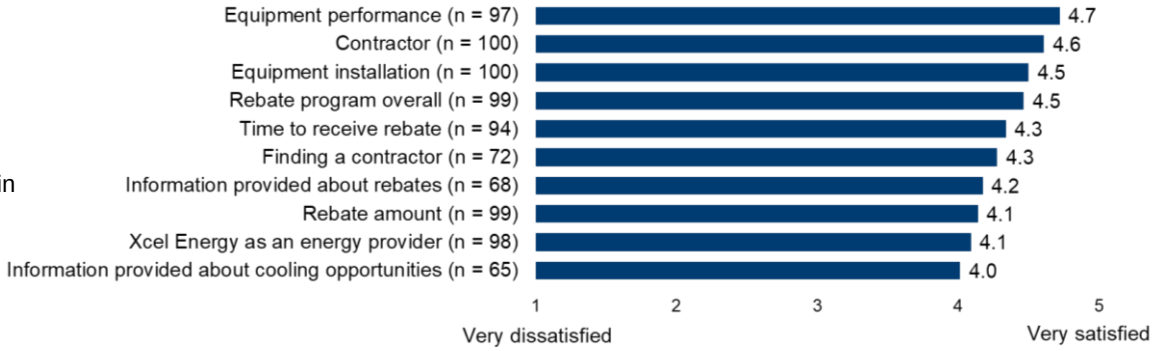
2021 Colorado Residential Heating and Cooling Product

Feedback on Product Experiences

Satisfaction and Experiences

Participating customers were **satisfied** with the product as a whole.

There was **no significant difference** in product satisfaction for participating customers who received QI.



4.5 out of 5

On average, **participating customers** rated their satisfaction a **4.5 out of 5**, where 1 means "not at all satisfied" and 5 means "very satisfied."

Trade Partners were **generally satisfied** with the product, with eighteen respondents rating their satisfaction a **4.1 out of 5**, on average.

Participating customers found all elements of the product to be **easy**. **Completing program paperwork**, **determining eligibility and rebate tier**, and **equipment installation through a contractor** were rated as the easiest elements.

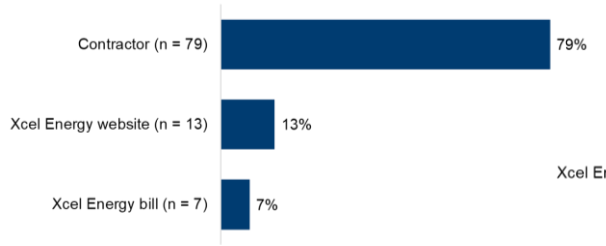
Trade partners provided **positive feedback** on the **comprehensive approach** to providing residential HVAC services within one product.

Awareness

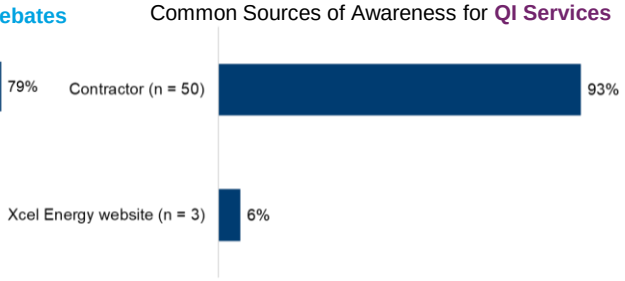
57%

of residential customers who received a heating rebate, but not a cooling rebate, in the past were at least **somewhat familiar** with Xcel Energy cooling rebates.

Common Sources of Awareness for Cooling **Equipment Rebates**



Common Sources of Awareness for **QI Services**



Motivations

Participating customers said the **energy efficiency of the equipment**, **contractor's recommendation**, and the **Xcel Energy rebates** were the biggest reasons for installing the particular cooling equipment they did through the product.

Among QI participants, **equipment efficiency**, **confidence in equipment installation**, and **equipment performance** were the biggest motivations for product participation.

Participating trade partners were most commonly motivated to participate in the product because of the **product's rebates**, the **ability to use the product rebates as a sales tool when selling higher efficiency air conditioners**, and the **product's QI standards make for happier customers and fewer call backs**.

"[The QI requirement] was huge. Not only does it help the rebate program, [but] made for less call backs and better installation on every job."

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2021 Colorado Residential Heating and Cooling Product

Barriers

Nonparticipating customers reported several key barriers to their participation in the Residential Cooling and Heating Product including **equipment and installation costs**.

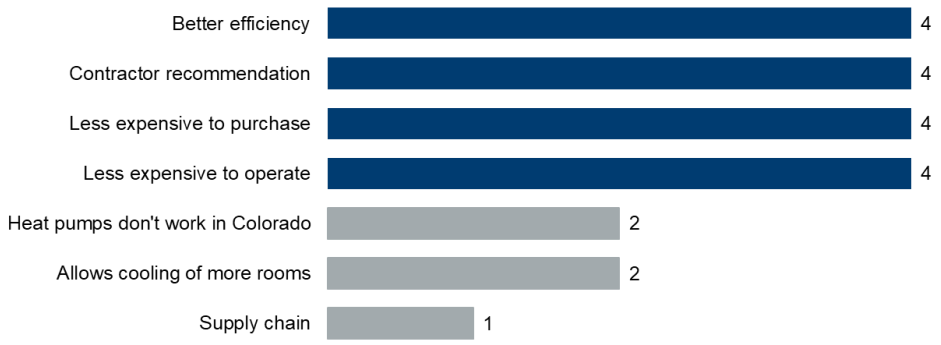
Participating trade partners described several key barriers to participating in the Residential Cooling and Heating Product including: the **rebate amounts**, the **variety of equipment rebated**, and the **spring start-ups** that are of product participation.

Nonparticipating trade partners described several key barriers to participating in the Residential Cooling and Heating Product including: the **rebate amounts**, issues with the **QI process**, and the **administrative burden** of product participation.

Heat Pump Market Growth

Almost two-thirds of participating customers (64%) who installed a heat pump through the product said the benefits of a heat pump include their **efficiency/need for less energy**, the **increased comfort**, and the **convenience of one unit providing both heating and cooling**.

Participating Air Conditioning Customers' Reasons for Installing an Air Conditioner Instead of a Heat Pump



4.2 out of 5

On average, participating trade partners rated their **familiarity with selling and installing heat pump technology** a **4.2 out of 5**, where 1 means "not at all familiar" and 5 means "extremely familiar."

Trade partners provided several examples of **challenges** faced by the heat pump market including how the **higher cost of electricity versus natural gas** in the Xcel Energy territory **impacts customers' interest in heat pumps** and the need for **additional heat pump education** so they are better able to discuss heat pump options with their customers.

Peer Utility Program Design and Experiences

All six peer utilities **offer heat pump rebates** but only one of the peer utilities requires **Quality Installation following the ACCA 5 Standards** like Xcel Energy.

The six peer utilities offer **varied incentive levels** for varied air conditioners and heat pump rebates offered through their residential rebate programs.

Heat pump market transformation was not a focus of peer utilities in their residential HVAC rebate pump programs and **no peer utilities** currently offer midstream rebates for **mini-split heat pumps**.

Four of the six peer utilities stressed the **important role trade partners** play in driving customer awareness and participation in their residential HVAC rebate programs.

Conclusions & Recommendations

1. The Residential Heating and Cooling Product **is influential** in encouraging residential customers to adopt energy-efficient cooling measures and conduct QI. At the measure level, the retrospective **NTGR for air conditioners was 0.73** and **mini-split heat pumps was 0.57**.

1a. Use a prospective NTGR of 0.73 for air conditioning equipment (both SEER 13-14 and SEER 15+).

- If the additional research from recommendation 2 is conducted, this may result in a different prospective NTGR estimate.

1b. Use a prospective NTGR of 0.57 NTGR for mini-split heat pumps.

- Re-evaluate this value if Xcel Energy changes its program design related to mini-split heat pumps and/or if Xcel Energy sees greater participation of this measure in the product.

2. The current rebate levels for air conditioners and heat pumps are **insufficient to overcome cost barriers** for participation in the Residential Heating and Cooling

2. Assess incremental cost data to determine feasibility of adjusting the rebate structure for air conditioners and heat pumps.

- Refer to peer findings for alternative rebate levels.
- Conduct NTGR research when rebate levels change to better understand its impact on customers decision-making.
- Conduct NTGR research on heat pump measures if, and when, the heat pump participant population expands to better understand influences beyond cost that may influence heat pump sales.

3. Few customers installed heat pumps in 2021 as heat pumps were often **price-restrictive for customers**, even with product rebates. Trade partners reported the cost to purchase and use heat pumps was too great, **particularly for customers receiving gas heat**.

3a. Market heat pump measures to customers who have installed solar at their homes, since these customers may be more open to using electric heat because they can generate their own electricity.

3b. Align heat pump offering with utility-wide discussions around carbon-free goals to make the operating cost of electric heating more feasible to customers.

- Continue conversations surrounding electric rates to make heat pumps more friendly to customers during heating periods of the year.
- Continue supporting efficient air conditioner installation rebates until product objectives change and/or barriers of heat pumps are addressed, including customer operating costs and trade partner ability to communicate the benefits of heat pumps to their customers. Continuing air conditioner rebates can help Xcel Energy sustain its relationships with their trade partners so it can effectively engage with trade partners on heat pumps once existing barriers to expanding the heat pump market are overcome.

Conclusions & Recommendations

4. Trade partners expressed interest in **additional opportunities** to learn about heat pump efficacy and installation.

4. Continue providing heat pump education to trade partners. Focus training on how to discuss heat pump technology with customers, particularly its benefits. Topics of interest include but are not limited to:

- Heat pump efficacy outside of shoulder seasons.
- Feasibility of heat pump technology in cold and/or high-altitude environments.
- Tools to communicate effectively with customers.

5. Nonparticipating trade partners reported **various challenges to participating** in the product, including a desire to drop NATE certification to align with rebated heating equipment and some aspects of the QI process.

5a. Clearly differentiate in the application which measures require QI, and which do not, for various HVAC measures and send periodic messages to trade partners about application updates and FAQs.

5b. Allow for alternate methods to assess refrigerant charge during the QI process as these technologies continue to evolve. Reach out to trade partners after this change is implemented to better understand trade partner experiences with new methods.

5c. Engage trade partners who are not interested in following QI procedures to encourage them to sell mini-split heat pumps, since they do not require QI.

- Clarify in product documentation that mini-split heat pumps do not require QI.

5d. Drop NATE certification for air conditioner and air source heat pump measures.

- As an alternative to NATE certification, Xcel Energy can use the annual QI training and testing process to have contractors sign off on committing to following QI protocols.

6. Overall, participating trade partners did not think midstream mini-split heat pump rebates would **affect their sales of mini-split heat pumps**.

6. Hold off developing a midstream mini-split heat pump offering.

- Instead, focus on increasing awareness around heat pumps among customers and trade partners to encourage more adoption of heat pumps through the product.
- Once heat pumps are more widely adopted and accepted in the market, consider more research into the viability of a midstream mini-split heat pump offering by determining if trade partners perceptions of such an offering have changed.

1 Introduction

Xcel Energy offers a comprehensive array of energy services and products to its customers, including demand-side management (DSM). For its 2021 product evaluations, Xcel Energy sought to understand the role each product plays in changing the marketplace, to analyze that influence on customer choices, and to use the findings to improve customer experience and ensure industry-leading product performance. To accomplish this, Xcel Energy contracted with TRC to evaluate eleven products offered in Colorado and Minnesota in 2021.[1] This included an evaluation of residential air conditioning and heat pump measures offered through the Colorado Residential Heating and Cooling Product, discussed in this report. This introduction includes an overview of the product and the evaluation approach and describes the organization of the report.

1.1 Product Overview

The Colorado Residential Heating and Cooling Product provides prescriptive rebates for a variety of heating, cooling, and ventilation measures. The 2021 evaluation focused on the air conditioning and heat pump measures offered through the Colorado Residential Heating and Cooling Product. Through this product, Xcel Energy provides rebates to residential customers who installed qualifying air conditioning or heat pump equipment. The product is designed to interact with customers that would not participate in an air conditioning or heat pump product on their own. To achieve this objective, Xcel Energy product staff train trade partners that primarily serve residential customers on equipment installation practices. The staff also help trade partners and customers with the rebate application process.

For customers to qualify for a rebate, trade partners must install equipment following a Quality Installation (QI) standard, defined by the Air Conditioning Contractors of America (ACCA) for air conditioners and heat pumps.[2] Trade partners must also document that the installed equipment met rebate eligibility requirements. To verify whether trade partners followed installation protocols, Xcel Energy uses a third-party contractor to perform measurement and verification (M&V) on a sample of projects The M&V contractor sends findings to the trade partners to let them know how they performed on the QI inspection, and Xcel Energy provides QI training and testing through a web application called Brainshark so trade partners can continue to improve their performance. Xcel Energy also trains trade partners who engage with the product on various cooling-related topics through semiannual trade partner training webinars. For most rebates offered through the product, Xcel Energy requires trade partners to be North American Technician Excellence (NATE) certified.[3] To address this potential barrier of applying for NATE certification, the product reimburses trade partners for NATE certification costs.

[1] The products selected for evaluation in 2021 include: ENERGY STAR New Homes (CO), C&I New Construction (CO), High Efficiency AC (CO), Home Lighting (CO), Compressed Air (CO), Compressed Air (MN), Commercial Efficiency (MN), Process Efficiency (MN), Low-Income Home Energy Squad (LIHES), Home Energy Savings Program (HESP), and Multi-Family Energy Savings Program (MESP).
[2] The 2020 application required trade partners to input data from their QI procedures. In 2021, Xcel Energy removed this section from the application form to streamline the application process.
[3] However, no QI or NATE certification is required for mini-split heat pumps or western cooling controls (WCC).

Additionally, Xcel Energy provides a range of financial incentives to encourage customers to purchase and install high-efficiency (HE) air conditioning and heat pump equipment. Many of the rebate levels changed in 2021, identified below in Table 1-1.

Table 1-1. Residential Heating and Cooling Product 2021 Rebate Changes

Change Description	Previous Rebate Amount	2021 Rebate Amount
Reduced the AC SEER 13-14 QI rebate	$300	$200
Increased the mini-split heat pump (15+ SEER) rebate	$300	$500
Increased the air source heat pump (15+ SEER) with QI rebate and added back-up heat source component	$500	$800
Added a rebate for cold-climate air source heat pumps (18+ SEER) with QI and back-up heat source.	N/A	$1,000
Added a rebate for cold-climate mini-splits (18+ SEER) with back-up heat source that meets Xcel Energy's definition of cold-climate heat pumps	N/A	$600
Increased ground source heat pump rebate for electric resistance heat as previous heat source	$300/heating ton	$1,500/heating ton
Added ground source heat pump rebate for gas heat as previous source or for new homes	N/A	$2,000/heating ton

In prior years, Xcel Energy required that air conditioning equipment be certified by the Air Conditioning, Heating, and Refrigeration Institute (AHRI) to ensure that it met energy efficiency specifications. However, due to market shifts stemming from COVID-19, demand outstripped supply during 2020. Therefore, in 2021, Xcel Energy dropped the certification requirement and offered customers who bought uncertified equipment the equivalent of the lower tier rebate. The theory behind this change was to continue to motivate customers and trade partners to perform QI despite not being able to confirm equipment certification. Xcel Energy adopted this approach moving forward.

In 2021, Xcel Energy combined its cooling offering with its heating offering to provide a comprehensive HVAC approach to its customers. The application process was also adjusted to make it easier for trade partners to enter information into the online application form. In 2021, trade partners no longer needed to enter all of the QI data. Instead, they were required to keep

their QI documentation on file for review if the project was selected for M&V. This change was expected to make the application process easier for trade partners.

Table 1-2 outlines customer product participation and measure-level savings from January 2020 – December 2020. Overall savings were primarily driven by SEER 15 air conditioners. While the heat pump market is growing, mini-split heat pumps and air source heat pumps together only made up 6% of the total electric savings for the product in 2020.

Table 1-2. Colorado Air Conditioner & Heat Pump Product Savings & Quantity, January – December 2020

Strata	Units	kWh	kW	Therm
Air Conditioners (SEER 15 or greater)	4,545	3,385,258	3,117.26	394,093
Air Conditioners (SEER 13-14)*	2,227	982,168	781.96	146,125
Mini-Split Heat Pumps	408	246,421	377.79	-
Air Source Heat Pumps	59	33,390	27.91	-
Ground Source Heat Pumps	11	256,879	88.87	-
Total	**7,250**	**4,904,116**	**4,393.79**	**540,218**

Source: These numbers are based on aggregated data provided to TRC in March 2021.

1.2 Evaluation Overview

The 2021 of the Residential Heating and Cooling Product evaluation consisted of an impact evaluation and a process evaluation. The impact evaluation focused on estimating a net-to-gross ratio (NTGR), while the process evaluation focused on customer and trade partner experiences with the product. The evaluations consisted of the following four objectives.

1. Estimate product influence on customers decisions (NTGR).
2. Collect feedback on trade partner and participating customer experiences with the rebate and QI processes to understand motivations for participation, perceptions of the most successful or valuable aspects of the product, and perceptions of the most challenging aspects of the product.
3. Identify barriers to participation in the product, particularly by investigating why trade partners and participating and nonparticipating customers may install equipment outside of the product.
4. Explore ways to grow the heat pump market. In doing so, TRC explored a variety of related topics, including how trade partners talk to their customers about the perceived benefits of heat pumps, whether trade partners specialized in the types of heat pumps they install, and the potential for midstream mini-split rebates.

Table 1-3 presents an overview of the research topics and data sources used in the evaluation of the Colorado Residential Heating and Cooling Product.

Table 1-3. Evaluation Summary Table

Primary Research Objectives	Staff Interviews (n=4)	Participating Participant Surveys (n=100)	Participating Customer Interviews (n=8)	Nonparticipating Customer Surveys (n=70)	Participating Trade Partner Interviews[a] (n=18)	Nonparticipating Trade Partner Interviews[b] (n=13)	Peer Utility Benchmarking Interviews (n=6)
Estimate an overall NTGR including the major drivers of free-ridership, spillover, and market effects		X	X	X	X	X	X
Collect feedback on product experiences	X	X	X		X	X	X
Identify barriers to participation	X	X	X	X	X	X	
Explore ways to grow the heat pump market		X	X	X	X	X	X

[a] *Participating trade partners were divided into two groups for interview prioritization, tier 1 and mid-tier trade partners. The evaluation team determined these categorizations based on the number of projects completed by the participating trade partners since the beginning of 2021. The eight tier 1 participating trade partners interviewed were among the top fourteen trade partners who completed the most projects in 2021. The ten mid-tier participating trade partners interviewed all completed at least four projects in 2021 and were prioritized for interviews based on the most projects completed.*

[b] *Nonparticipating trade partners were those who completed three or fewer projects in 2021 or whose participation in the product lapsed.*

1.3 Report Organization

The following sections organize our evaluation approach and findings into two components: impact and process evaluation results.

- Section 2 reviews the approach and results of the impact evaluation and the attribution of product impacts using a standard NTGR analysis.
- Section 3 discusses the process evaluation components, including product experience and satisfaction, motivations and barriers to participation, and the Colorado heat pump market and opportunities for growth.
- Section 4 contains the evaluation team's conclusions and recommendations.
- Supporting documents, such as the evaluation plan, data collection instruments, and task-specific findings, can be accessed in this report's appendices.

2 Impact Findings

A central component of this evaluation was the estimation of the net-to-gross ratio (NTGR) for the air conditioning and heat pump measures within the Xcel Energy Residential Heating and Cooling Product in Colorado. For DSM products, the NTGR is a metric that estimates the influence of the product on the target market. It is used both as a benchmarking indicator of effectiveness and to adjust reported gross energy savings to account for energy efficiency that would occur in the absence of the product. NTGR results can indicate opportunities for Xcel Energy to adjust the design and implementation of its products to increase the cost-effectiveness of both individual products and the entire portfolio. The NTGR includes several factors that create differences between gross and net savings, such as free-ridership and spillover. In prior years, Xcel Energy Colorado relied on stipulated NTG values of 0.68 for all air conditioning measures and 1.00 for all heat pump measures.

TRC estimated a retrospective NTGR based on data reported by customers and trade partners. The evaluation team then recommended prospective NTGRs based on potential changes to the product's design and market conditions. Note that a NTGR of 1.00 may not be achievable in all cases, as eliminating all free-ridership may not be feasible for a product operating at significant scale. In addition, a variety of factors, including the maturity of the product, the maturity of the technologies it promotes, product intervention strategies, and cross-product coordination strategies, affect the achievable level of free-ridership. The evaluation team has taken care to present NTGR results with this context in mind.

This section presents:

- **Key Impact Findings –** The key findings section presents the recommended NTGR based on the evaluation team's synthesis of findings from customers and trade partners.
- **Net-to-Gross Approach –** The approach section presents an overview of the evaluation team's methods to estimating the recommended NTGR.
- **Retrospective Net-to-Gross Ratio Inputs –** This section presents qualitative and quantitative data that support the NTGR estimations.
- **Prospective Net-to-Gross Considerations –** This section presents findings the evaluation team considered when recommending its prospective NTGR.
- **Peer Utility Net-to-Gross Comparisons –** This section presents NTGR ratios across peer utilities included in this evaluation.

2.1 Key Impact Findings

This section presents a summary of the key findings from the impact evaluation for the Colorado Residential Heating and Cooling Product, including retrospective and prospective NTGR recommendations. The evaluation team provides its estimated retrospective NTGRs, based on the quantitative and qualitative results from data collection efforts with participating customers , nonparticipating customers, participating trade partners, and nonparticipating trade partners. We

then provide the recommended prospective NTGR, based on potential changes to product design and the residential air conditioning and heat pump markets.

2.1.1 Retrospective Net-to-Gross Ratio

TRC estimated an overall NTGR for air conditioning and heat pump equipment within the Residential Heating and Cooling Product. The evaluation team developed this estimate based on estimating separate retrospective NTGRs for the equipment rebate and QI components of the product. The evaluation team weighted the two component results by product savings to estimate an overall retrospective NTGR of 0.71. We estimated this score based on data collected from participating customers, nonparticipating customers, participating trade partners, and nonparticipating trade partners.

To estimate the NTGR, the evaluation team took the following steps:

- TRC first estimated unweighted free-ridership ratios to be 0.41 for equipment rebates and 0.21 for QI. We based these values on participating customer surveys and included any adjustments based on follow-up interviews with customers that we conducted to clarify survey results. TRC found trade partners to be highly influential, as participating customer respondents rated their trade partners as the most influential product factor by over a quarter of participants. Additionally, trade partners rated the influence of the product very highly on their likelihood to sell efficient equipment and conduct product-eligible QI.
- These results were weighted to be representative of the population by kWh, which adjusted the free-ridership scores to 0.39 for equipment rebates, while the QI free-ridership score remained 0.21.
- The evaluation team also analyzed spillover to determine if any survey respondents installed additional energy efficiency equipment as a result of participating in the Residential Heating and Cooling Product and without participating in an Xcel Energy rebate offering. The evaluation team found no evidence of quantifiable spillover for either equipment rebates or QI components.
- The evaluation team included a 1% adder for market effects to the equipment rebate NTGR. Participating trade partners felt the product increased the amount of efficient equipment they installed; however, nonparticipating trade partners reported limited impact, thereby limiting the amount of market effects attributable to the product. The evaluation team included a 3% adder for market effects to the QI NTGR. We found slightly higher market effects for QI compared to equipment rebates because participating trade partners reported the product helped them imbed QI practices in their service offering, and participating trade partners now see QI is as competitive advantage in the market.
- To calculate the overall NTGR, the evaluation team subtracted the free-ridership ratio from 1.00, then added the market effect results. This brings the equipment rebate NTGR to 0.62 and the QI NTGR to 0.82.
- When the evaluation team applied these two NTGR to the overall product, based on relative energy savings, it estimated an **overall retrospective NTGR to be 0.71.** Detailed methodology for the NTGR calculation can be found in Section 2.2.

2.1.2 Prospective Net-to-Gross Ratio

Due to expected changes in the market and varying implementation strategies for each measure in the Residential Heating and Cooling Product in Colorado, the evaluation team recommends Xcel Energy continue to apply measure-based NTGRs prospectively. Based on evaluation results, TRC recommends the following:

- Apply a 0.73 NTGR to air conditioning equipment (both SEER 13/14 and SEER 15+). This value is based on the retrospective SEER NTGR specific to air conditioners. TRC recommends re-evaluating this prospective NTGR if Xcel Energy makes major adjustments to its rebate values.
- Apply a 0.57 NTGR to mini-split heat pumps. This value is based on the retrospective NTGR for mini-split heat pumps, which considers the mini-split heat pump free-ridership value of 0.44 and the 0.01 market effects adder. Xcel Energy's influence on this measure type will likely be unique, given its ability to support beneficial electrification opportunities. However, because this result is based on a limited sample size and the heat pump market is expected to change in the coming years, TRC recommends Xcel Energy re-evaluate this value if Xcel Energy changes its program design related to mini-split heat pumps and/or if Xcel Energy sees greater participation of this measure in its product
- TRC recommends not changing the air source heat pump NTGR until Xcel Energy sees greater participation of this measure. The evaluation team only spoke to 2 of the 6 participating customers who received an air source heat pump and, therefore, cannot recommend a prospective NTGR for this measure at this time.

2.2 Net-to-Gross Approach

The NTGR assessment aims to estimate the percentage of savings achieved that can be attributed to product actions. The NTGR value includes multiple metrics, which are described in the sections below. To determine the NTGR, the evaluation team primarily used participating and nonparticipating customer self-report surveys and participating and nonparticipating trade partner interviews to assess product attribution, including free-ridership, spillover, and market effects metrics. The evaluation team based its methodology on the Illinois Technical Reference Manual (TRM),[4] as this type of approach is used extensively in other jurisdictions, both by the evaluation team and outside industry experts, and because it was the basis of the NTGR approach for the evaluation of the 2019 Xcel Energy Minnesota Cooling Evaluation, which estimated a NTGR for similar measures.

The evaluation team estimated a retrospective and prospective NTGR value for both the equipment rebate and QI components of the Residential Heating and Cooling Product before calculating the NTGR for the product as a whole. The equipment rebate NTGR applies to SEER 15+ air conditioners, air source heat pumps, and mini-split heat pumps; it does not apply to SEER 13/14 air conditioners since the rebate for that equipment is based on QI savings. Similarly, the QI NTGR applies to all air conditioners and air source heat pumps; it does not

[4] Illinois Energy Efficiency Stakeholder Advisory Group. Illinois Statewide Technical Reference Manual, Version 9.0, Volume 4, Attachment A: IL-NET-TO-GROSS Methodologies, Section 4. September 25.

apply to mini-split heat pumps, since QI is not required for mini-split heat pumps. The remainder of this section presents the evaluation team's methodology for estimating the retrospective and prospective NTGRs.

The data inputs to the NTGR analysis included:

- **Participating customer surveys –** focused on project-level effects, including free-ridership and participating customer spillover
- **Follow-up interviews with participating customers –** sought to clarify any conflicting information in the participating customer surveys
- **Participating trade partner interviews –** focused on determining overall market effects and whether trade partners were influenced by Xcel Energy
- **Nonparticipating trade partner interviews –** focused on determining overall market effects and whether nonparticipating trade partners were influenced by Xcel Energy.
- **Nonparticipating customer surveys –** focused on understanding nonparticipating customer spillover

The evaluation team initially developed the participating customer survey sample to reach a 90% level of confidence with a minimum of +/- 10% relative precision at the product level. We also attempted to survey participating customers based on the equipment rebated through the product – whether the participating customer installed a SEER 13-14 air conditioner, SEER 15+ air conditioner, an air source heat pump, or a mini-split heat pump. Table 2-1 shows the type of equipment and number of respondents by strata.

Table 2-1. Number of Residential Heating and Cooling Product Participating Customer Survey Respondents by Strata

Strata	Equipment	Completes
QI Only	Air Conditioners (SEER 13-14)	18
Efficient Equipment & QI	Air Conditioners (SEER 15 or greater)	54
Efficient Equipment & QI	Air Source Heat Pumps	2
Efficient Equipment Only	Mini-Split Heat Pumps	26
Total		**100**

The evaluation team used self-reported data from participating customer respondents to develop an initial free-ridership score. Data from the additional sources listed above were then

used in constructing a logical narrative of product attribution and in finalizing the retrospective and prospective NTGRs for the product.

The NTGR relies on three key components, a free-ridership score, a spillover score, and a market effects adder. The following sections define each of these key components and explain how they are combined to estimate the NTGR.

2.2.1 Free-Ridership

Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Free-ridership is assessed on a scale from 0 to 1, where 1 indicates that the product had 100% free-ridership and all product savings would have occurred without any of the product's rebates or assistance.

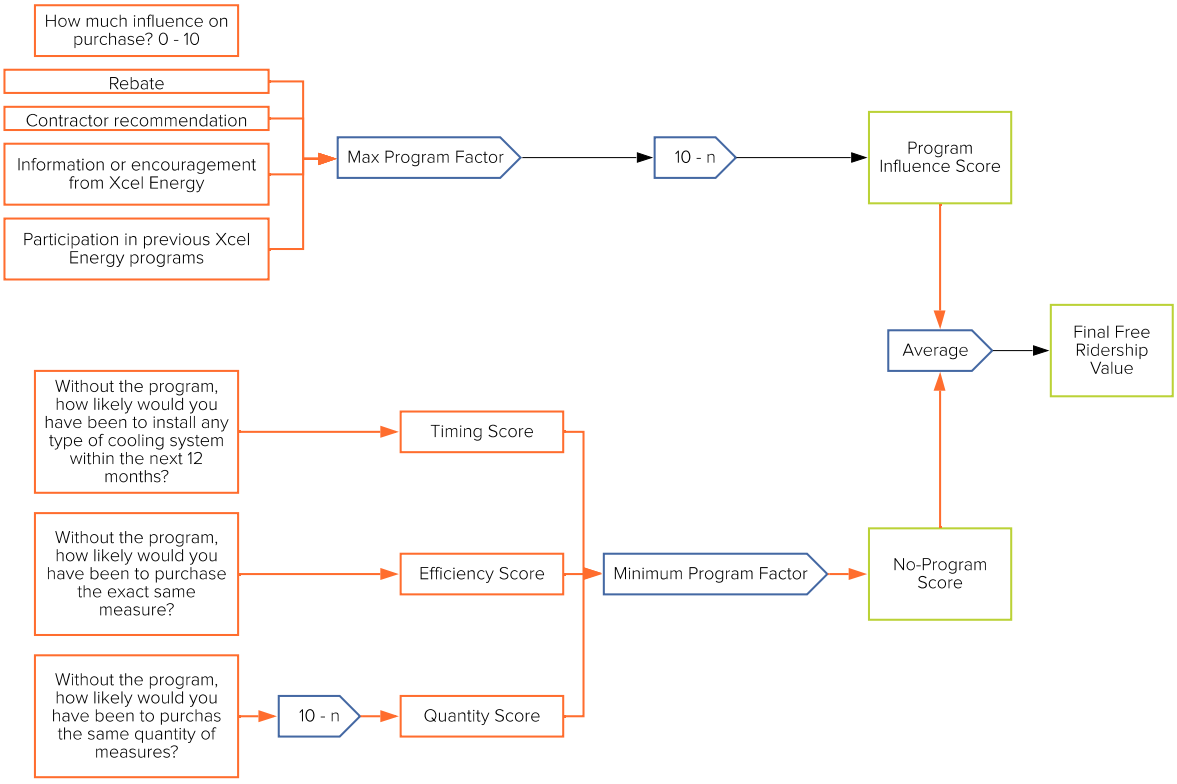
To determine free-ridership for both the equipment rebate and QI components of the product, the evaluation team started with the Residential Prescriptive Rebate (With No Audit) Protocol from the Illinois TRM, and wrote specific questions to assess four free-ridership metrics:

- **A Product Components Score**, based on participating customers' perceptions of the importance of various product components in their decision to carry out energy efficiency projects.
- **A No-Product Score**, based on participating customers' intentions to carry out energy efficiency projects without product support.
- **A Timing Adjustment**, based on participating customers' perceptions of when they would have carried out the project in the absence of the product.
- **A Quantity Adjustment**, based on participating customers' intentions to carry out their energy efficiency projects with the exact same quantity without the product.[5]

Altogether, these metrics assessed the likelihood of free-ridership on a scale of 0 to 10. The Product Components Score and the No-Product Score were averaged together and then adjusted to account for whether the product influenced customers to install the measures sooner than they would have otherwise and/or adjusted the number of measures installed. This adjustment then produced the final free-ridership score. Figure 2 describes the logic used for calculating free-ridership for the Residential Heating and Cooling Product.

[5] The quantity adjustment was only applicable to the equipment rebates NTGR.

Figure 2-. Free-Ridership Calculation Methodology



((Program Influence Score) + (No-Program Score)) / 2

For the Products Component Score, the evaluation team included the following items as product factors that might have influenced the customer to pursue installation of energy-efficient equipment:

- The availability of the rebate
- Information or encouragement received from Xcel Energy
- Contractor recommendation
- Participation in a previous Xcel Energy product

To understand the influence Xcel Energy had on customers' choice to receive QI services, the evaluation team asked participating customers if they knew they received QI services. If they were aware, the evaluation team asked the same set of questions used for the equipment rebates approach but adjusted questions, as needed, to account for the installation process, rather than the equipment purchase. The evaluation team also asked participating customers about the influence of the Xcel Energy verification of QI processes. If respondents were not aware they received QI services, the evaluation team only asked the equipment rebate-related questions.

The evaluation team assessed free-ridership primarily using participating customer self-report surveys and integrated participating and nonparticipating trade partner interviews where applicable. For example, when customer survey respondents rated trade partners as highly influential on their decisions to install a measure but indicated free-ridership elsewhere in the survey, the evaluation team reviewed trade partner responses to assess the product's influence on their practices. Doing this helped the evaluation team better understand a trade partner's role in a participating customer's product participation, and whether a participating customer under or over-valued the product's influence on their equipment decisions.

2.2.2 Spillover

Spillover is a measure of the amount of energy savings that occur due to the product that are not captured in the product's claimed energy savings. For this evaluation, spillover is composed of both participant and nonparticipant customer spillover. To be eligible for spillover, customers must have:

1. Installed additional efficient air conditioning or heat pump equipment or other energy efficiency equipment after participating in the product;
2. Not received rebates for this equipment (and not be in the process of applying for rebates); and
3. Been influenced to install this equipment by the Colorado Residential Heating and Cooling Product.

We explain how we calculated both participant and nonparticipant spillover below.

Participant Spillover. The spillover metric represents additional energy savings achieved by product participants as a result of product activities, but not accounted for by Xcel Energy. The evaluation team incorporated two measure attribution scores; the first incorporates the influence the product had on the purchase of additional measures (measure attribution score #1), and the second incorporates likely actions taken in absence of product participation (measure attribution score #2). The spillover score, as calculated below, must be greater than five in order for an additional measure to qualify as spillover. When this criterion is met, the savings are added to product attributable savings.[6]

Equation 2-1. Participation Spillover Calculation

$$Spillover\ Score = \frac{Measure\ Attribution\ Score_1 + (10 - Measure\ Attribution\ Score_2)}{2}$$

Nonparticipant Spillover. The evaluation team estimated nonparticipant spillover by using the IL TRM "Nonparticipant Spillover Measured from Customers" Protocol (NPSO Protocol).[7] TRC defined nonparticipating customers as those customers who have no record of having completed an air conditioner or heat pump project in Xcel Energy's Salesforce system (i.e.,

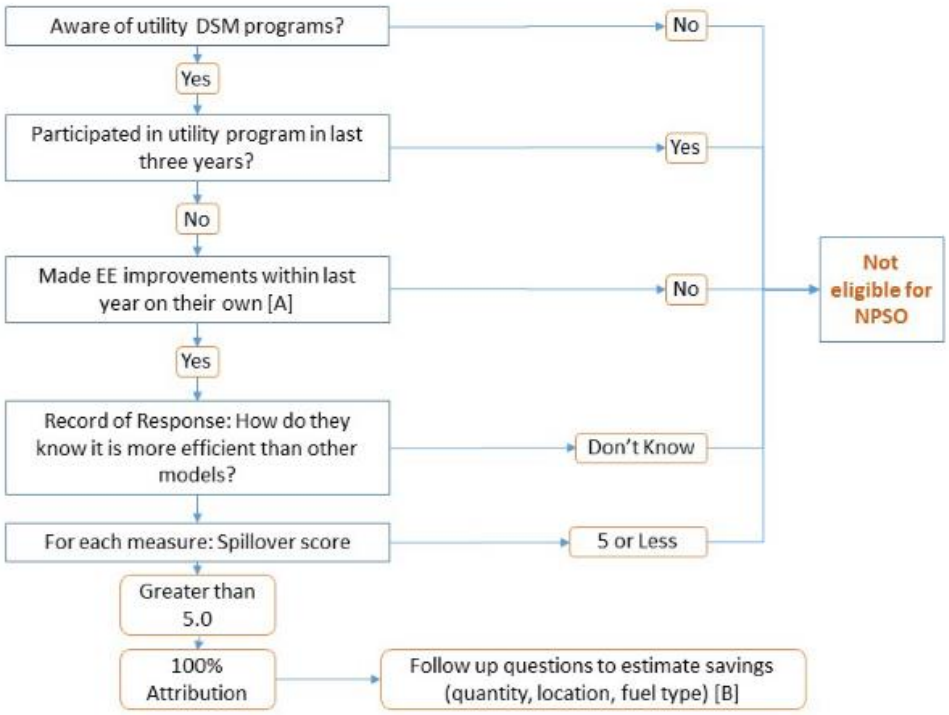
[6] IL TRM Version 9, Volume 4, page 64-65.

[7] IL TRM Version 9, Volume 4, page 66-68.

have not participated since 2012). The survey asked nonparticipating customers if they completed any qualifying air conditioning or heat pump projects but did not receive a rebate.

To determine spillover-qualified equipment, the evaluation team first determined whether the customer knew about Xcel Energy's energy efficiency products and/or marketing messages. If the customer was aware, the survey asked if they or anyone in their household made an energy efficiency improvement within the last year, and if so, what improvements they made. Responses to these questions generated a list of potential spillover measures (shown at point "[A]" in Figure 2-1). Customers were asked how they knew the measure was more efficient than other models. If the respondent named an efficiency level that was above the minimum federal standard, or if they identified a technology (or QI procedures) that TRC could confirm was above the minimum federal standard, it counted towards nonparticipant spillover.

Figure 2-1. Nonparticipant Spillover Question Logic[8]



Note: TRC used the threshold of participation since 2012, rather than the last three years, due to the longer lifespan of cooling equipment, and given when projects began being tracked in Salesforce.

Similar to participant spillover, the evaluation team incorporated two measure attribution scores. The first incorporated the influence the utility had on the purchase of this additional measure (measure attribution score #1), and the second incorporated whether the customer would have installed the measure had they not been influenced by the product (measure attribution score

[8] As depicted in the IL TRM Version 7, Volume 4, Figure 4-1, page 51.

#2). The spillover score, as calculated below,[9] must be greater than five in order for the additional measure to qualify for spillover.

Equation 2-2. Nonparticipant Spillover Score

$$NPSO\ Score = \frac{Measure\ Attribution\ Score_1 + (10 - Measure\ Attribution\ Score_2)}{2}$$

2.2.3 Market Effects

The trade partner interviews offered important insights into market effects of the product. Such "market effects" signify a transformation in the underlying structure and functioning of the market. Market effects can take many forms and may result from product impacts in a market over time. Examples of market effects include trade partners changing their business models based on the influence of the product—for instance, a trade partner may be more likely to promote high-efficiency air conditioning and heat pump equipment to residential customers knowing that a rebate is available for customers. Over time, the trade partner builds this into their general approach to marketing and selling air conditioning and heat pump measures. Our interview guide also included questions to assess long-lasting changes to trade partner practices. Based on expertise, the evaluation team found that market effects typically fall between 0-0.05, with 0 meaning no market effects from a product and 0.05 meaning large market effects from a product. We estimate the market effects value based on qualitative feedback from customers and trade partners to understand the effect the product has had on its respective market.

2.2.4 Determination of Net-to-Gross Ratio

The evaluation team estimated separate initial NTGRs for the equipment rebates and QI components of the Colorado Residential Heating and Cooling Product using the formula shown in Equation below:

Equation 2-3. Generalized Net-to-Gross Ratio

$$NTGR = 1 - (Free - Ridership) + (Spillover\ Ratio) + (Market\ Effects\ Adder)$$

Finally, the evaluation team utilized all the information collected about the product (through the customer and trade partner data collection efforts) to construct a logical, internally consistent, and coherent narrative of product attribution that attempted to identify all possible pathways of Xcel Energy influence, both through the equipment rebates and QI offerings of the product. Based on these results, the evaluation team recommended final summative NTGRs for both equipment rebates and QI that are consistent with this narrative.

2.3 Retrospective Net-to-Gross Ratio Inputs

As described in the approach section, the recommended retrospective NTGRs for equipment rebates and QI are based on three primary data inputs: the Free-Ridership Score, the Spillover

[9] IL TRM Version 7, Volume 4, page 35-36.

Score, and the Market Effects Adder. This section explores each of these results in more detail, including qualitative data that support the results for both equipment rebates and QI through the Residential Heating and Cooling Product. TRC first presents equipment rebate results, then QI results, and concludes with the overall product NTGR.

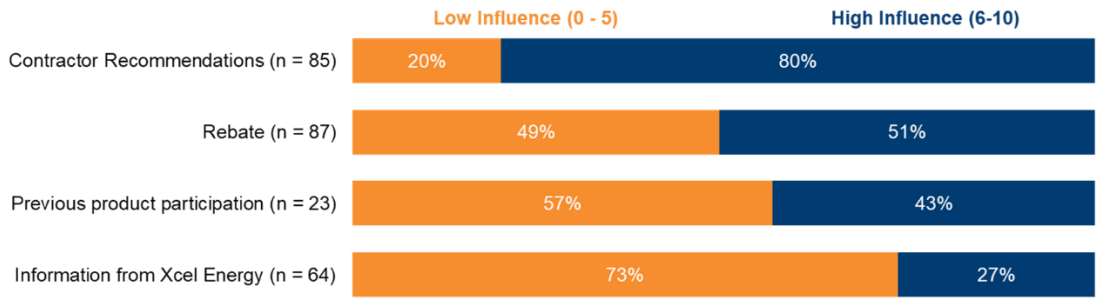
2.3.1 Equipment Rebates: Free-Ridership Results

This section presents results related to the four metrics (the Product Components Score, the No-Product Score, the Timing Adjustment, and the Quantity Adjustment (for equipment rebates only) used to estimate the final equipment rebate free-ridership value of 0.39.

Equipment Rebates: Product Components Score

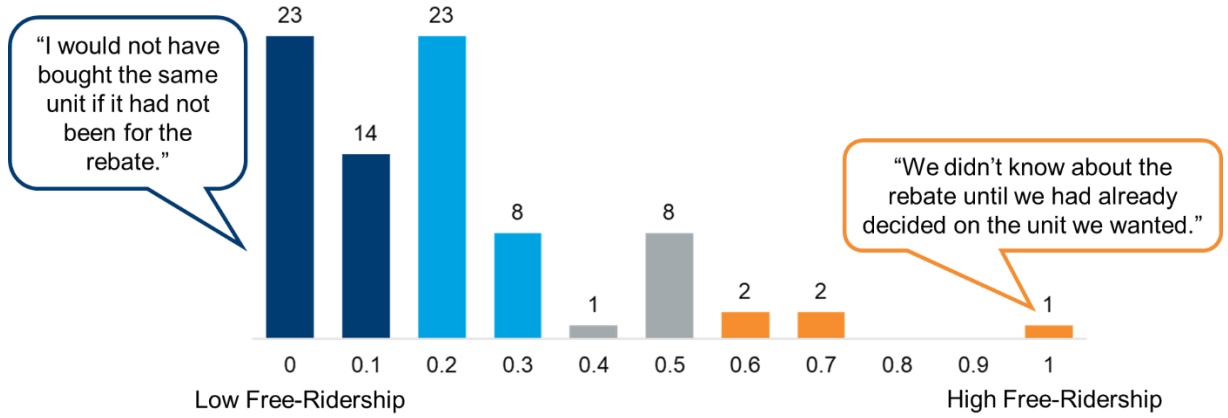
The evaluation team estimated the unweighted Product Components Score for equipment rebates as 0.17. To estimate this number, TRC first asked respondents to rate the overall influence of various product elements on their choice to install-high efficiency equipment on a scale of 1 to 10. Figure 2-2 shows each product component. The percentage of respondents attributing significant influence for a particular component have been shown in blue, while the percentage of respondents attributing little influence for a component have been shown in orange. Respondents rated contractor recommendations and the product rebate as the most important to their decision to install a high-efficiency air conditioner or heat pump.

Figure 2-2. Equipment Rebate Product Components Scores by Degree of Influence



To determine the Product Components Score for each respondent, the evaluation team took the top-rated product component, shown above in Figure 2-2, and reversed the scale, so a “10” was now a “0” and adjusted the score to fall between “0” and “1.” We did this to have matching scales with the No-Product Score and thereby more easily calculate free-ridership. We then averaged all of the Product Components Scores to create an overall unweighted Product Components Score of 0.17. Figure 2-3 shares distribution details for this score, where we have categorized the number of respondents by their Product Components Score, rounded to the nearest tenth. A score closer to 0 indicates the product has a high level of influence. Only one customer, shown on the far right in Figure 2-3, was considered a free-rider based on the Product Components Score. Over one-fourth of respondents were considered “0%” free riders.

Figure 2-3. Distribution of Equipment Rebate Product Components Scores



The Product Components Score of 0.17 indicates that the Residential Heating and Cooling Product played a highly influential role in customer decisions to install equipment through the product. However, since the Product Components Score does not take into account what would have happened in the absence of the product, it typically underestimates free-ridership and is balanced by the No-Product Score, discussed in the next section. The evaluation team averaged the Product Components Score and the No-Product Score together to estimate an initial free-ridership score for each participating customer respondent.

Equipment Rebates: No-Product Score

TRC estimated the average unweighted No-Product Score to be 0.72 for equipment rebates. The No-Product Score is a measure of how likely customers are to have installed identical equipment without the influence of the product. In contrast to the product component score, which asks how influential the product was on a customer's decision to install equipment, the No-Product Score asks whether that decision would have been different absent the product.

To estimate this score, the evaluation team asked participating customer survey respondents about the likelihood they would have installed the exact same equipment within the next twelve months without the product. Most customers reported they would have installed the same measure without the product, with an average score of 7.4 out of 10, where 0 is not at all likely and 10 is extremely likely, as shown in Figure 2-4. Thirty four percent (n=28) of respondents rated their likelihood of completing the exact same project as a ten, suggesting high free-ridership for those participants. This free-ridership was often driven by rebates not being large enough to make a difference in the customer decision-making process or a respondent's lack of awareness about the rebate before initiating product participation. One participating customer with high free-ridership said:

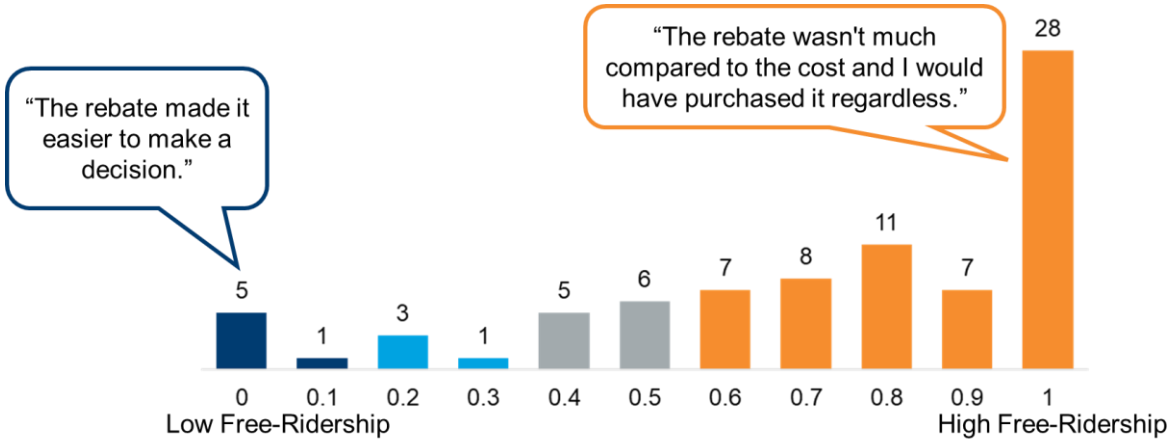
> *"Quite frankly [the rebate] didn't make a difference."*

Another respondent with high free-ridership reported:

> *"[The rebate] played no part in our decision at all, because it was only after the fact that we knew about it."*

Five total participants rated their likelihood to install the exact same measures as a zero out of ten, suggesting low free-ridership for those participants.

Figure 2-4. Equipment Rebate No-Product Score



Equipment Rebates: Timing Adjustments

The evaluation team made zero timing adjustments for participating customers who participated in equipment rebates because no respondents indicated equipment that was installed sooner than it would have been without the product.

Equipment Rebates: Quantity Adjustments

The evaluation team made zero quantity adjustments for participating customers who participated in equipment rebates. To determine this, participating customers were asked the likelihood that they would have purchased fewer equipment if the product had never existed. In response, zero participating customer respondents said that they would have installed a different quantity of equipment without the product.

Equipment Rebates: Free-Ridership Adjustments due to Consistency Checks

As a consistency check, the evaluation team reviewed responses for participants with Product Components Scores that conflicted with their No-Product Scores (i.e., when respondents stated that they were highly influenced by a product factor but also that they would have been highly likely to complete the same project in the absence of the product). When discrepancies were found between these participants' responses, TRC followed up with respondents via telephone. If we were not able to reach a respondent and their qualitative findings were similar to another respondents, we applied a similar adjustment.

The evaluation team identified 22 respondents for follow-up telephone interviews. However, we were only able to conduct follow-up interviews with eight total respondents. Through these telephone interviews and internal consistency checks, the evaluation team made 22 score adjustments. These free-ridership scores were adjusted down to account for instances where we determined that the respondent under-stated the influence of the product in their initial responses. Adjustments were primarily made when open-ended responses indicated that the

rebate played a more significant impact in their decision to participate in the product than their quantitative responses reflected. Based on these adjustments, the evaluation team calculated the final adjusted, unweighted equipment rebate free-ridership score to be 0.41.

Equipment Rebates: Final Free-Ridership

To develop the final free-ridership score for equipment rebates, the evaluation team weighted each individual free-ridership score by the proportion of its associated savings within the sample so that the score would be representative of population-level savings. In other words, respondents with projects with a larger share of total kWh were weighted more heavily, as they had more influence on total product savings. With the sampling weights applied, the free-ridership ratio for equipment rebates came out to 0.39.

To understand if free-ridership varied by measure type, the evaluation team estimated a free-ridership score for each of the measure types included in the equipment rebate analysis, as shown in Table 2-2 below. As a reminder, we did *not* ask these questions to participating customers who received SEER 13 or SEER 14 air conditioners, because their rebate was based entirely on QI. Mini-split heat pumps had the highest free-ridership, with an averaged free-ridership score of 0.44. SEER 15+ air conditioners had an average free-ridership score of 0.40, and air source heat pumps had a score of 0.36.

Table 2-2. Average Free-Ridership Scores by Measure Type

Measure Type	Average Free-Ridership Score
Mini-split Heat Pump (n = 26)	0.44
AC SEER 15+ (n = 54)	0.40
Air Source Heat Pump (n = 2)	0.36

2.3.2 Equipment Rebates: Spillover Results

Spillover is a measure of the amount of energy savings that occur due to the product that are not captured in the product's claimed energy savings. The evaluation team found no evidence of quantifiable spillover for the equipment rebates offered through the Residential Heating and Cooling Product. The following sections outline findings relating specifically to participating customer and nonparticipating customer spillover for equipment rebates.

Equipment Rebates: Participating Customer Spillover

Since participating in the product, 6 of 100 participating customer respondents indicated they had installed energy-efficient equipment after participating in the product, but none reported to have been influenced by their participation in the Residential Heating and Cooling Product. Therefore, the evaluation team did not factor in any participating customer spillover to the free-ridership score.

Equipment Rebates: Nonparticipating Customer Spillover

For nonparticipating customers, 12 of 70 reported installing an energy-efficient air conditioner or heat pump in their home in the past year, but none reported to have been influenced by the Residential Heating and Cooling Product. Therefore, the evaluation team did not factor in any nonparticipant spillover to the free-ridership score.

2.3.3 Equipment Rebates: Market Effects

In addition to free-ridership and spillover, the evaluation team also analyzed market effects for the equipment rebates. We applied a 0.01 adder for market effects to the equipment rebate free-ridership score, due to the influence of the Xcel Energy Residential Heating and Cooling Product on the Colorado market. While this adder is not always relevant in impact evaluations, it is appropriate in cases where the product has had significant impact on the marketplace.

The evaluation team estimated the 0.01 adder based on feedback from trade partner interviewees, who reported that the equipment rebates were important in influencing their decision to recommend that a customer install energy-efficient equipment at their facility. On average, trade partners said the amount of energy-efficient equipment would decrease if the product did not exist, with air conditioners sales decreasing by about 18% and heat pump sales decreasing by 3%. These reflections are highlighted in the following two quotes:

> *"It's clear that it helps [us] market equipment, [the product] has a profound effect. Without the rebate, we would see reduced revenue [and] less opportunities."*

> *"Rebates sell systems. Period."*

While the evaluation team recognizes the impact the product has had on the Colorado market, it does not recommend including any more than 0.01 to the market effects adder since nonparticipating trade partners did not describe strong evidence of the product influencing the overall high-efficiency air conditioning and heat pump market in Colorado.

2.3.4 Equipment Rebates: Retrospective Net-to-Gross Ratio

Overall, the evaluation team found that the product impacted participating customer decisions to purchase high-efficiency air conditioning and heat pump equipment. Using the net-to-gross formula, shown in Equation 2-4 below, the evaluation team estimated the equipment rebates NTGR to be 0.62. This is based on the free-ridership ratio of 0.39, which was driven by customers being influenced by their trade partner, who reported to be influenced by the product. Free-ridership most often occurred when participating customer respondents reported that the rebates were not large enough to make a difference in their decision-making process or that they were not aware of the equipment rebate before initiating product participation. The evaluation team did not find any evidence of spillover, and it added a 0.01 adder for market effects to account for the product's impact on trade partners.

Equation 2-4. Residential Air Conditioner and Heat Pump Equipment Rebates Net-to-Gross Ratio

$$NTGR = 1\text{-}(Free\ Ridership) + (Spillover) + (Market\ Effects)$$

$$0.62 = 1 - (0.39) + (0) + (0.01)$$

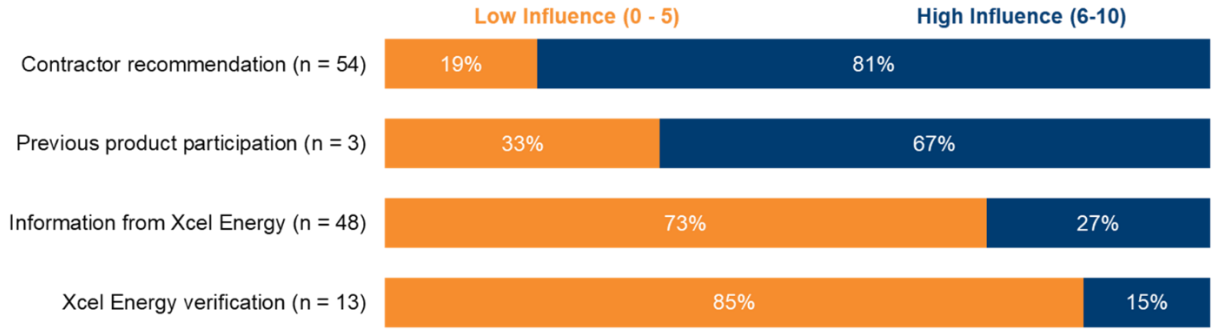
2.3.5 QI: Free-Ridership Results

Like the equipment free-ridership results, this section presents the free-ridership metrics (e.g., Product Components Score, No-Product Score, and timing adjustment) used to estimate the final QI free-ridership value of 0.21. There is no quantity adjustment metric for QI free-ridership because QI can only occur once, versus multiple times, for participating customers. Only participating customer respondents that installed an air conditioner or an air source heat pump *and* recalled receiving QI through the product were considered when calculating the free-ridership score.

QI: Product Components Score

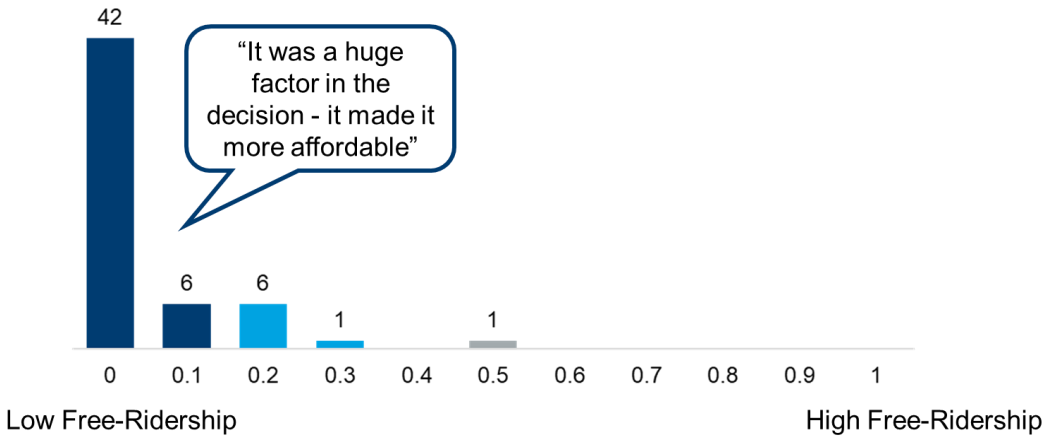
The evaluation team estimated the unweighted Product Components Score for the QI offering of the Residential Heating and Cooling Product to be 0.05. Each QI product component is shown in Figure 2-5. The percentage of respondents attributing significant influence for a particular component have been shown in blue, while the percentage of respondents attributing little influence for a component have been shown in orange. As shown in Figure 2-5, respondents rated contractor recommendation and previous Xcel Energy product participation as the most important product components influencing their decision to install an air conditioner or heat pump.

Figure 2-5. QI Product Components Scores by Degree of Influence



Similar to the equipment NTGR methods, the evaluation team took the top-rated program component for each respondent and reversed the scale, so a “10” was now a “0” and adjusted the score to fall between “0” and “1.” We then averaged all of the Product Components Scores to create an overall unweighted Product Components Score of 0.05. Figure 2-6 shares distribution details for this score, where we have categorized the number of respondents by their Product Components Score, rounded to the nearest tenth. No participants were considered free-riders based on the Product Components Score, and three-fourths (n=42) of respondents were considered “0%” free riders.

Figure 2-6. Distribution of QI Product Components Scores



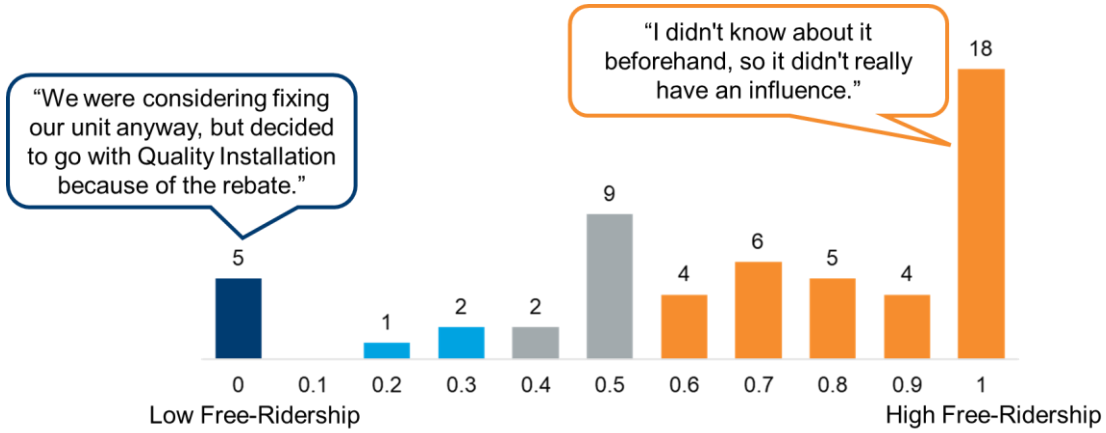
As the Product Components Score does not take into account what would have happened in the absence of the product, it typically underestimates free-ridership and is balanced by the No-Product Score, discussed in the next section. The evaluation team averaged the Product Components Score and the No-Product Score together to estimate an initial free-ridership score for each respondent.

QI: No-Product Score

TRC estimated the average unweighted No-Product Score for the QI offering to be 0.68. The No-Product Score is a measure of how likely customers are to have installed identical equipment without the influence of the product. In contrast to the Product Components Score, which asks how influential the product was on a customer's decision to install equipment, the No-Product Score asks whether that decision would have been different absent the product.

To estimate this score, the evaluation team asked participating customer survey respondents about the likelihood they would have pursued QI without the product. Most customers reported they would have had QI conducted without the product, with an average score of 6.8 out of 10, where 0 is not at all likely and 10 is extremely likely. The distribution of No-Product Scores, shown in Figure 2-7, show the likelihood that customers would have conducted QI over a standard installation for their air conditioning and heat pump equipment that they installed through the product. Of product participants who responded to the survey, 9% (n=5) reported they were very unlikely to have conducted the same QI without the product, while 32% (n=18) said they were likely to have conducted the same QI without the product.

Figure 2-7. No-Product Score Distribution – QI



QI Timing Adjustments

The evaluation team made zero timing adjustments for participating customers who participated in QI because no respondents indicated installation sooner than it would have been without the product.

QI Free-Ridership Adjustments Due to Consistency Checks

The evaluation team used the same process, as described in the previous section for equipment rebates, to conduct consistency checks for QI. TRC looked at both qualitative and quantitative data. When performing these checks, the evaluation team found that a large number of customers reported that they would have received QI without the product but that they would have relied on the same trade partner regardless of the product. In these instances, the evaluation team then looked at participating trade partner responses to better understand the influence the product had on trade partners' decisions to perform QI. Overall, the evaluation team found the following evidence that Xcel Energy influenced trade partners to perform QI:

- Trade partners reported differences in "standard" practice and QI, with four of eight tier 1 trade partners reporting sealing duct work as a primary difference between the practices. Another eight nonparticipating trade partners also reported they did not perform QI because duct sealing was too time intensive.
- Six of ten mid-tier trade partners also reported that the product influenced their practices, four of which reporting that they perform QI to remain competitive with larger companies.
- Additionally, eight nonparticipating trade partners mentioned that the Manual J[10] calculations were a barrier to performing QI.

[10] For residential applications, ACCA's Manual J presents the QI procedure recognized by the American National Standards Institute (ANSI). https://www.acca.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=df4aaf8b-c82b-4337-bb95-081f67444222&forceDialog=0

Due to the above evidence, the evaluation team determined the product likely impacted trade partners decision to pursue QI and, if the product disappeared, it would be less likely that customers would receive the same QI service as they received with the product. Therefore, if a participating customer reported that they would have received QI without the product and they would have used the exact some contractor no matter what, the evaluation team assumed their original score likely underestimated the role the product had in influencing their trade partner to perform QI. Through these internal consistency checks, TRC adjusted 45 free-ridership scores down. The evaluation team calculated the final adjusted, unweighted QI free-ridership score to be 0.21.

QI: Final Free-Ridership

The evaluation team averaged the Product Components Score and No-Product Score and applied sampling weights to estimate the final free-ridership score for QI. Because QI savings is the same for all measures, the weighting had a limited impact on the final score and remained at 0.21.

2.3.6 QI: Spillover Results

The evaluation team found no evidence of quantifiable participating or nonparticipating customer spillover for QI.

2.3.7 QI: Market Effects

The evaluation team applied a 0.03 adder for market effects to the QI free-ridership scores, due to the product's influence on QI practices in the Colorado market. Similar to the equipment rebates market effects analysis, the evaluation team relied on data from trade partners to determine market effects.

Trade partners who conducted QI reported that the Residential Heating and Cooling Product changed their installation practices. Seven of eight tier 1 trade partners reported that the product "raised the bar" among installers. QI providers reported they were unlikely to perform the type of QI eligible for the Residential Heating and Cooling Product if the funding and support were not available. Trade partners also described the product as influential in their decision to conduct QI for their customers, as shown in the following two quotes:

> *"Use the QI installation for every install that [we] do, that way there is no question, no lesser install because [customers] aren't getting a rebate, like the idea doing a QI."*

> *"[QI has] made team better, made company better. [We've] been on board with Ann since day one, [the product has] raised bar for installations."*

Meanwhile, 9 of 13 nonparticipating trade partners reported performing some aspects of QI to stay competitive in the market, while acknowledging that they do not perform full QI services because it remains too costly to them to perform.

Taken together, the evaluation team observed that the product has had significant impact on the Colorado market. Due to this, we recommend including a 0.03 to the market effects adder since

trade partner installation practices have been positively impacted by the Residential Heating and Cooling Product when installing air conditioners and heat pumps in Xcel Energy customers' households.

2.3.8 QI: Retrospective Net-to-Gross Ratio

Overall, the evaluation team found that the product significantly impacted participating customer decisions. Using the net-to-gross formula, shown in Equation 2-1, the evaluation team estimated a QI NTGR of 0.82. This is based on the free-ridership ratio of 0.21, which was driven by customers being influenced by their trade partner. Additionally, the evaluation team found that no customers installed additional energy-efficient measures as a result of their participation in the product, resulting in a spillover ratio of zero. We also applied a 0.03 adder for market effects to account for the impact the product has had on the high-efficiency air conditioning and heat pump market over time.

Equation 2-5. Residential Air Conditioner and Heat Pump QI Net-to-Gross Ratio

$$NTGR = 1\text{-}(Free\ Ridership) + (Spillover) + (Market\ Effects)$$

$$0.82 = 1 - (0.21) + (0) + (0.03)$$

2.3.9 Overall Retrospective Net-to-Gross Ratio

With recommended retrospective NTGRs for equipment rebates and QI estimated, the evaluation team then determined the overall retrospective NTGR for air conditioning and heat pump measures included in the Residential Heating and Cooling Product. We weighted each of these scores based on their relative proportion of energy savings claimed through the product. This resulted in a combined overall retrospective NTGR of 0.71 for the air conditioning and heat pump equipment included in the Residential Heating and Cooling Product. For air conditioners alone, we estimated the retrospective NTGR to be 0.73. For mini-split heat pumps, we estimated a retrospective NTGR to be 0.57. The evaluation team did not calculate a NTGR specific to air source heat pumps because the population was too small in 2021 to calculate a representative value.

2.4 Prospective Net-to-Gross Ratio Considerations

While the retrospective NTGR is representative of both air conditioning and heat pump equipment, Xcel Energy reports varying NTGRs based on measure types within the Residential Heating and Cooling Product. To be consistent with 2021 reporting practices, whereby heat pumps, air conditioners, and other HVAC equipment were associated with different NTGRs, Xcel Energy could apply a NTGR specific to air conditioners and another for heat pumps. TRC believes this approach is justified given that heat pumps will likely play a larger role, for the foreseeable future, in the product compared to its role in 2021. Additionally, Xcel Energy's influence on this measure type will likely be unique, given its ability to support beneficial electrification opportunities. In summary, TRC recommends the following:

- Apply a 0.73 NTGR to air conditioning equipment (both SEER 13/14 and SEER 15+). This value is based on the retrospective NTGR specific to air conditioners. The evaluation team calculated this value by weighting the individual NTGRs for equipment

rebates for SEER 15+ air conditioners and the proportional QI savings from SEER 13/14 and SEER 15+ air conditioners. TRC recommends re-evaluating this prospective NTGR if Xcel Energy makes major adjustments to its rebate values.

- Apply a 0.57 NTGR to mini-split heat pumps. This value is based on the retrospective NTGR for mini-split heat pumps, which takes into account the mini-split heat pump free ridership value of 0.44 and the 0.01 market effects adder. Despite the small sample size of participants surveyed who installed mini-split heat pumps (n= 26), the evaluation team has a 90% level of confidence that the free-ridership value for mini-split heat pumps is within 0.07 of 0.44. Because this result is based on a limited sample size and the heat pump market is expected to change in the coming years, TRC recommends Xcel Energy re-evaluate this value if Xcel Energy changes its program design related to mini-split heat pumps and/or if Xcel Energy sees greater participation of this measure in its product.
- Hold off making any changes to the air source heat pump NTGR until Xcel Energy sees greater measure participation. The evaluation team was only able to talk to 2 of the 6 participants who installed this equipment during the sample timeframe, and therefore it does not have enough data to recommend making any changes to the NTGR at this time.

2.5 Peer Utility Net-to-Gross Comparisons

The retrospective NTGR is lower than most of the peer programs that the evaluation team examined through this research, as shown in Table 2-3. This is likely due to the fact that we did not find evidence of other utilities continuing to offer rebates for SEER 13/14 air conditioners. Utilities A and I are most comparable to the Xcel Energy offering, in that they require QI and offer rebates for both air conditioning and heat pump equipment. The NTGR for Utility A is a stipulated value, rather than an evaluated value. The evaluation team was not able to interview Utility I, and therefore, we have limited understanding of why its NTGR is greater than the calculated NTGR for the Residential Heating and Cooling Product. However, the fact that Utility I also does not offer rebates for ACs SEER 13-14 may be a contributing factor to its higher NTGR.

Table 2-3. Peer Utility Net-To-Gross Ratios & Program Offerings

	Xcel Energy	Utility A	Utility D	Utility E	Utility G[ab]	Utility H[b]	Utility I[b]
Program Overall[c]	Central ACs **0.74** MSHP **0.57**	**1.00**	**0.82**	**0.98**	Central ACs **0.81** ASHP **0.98** DMSHP **0.61**	**0.76**	**0.92**
Year	PY 2021 Evaluation	Stipulated	2021	PY 2020	PY 2020	2020-2029 Program Plan	PY 2020
Measures Included	Heat pumps; SEER 13/14; SEER 15+	Heat pumps; SEER 15+	Cooling measures (not specified)	All Res HVAC measures (no air conditioners)	Heat pumps; ACs SEER 15+	Heat pumps; ACs SEER 15+	Heat pumps; ACs SEER 15+
QI	Required	Required	Not Required	Required	Not Required	Not Required	Required

Note: Air source heat pump (ASHP). Mini-split heat pump (MSHP). Peer utilities B, C, and F are not included in Table 2-3 because these utilities did not report NTGRs for their residential HVAC programs.

[a] *No program-wide NTGR available.*

[b] *Peer utilities G, H, and I were not interviewed for this evaluation but were included in Table 2-3 as additional references.*

[c] *Utility A NTGR reported in interview. All others were found in regulatory documents.*

3 Process Evaluation

TRC conducted a process evaluation to determine how Xcel Energy can optimize the design and delivery of the Residential Heating and Cooling Product to its customers. Specific research objectives of the process evaluation are listed in the bullets below:

- Collect feedback on product experiences.
- Identify barriers to participation in the product.
- Explore ways to grow the heat pump market.

To accomplish these objectives, the evaluation team elicited feedback from product staff, participating customers, nonparticipating customers, participating and nonparticipating trade partners in Xcel Energy's Colorado service territory, and peer utilities. This section presents key findings from the process evaluation, the approach to conducting this work, and detailed finding relating to each evaluation objective. Sub-sections for each objective include data from all relevant data collection efforts. Our synthesis of findings places an emphasis on helping Xcel Energy to interpret research findings and identify actionable opportunities for improving product operations. These findings, along with findings from the impact evaluation, inform the conclusions and recommendations presented in the final section.

3.1 Key Findings

The evaluation team found that customers and trade partners were very satisfied with current product operations, and staff reported product processes were running smoothly. Customers and trade partners both noted that the product was easy to participate in and that they were happy with their experiences. We provide additional key findings from the process evaluation research below, broken out by research objective:

- **Collect feedback on the product experiences:** Participating customers and trade partners were generally satisfied with the product. Participating customers rated no aspect of their experience with the product below a 4, on a scale of 1 to 5. The product gave participating customers confidence that equipment was installed well and gave trade partners the ability to differentiate themselves in the market. Participating customers were primarily motivated to participate in the product by the energy-efficiency equipment available through the product, their contractor's recommendation, and the rebates available through the product. Overall, participating trade partners (tier-1 and mid-tier, n=18) were satisfied with the product, with an average satisfaction of 4.1, on a scale of 1 to 5.
- **Identify barriers to participation:** Equipment costs were barriers to customer product participation. Nonparticipating trade partners also faced barriers relating to performing QI and becoming eligible to be a qualified contractor.
- **Explore ways to grow the heat pump market:** Trade partners highlighted that heat pumps are most applicable to homes with solar panels, since these homes can rely on their solar power for electricity and therefore do not face the higher costs of electric heating, compared to gas heating, in the Xcel Energy territory. Trade partners felt that

increased education and rebates for heat pumps would drive further product participation.

Section 3.2 describes our overall approach for the process evaluation research activities, and Section 3.3 provides detailed results from all of these activities.

3.2 Approach

To accomplish the objectives for the Residential Heating and Cooling Product evaluation, the evaluation team completed a suite of intersecting and complementary research activities in 2021. Detailed information on the sampling approach used for the research can be accessed in the evaluation plan, found in Appendix A. The following discussion highlights the research topics contributed by each research activity: staff interviews, participating customer surveys, nonparticipating customer surveys, participating trade partner interviews, nonparticipating trade partner interviews, and peer utility interviews.

3.2.1 Staff Interviews

The evaluation team conducted four telephone interviews with Xcel Energy staff who managed and implemented the Residential Heating and Cooling Product in Colorado, including:

- Two Product Managers, one of which also served as the trade partner manager
- One member of the engineering team
- One member of the third-party measurement and verification team

Interviews with these staff members covered the following topics:

- Description of the product's process and goals
- Staff perceptions of the product's challenges and successes
- Product staff evaluation priorities

Appendix B.1 presents the interview guide used for these discussions, and Appendix C.1 provides results specific to this research activity.

3.2.2 Participating Customer Surveys

The evaluation team conducted telephone surveys with participating customers using customer records from Xcel Energy for the sample frames. The evaluation team spoke to 100 respondents (eighteen AC SEER 13-14 customers, fifty-four AC SEER 15+ customers, two air source heat pump customers, and twenty-six mini-split heat pump customers) which provided a 90% level of confidence with a minimum of +/- 10% relative precision.

For the purposes of this evaluation, the evaluation team defined a participating customer as any customer who participated in the Residential Heating and Cooling Product between April 1,

2021, and September 15, 2021.[11] The participating customer sample was stratified by the type of cooling equipment rebated through the product: an AC SEER 13-14, an AC SEER 15+, a mini-split heat pump, or an air source heat pump. The participating customer survey was designed to address the following process objectives:

- **Collect feedback on product experiences:** The evaluation team collected feedback on participating customer experiences with the Residential Heating and Cooling Product QI and Equipment Rebate processes.
- **Identify barriers to participation:** The evaluation team identified barriers to participation in the product, particularly by investigating why participating customers may install equipment outside of the product.
- **Explore ways to grow the heat pump market:** The evaluation team worked to understand what participating customers perceive as the benefits of heat pumps and explore if participating customers who installed air conditioners discussed the viability of heat pumps with their contractors. In addition, we probed into why those customers installed an air conditioner over a heat pump.

Appendix B.2 contains the survey instrument used for the participating customer survey, and Appendix C.2 provides results specific to this research activity.

3.2.3 Nonparticipating Customer Surveys

The evaluation team conducted 70 telephone interviews with nonparticipating customers. We defined a nonparticipating customer as any electric or combination customer who received a furnace rebate but did not receive a cooling equipment rebate, for either an air conditioner or heat pump, since 2012, which was when Xcel Energy started tracking product participation through its data tracking tool, Salesforce. The number of completed interviews provided a 90% confidence level with +/- 10% precision for each stratum.

The evaluation team conducted this research to assess the following key process evaluation objectives:

- **Identify barriers to participation:** The evaluation team assessed nonparticipating customer experiences and decision-making processes to understand why customers decided not to participate in the Residential Heating and Cooling Product. This helped us understand why nonparticipating customers may decide to install efficient air conditioning or heat pump measures outside of the product, and whether there are any particular aspects of the product process that prevent customers from participating.
- **Explore ways to grow the heat pump market:** The evaluation team asked nonparticipating customers if they had air conditioning in their homes and their level of interest in heat pumps.

[11] The evaluation team selected these dates because the product rolled out some significant product changes which took effect starting April 1, 2021, and TRC wanted the survey to ask customers about the updated product design.

Appendix B.3 contains the survey instrument used for the nonparticipating customer interviews and Appendix C.3 provides results related specific to this research activity.

3.2.4 Participating Trade Partner Interviews

In addition to customer data collection efforts, the evaluation team conducted eighteen in-depth interviews with tier 1 and mid-tier trade. We determined trade partner tiers based on the number of projects completed between April and September 2021. Tier 1 trade partners were the top 14 trade partners completing projects. The evaluation was able to interview 8 of the 14 tier 1 trade partners. Mid-tier trade partners were those who completed at least four projects between April and September 2021 and were prioritized for interviews by the number of projects completed. The participating trade partner interviews addressed the following process objectives:

- **Collect feedback on product experiences:** The evaluation team explored participating trade partners' awareness of eligible equipment, product rebates, and the ACCA 5 Standard QI process. We also collected their feedback on the new comprehensive approach to providing residential HVAC services in one product.
- **Identify barriers to participation:** The evaluation team asked participating trade partners what they view as the biggest barriers to engaging with the product and what may motivate them to install equipment outside of the product. We also determined the tools trade partners find most helpful in motivating customers to purchase efficient air conditioning and heat pump equipment and perform QI.
- **Explore ways to grow the heat pump market:** The evaluation team gauged the potential of going midstream with mini-split rebates and discussed participating trade partners' familiarity with heat pump installation processes. Overall, this helped to understand what trade partners think the future of the heat pump market looks like.

Appendix B.4 presents the interview guide used for the participating trade partner research, and Appendix C.4 provides results specific to this research activity.

3.2.5 Nonparticipating Trade Partner Interviews

In addition to the participating trade partner data collection efforts, the evaluation team conducted six interviews with low-participating trade partners and seven interviews with nonparticipating trade partners. We classified low-participating trade partners as those who completed three or fewer projects through the product between April and September 2021, and we classified nonparticipating trade partners as those who completed no projects though the product in 2021. This research addressed the following process objectives:

- **Identify barriers to participation:** The evaluation team asked nonparticipating trade partners about what they view as the biggest barrier to engaging with the product and, if applicable, what motivates them to install high-efficiency air conditioners or heat pumps outside of the product. We also asked about ways Xcel Energy can encourage increased trade partner participation in the future.

- **Explore ways to grow the heat pump market:** The evaluation team explored nonparticipating trade partners' level of awareness and perceptions of heat pump products and how they see their participation in the heat pump market in the future.

3.2.6 Peer Utility Benchmarking Interviews

Last, the evaluation team interviewed representatives from peer utilities. The objective of the peer utility benchmarking task was to understand how peer utilities approach key issues related to implementing residential high-efficiency air conditioning and heat pump programs. The evaluation team collaborated with the Xcel Energy Product Manager to identify 16 peer utilities to include in its sample, of which the evaluation team spoke to 6. We considered the following criteria when selecting peer utilities: similar program designs, programs known to require QI, programs that offer high-efficiency air conditioning and heat pump rebates, programs that allow fuel-switching, and utilities that operate in similar territories (including the geography and the number of customers in its territory).

The evaluation team recruited staff in key management roles related to residential high-efficiency air conditioning and heat pump programs at peer utilities. Interviews with these staff focused on the same discussion topics explored in the interviews with Xcel Energy customers and trade partners, but emphasized the following research objectives specific to peer benchmarking interviews:

- **Collect feedback on product experiences**: The evaluation team explored peer utility program strengths, challenges, implementation strategies, approaches to working with trade partners, rebate levels, and recent or planned program changes.
- **Explore ways to grow the heat pump market:** The evaluation team asked peer utilities how they support trade partners with heat pump education and training through their programs. We also investigated peer utility mini-split heat pump rebate offerings, cold-climate heat pump definitions and their inclusion in programs, and peer utilities' perspectives on heat pump transformation.

The peer utility staff who were interviewed were from across the nation and included both rural and urban territories. Five utilities spanned many areas of the state they serve, while one was confined to a targeted area of a state. Four of the six peer utilities had a version of QI as part of their residential HVAC rebate program, with Utility A being the only peer to adopt the ACCA 9 Standard QI practices. The programs were generally staffed by a handful of people, with a large range of trade partners. Table 3-1 outlines background information for each peer utility interviewed and their respective residential HVAC rebate programs.

Table 3-1. Peer Utility Program Design Overview

Utility	Heat Pumps	Cold-Climate Heat Pumps	AC SEER 13-14	AC SEER 15+	QI
Xcel Energy	x	Not specified	x	x	Required: ACCA 5 Standard
Utility A	x	Not specified	Not offered	x	Required: ACCA 5 Standard
Utility B	x	X	Not offered	Not offered	Specification in statewide program manual
Utility C	x	X	Not offered	x (SEER 16+)	Not required
Utility D	x	Not specified	Not specified	Not specified	Not required
Utility E	x	Not specified	Not offered	Not offered	Required: Technical Specification Manual on program website
Utility F	x	Not specified	Not offered	Not offered	Specification in statewide program manual
Utility G	x	Not specified	Not offered	x	Not required
Utility H	x	Not specified	Not offered	x	Not required
Utility I	x	Not specified[a]	Not offered	x	Required

Note: Peer utilities G, H, and I were not interviewed for this evaluation but were included in Table 3-1 as additional references.

[a] *Utility I offers cold-climate heat pumps through its income-qualified program.*

Appendix B.5 presents the interview guide used for the peer utility research, and Appendix C.5 provides results related specifically to this research activity.

3.3 Detailed Findings

Below, the evaluation team presents findings related to each of the main process evaluation objectives: product experience, motivations & barriers, and heat pump market growth. Within these topics, we have included data from all relevant data collection efforts. The synthesis of findings places an emphasis on helping Xcel Energy to interpret research findings and identify actionable opportunities for improving product operations.

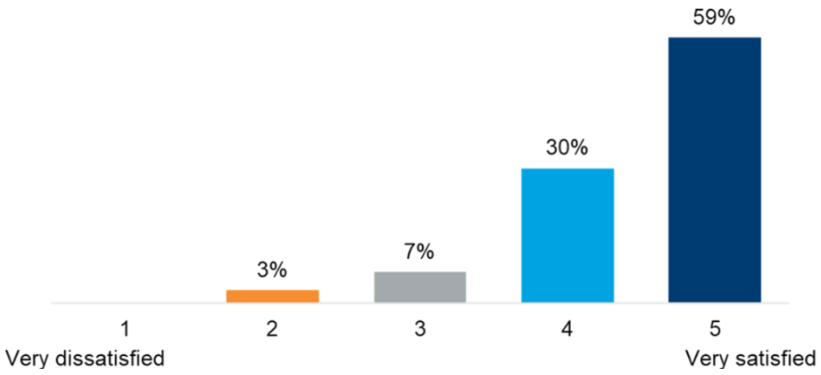
3.3.1 Product Experience & Satisfaction

Participating customer reported positive experiences, which were primarily driven by equipment performance and interactions with trade partners, who communicate information about the product itself and the benefits of efficient air conditioning and heat pump equipment and QI. Participating trade partners also reported generally positive satisfaction with the product. Participating trade partners who were less than extremely satisfied with the product said this was primarily due to the product's rebate levels. The next section provides detailed findings from participating customer respondents and participating trade partners related to their experiences with the Residential Heating and Cooling Product.

Participating Customer Satisfaction

To understand participating customers' experiences with the product, the evaluation team asked survey respondents about their satisfaction with the product overall, as well as with various aspects of the product. Respondents reported high levels of satisfaction with all aspects of the product and with the product overall. From an overall perspective, respondents gave an average rating of 4.5 out of 5, where 1 meant "very dissatisfied" and 5 meant "very satisfied." As seen in Figure 3-1, 59% of respondents reported being very satisfied with the overall product. Although no respondents considered themselves "very dissatisfied," three participating customer respondents rated their product satisfaction a 2 out of 5. These respondents mentioned issues with submitting product forms, receiving inconsistent product information from their contractors, and wanting a higher rebate. Overall, though, the findings in Figure 3-1 suggest that end-users of the Residential Heating and Cooling Product are mostly satisfied with it.

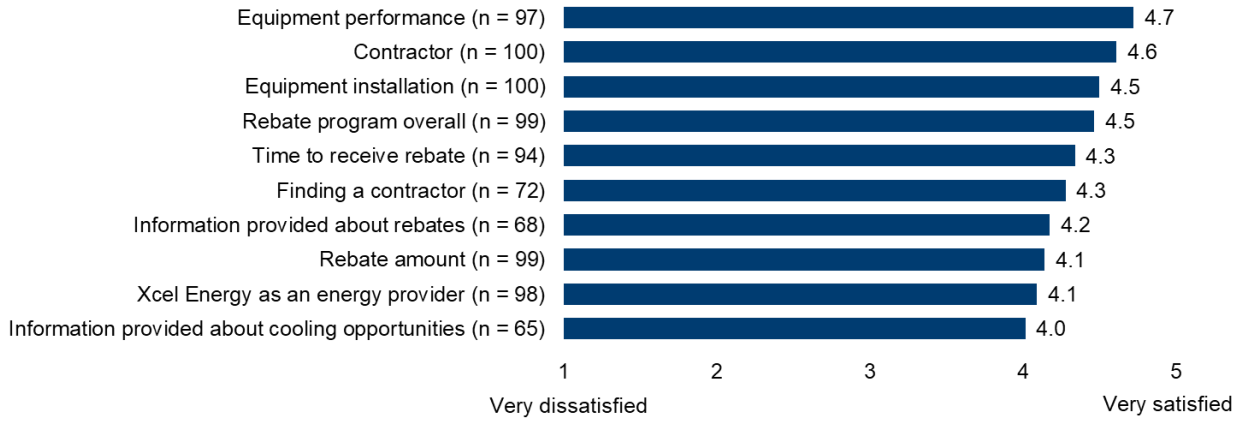
Figure 3-1.Overall Participating Customer Respondent Product Satisfaction



When asked about various aspects of the product, respondents gave the highest satisfaction ratings to equipment performance, with an average satisfaction score of 4.7 out of 5 (n = 97), as shown in Figure 3-2. The next-highest-rated product elements were the contractor who installed the equipment, with an average score of 4.6 out of 5 (n = 100), and equipment installation, with an average score of 4.5 (n= 100). The product element that received the lowest satisfaction rating was the information provided about cooling opportunities, with an average score of 4 out of 5. Seven participating customer respondents rated this product element below a 3, with five respondents mentioning that they found the product information hard to find and that they didn't know air conditioning and heat pump rebates were available until their contractor or Xcel Energy

told them directly. While the majority of customers were satisfied with the information provided about cooling opportunities, this indicates that Xcel Energy could improve communication methods about the product to customers. There was no significant difference in satisfaction findings between respondents who received QI through the Residential Heating and Cooling Product, and those that did not.

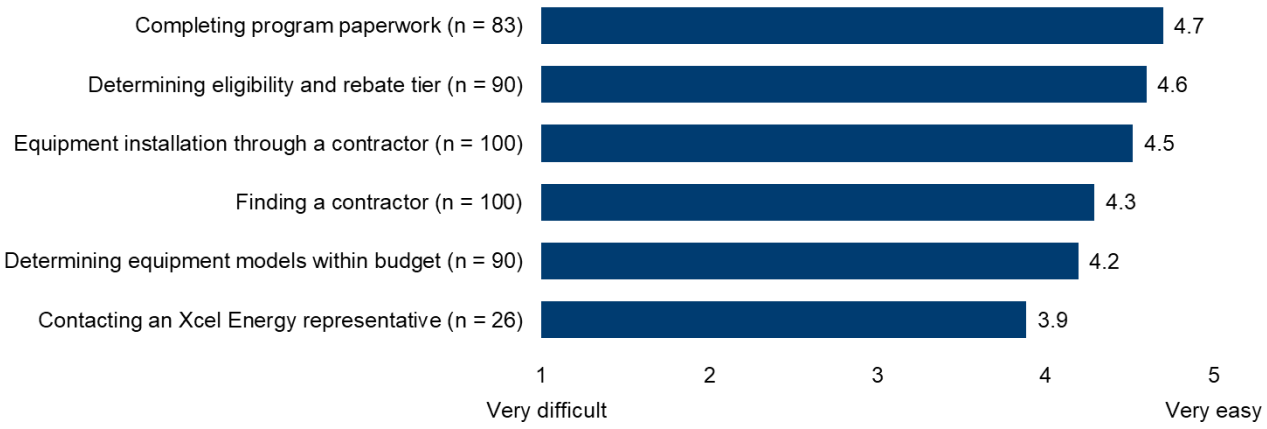
Figure 3-2. Average Participating Customer Satisfaction with Product Elements



Note: Reported n's include valid responses only and do not include "Don't Know" or "Not Applicable" responses.

Respondents found all elements of the product easy to complete, rating the ease or difficulty of completing each product element, using a scale of 1 to 5, where 1 was "very difficult" and 5 was "very easy," as shown in Figure 3-3.

Figure 3-3. Average Participating Customer Scores for Product Element Ease of Completion



Note: Reported n's include valid responses only and do not include "Don't Know" or "Not Applicable" responses.

Respondents rated completing product paperwork, determining eligibility and rebate tier, and equipment installation through a contractor as the easiest program elements, with average

scores of 4.7, 4.6, and 4.5, respectively, on a 1-to-5 scale. Contacting an Xcel Energy representative was the product element with the lowest "ease of completing" score, with an average of 3.9 on the 1-to-5 scale. Four total respondents rated this product element a 2, citing issues in reaching the correct person on the telephone and wait times when calling Xcel Energy. Although Xcel Energy relies on trade partners to market and process the rebate for customers, these responses indicate an opportunity to examine opportunities to improve call center experiences related to the product.

Participating Trade Partner Satisfaction

Similar to participating customer findings, participating trade partners were also generally satisfied with the overall product, with 14 out of 18 respondents rating their satisfaction a 4 or 5 out of 5. Participating trade partners attributed their satisfaction to how product rebates help customers make the final decision to install higher-efficiency equipment and how the product adds value to customer experiences with trade partners and Xcel Energy as a whole. One trade partner who rated their satisfaction highly stated:

> *"Love the program, [it] adds great value [and] helps people make decisions that they wouldn't make if the program weren't available."*

Three trade partners rated their satisfaction a 2 or 3 out of 5. These lower scores were driven by feelings that rebate amounts were not where they needed to be, a lack of understanding of the heat pump portion of the product, and the challenge of matching equipment with the AHRI number. The trade partner who mentioned needing a better understanding of the product's heat pump rebates stated:

> *"Better understanding of heat pump rebates and how to obtain them and make sure [customers] have them ahead of time. [It] would be nice to get customers the certainty that they will get the rebate."*

Participating trade partners also provided positive feedback on the comprehensive approach to providing residential HVAC services within one product. Participating trade partners described how the comprehensive approach made participation in the product easier and encouraged Xcel Energy to continue this approach, with one participating trade partner saying, "[We] love every minute."

3.3.2 Awareness of Product Components

The following section describes customer and trade partner awareness of product components. Nonparticipating customers, participating trade partners, and nonparticipating trade partners all described a lack of awareness and understanding of either the potential or affordability of heat pumps in the residential sector in Colorado as a barrier to participation. Trade partners also described how the product rebate levels are insufficient and how the QI process is cumbersome and is therefore a barrier to product participation. The next section provides detailed findings from participating customers on their awareness of the Residential Heating and Cooling

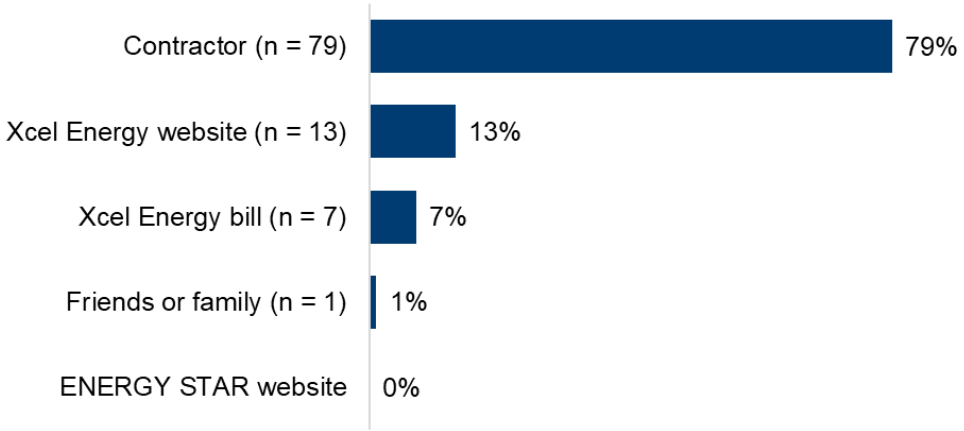
Product, followed by findings related to nonparticipating customers' awareness of Xcel Energy rebate programs as a whole and their awareness of the Residential Heating and Cooling Product specifically.

Participating Customer Respondent Awareness

Participating customers commonly reported learning about the Residential Heating and Cooling Product through trade partners. Trade partners both informed participating customers of the equipment rebates and the QI available through the product. This aligns with the product design, whereby Xcel Energy provides support, training, and other resources to trade partners, who then communicate information about the Residential Heating and Cooling Product to their customers.

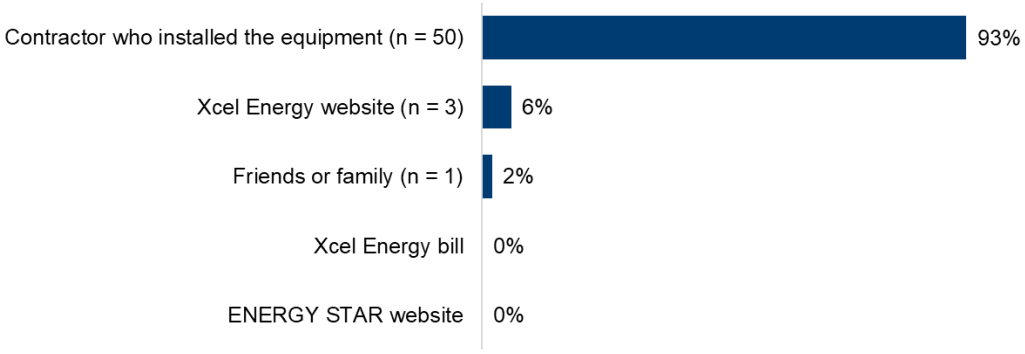
Seventy-nine (79%) respondents said they learned about the Xcel Energy rebates for air conditioning and heat pump equipment through their contractor, with thirteen (13%) reporting they learned about the rebates from the Xcel Energy website, as shown in Figure 3-4. below.

Figure 3-4. Sources of Participating Customer Awareness of Air Conditioning and Heat Pump Equipment Rebates



The majority of respondents who knew that they received QI through the product learned about QI through their contractor (n = 15, 93%), with some learning about QI from the Xcel Energy website (6%, n = 3), as show in Figure 3-5. Given that Xcel Energy relies on trade partners to market and process the equipment rebates and QI for customers, the fact that 93% of participating customer respondents learned of QI from their contractors is not surprising; rather, it demonstrates that trade partners are doing their due diligence to educate customers on the benefits of QI.

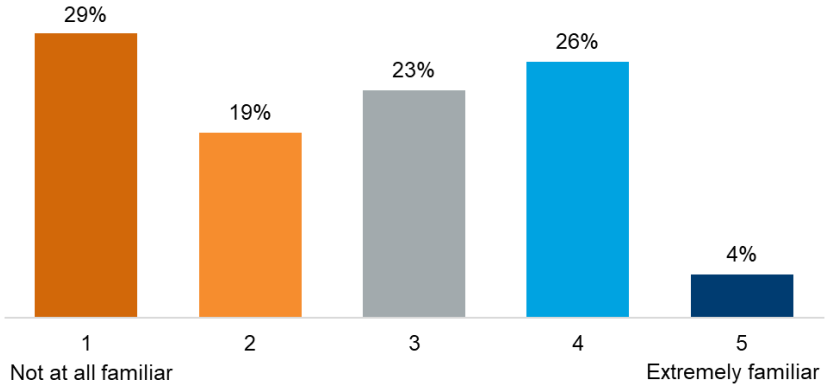
Figure 3-5. Source of Participating Customer Respondent QI Awareness



Nonparticipating Customer Awareness

The evaluation team also explored whether nonparticipating customers were aware of Xcel Energy energy efficiency rebate programs. When asked about their familiarity, almost three-fourths (71%, n = 50) of respondents indicated they were at least slightly familiar with Xcel Energy's energy efficiency rebate programs, rating their familiarity at least a 2, on a 1-to-5 scale, shown below in Figure 3-6. Over three-fourths (29%, n = 20) of nonparticipating customers reported that they have not heard of Xcel Energy's energy efficiency rebate programs. The evaluation team expected this percentage to be lower since all of the nonparticipating customers have participated in an Xcel Energy rebate program in the past. However, it is possible that these previous participating customers did not recall their prior participation because the trade partner handled the rebate for them.

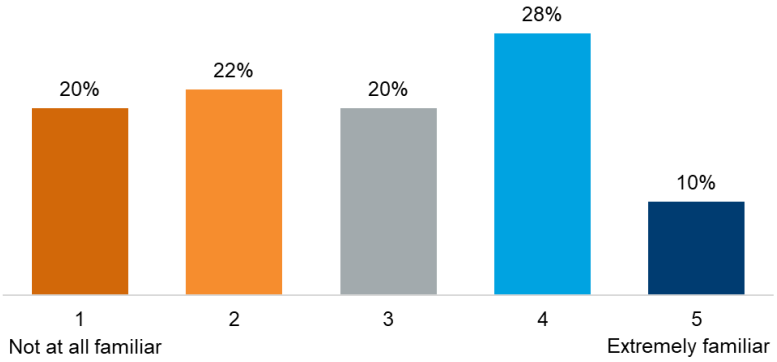
Figure 3-6. Nonparticipating Customer Familiarity with Xcel Energy Efficiency Rebate Programs



Of those fifty nonparticipating customers who were at least somewhat familiar with Xcel Energy's energy efficiency rebate programs, 80% (n=40) were somewhat familiar with rebates for residential cooling equipment, rating their familiarity at least a 2, on a 1-to-5 scale, shown below in Figure 3-7. [12]

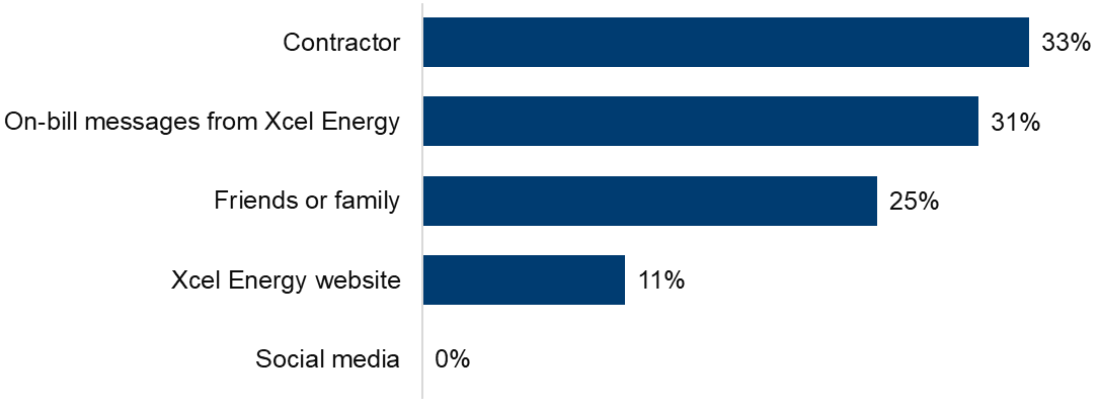
[12] No differentiation between types of cooling equipment was made in the nonparticipating customer survey language.

Figure 3-7. Nonparticipating Customer Familiarity with Residential Cooling Rebates



Nonparticipating customers that had at least some familiarity with the residential cooling rebates indicated that they learned of the product through a contractor (33%, n = 12) or on-bill messaging from Xcel Energy (31%, n = 11). Figure 3-8 also shows that nine respondents (25%) learned about residential cooling rebates from friends or family, and four (11%) learned about the rebates from the Xcel Energy website.

Figure 3-8. Source of Nonparticipating Customer Residential Cooling Rebates Awareness



Peer Utility staff reported similar findings relating to the sources of customer awareness, namely that trade partners drive awareness of peer utility programs, too. Four of the six peer utilities interviewed stressed the important role trade partners play in driving customer awareness and participation in their residential HVAC rebate programs. One peer specifically mentioned the "huge role" trade partners play in their program and how trade partners are "on the ground talking to customers," driving program participation. Based on the above, peer utilities confirmed that relying on trade partners to drive product participation is an effective approach to increasing product participation.

3.3.3 Motivation & Benefits of Product Participation

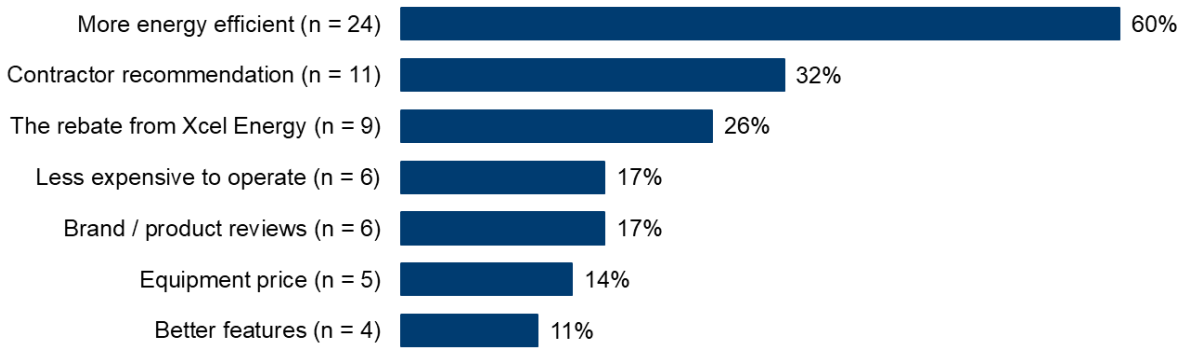
The evaluation team collected feedback on what motivates participation in the Residential Heating and Cooling Product through participating customer surveys, participating trade partner

interviews, and nonparticipating trade partner interviews. Better understanding motivation to participate in the product helps pinpoint where there may be opportunities to target additional marketing or support in order to grow the product over time. These results highlight how participating customer were primarily motivated by the energy-efficient equipment available through the product, their contractor's recommendations, and the rebates available through the product. Participating trade partners and nonparticipating trade partners similarly reported being motivated by opportunities to help their customers with better equipment. Responses from customers and trade partners are summarized in the following sections.

Participating Customer Respondent Motivations

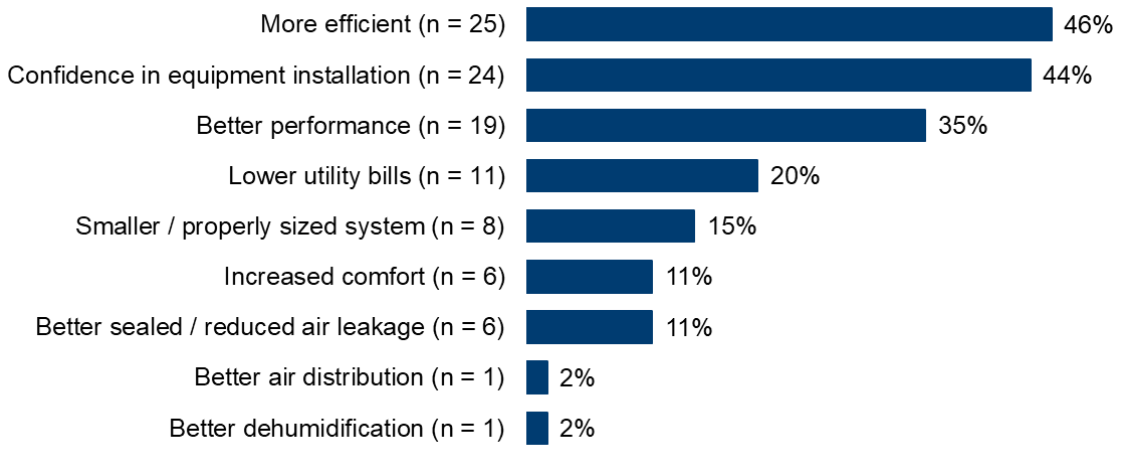
Findings related to participating customers' motivations to install energy-efficient air conditioning and heat pump equipment indicate that the product is operating as designed. This means that customers are motivated to participate in the product, because they are interested in more efficient air conditioning and heat pump equipment and need the support of the product rebate to reduce the upfront costs. Figure 3-9 outlines the factors that most motivated participating customer respondents to install high-efficiency air conditioning and heat pump equipment through the Residential Heating and Cooling Product, including having more energy-efficient equipment, their contractor's recommendation, and the rebate offered by Xcel Energy.

Figure 3-9. Motivations for Participation in the Equipment Rebates



Findings related to participating customer respondents' motivations to have QI conducted through the product indicate contractors play a large role in the QI piece of the product and help product participation by educating customers about QI. Figure 3-10 outlines the factors that most motivated participating customer respondents to have QI conducted through the Residential Heating and Cooling Product, with more efficient equipment, confidence in the equipment installation, and better equipment performance being the most motivating factors.

Figure 3-10. Motivations for Participation in QI



Participating Trade Partner Motivations

Twelve of the eighteen participating trade partners explicitly said that the product rebates are a reason they participate in the product, with ten participating trade partners reporting that they use the product rebates as a sales tool when selling higher efficiency air conditioners. Describing the benefits of the rebates, two participating trade partners said:

> *"Provides value to customers, makes higher efficiency equipment more attainable to the customer."*

> *"[Rebates] make it an easier sell to customers, [it's] good for [the] customer to get [a] rebate."*

Four participating trade partners highlighted how the QI standards of the product have made customers happier and resulted in fewer call backs due to the higher quality of installation. Three participating trade partners said that the partnership they have with Xcel Energy through the product gives them the extra credibility with customers during the sell. One trade partner described this when they said,

> *"[Gives us] credibility with customer[s] and [an] extra incentive to upsell better equipment."*

Nonparticipating Trade Partner Motivations

Two of the thirteen nonparticipating trade partners said they sell high-efficiency equipment outside of the product, citing the following motivations to sell high-efficiency equipment: (1) it was overall better equipment, because it operated better for their customers, and (2) it was more expensive and, therefore, earned them a better profit. One of these nonparticipating trade partners said:

> *"[We] sell high-efficiency equipment because they are quieter and tend to be better for customers in terms of providing whole house comfort."*

This finding suggests that there is an opportunity to increase product participation if nonparticipating trade partner barriers, discussed below, are addressed, since some nonparticipating trade partners are encouraging and selling high-efficiency air conditioning and heat pump equipment to their customers. If these nonparticipating trade partners joined the product, then they would likely sell high-efficiency air conditioning and heat pump equipment to more customers, thereby increasing product participation.

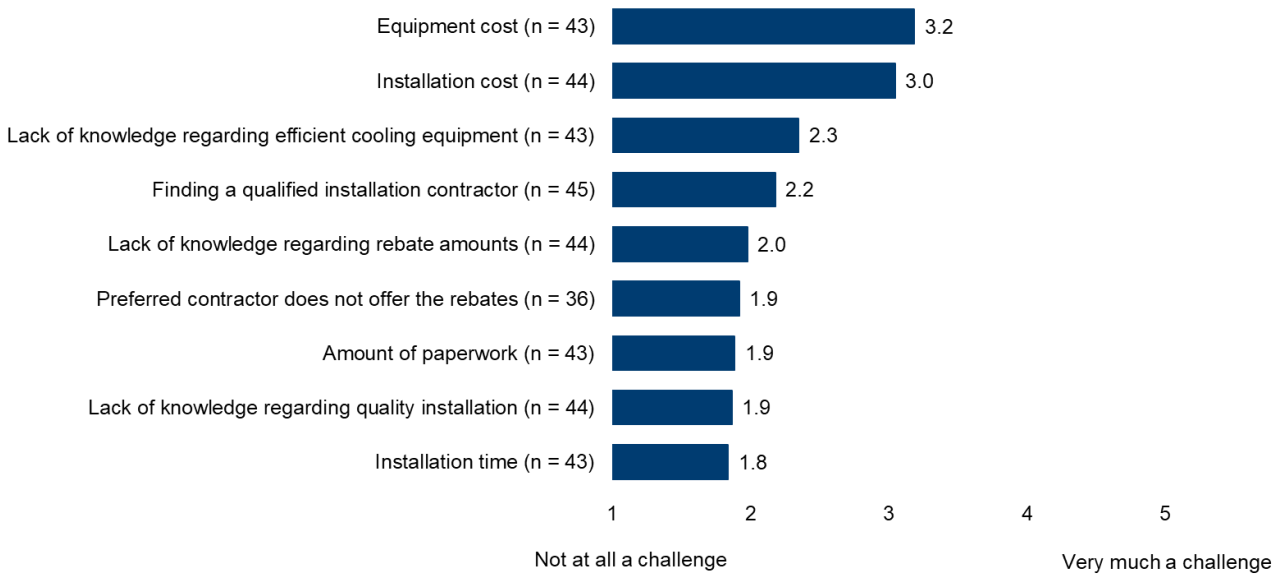
3.3.4 Barriers to Participation

Through nonparticipating customer surveys, participating trade partner interviews, and nonparticipating trade partner interviews, the evaluation team collected feedback on the barriers that prevent product participation. Overall, equipment and installation costs were the main barriers preventing nonparticipating customers from product participation, while participating trade partners mentioned rebate amounts and the lack of equipment rebated through the product as barriers to product participation. Meanwhile, for nonparticipating trade partners, the most-cited barriers to product participation were rebate amounts and the QI process. We have summarized the detailed responses from the nonparticipating customer respondents, participating trade partners, and nonparticipating trade partners in the following sections.

Nonparticipating Customer Barriers

The evaluation team asked nonparticipating customers to rate a variety of product elements on whether they made participation in the Residential Heating and Cooling Product a challenge or not. Figure 3-11 shows the average score for each product element on a scale of 1 to 5, where 1 is "not at all a challenge" and 5 is "very much a challenge." Nonparticipating customers said that equipment cost (86%, n = 43) and installation cost (88% n = 44) were the biggest barriers to their participation in the product, with average scores of 3.2 and 3.0, respectively.

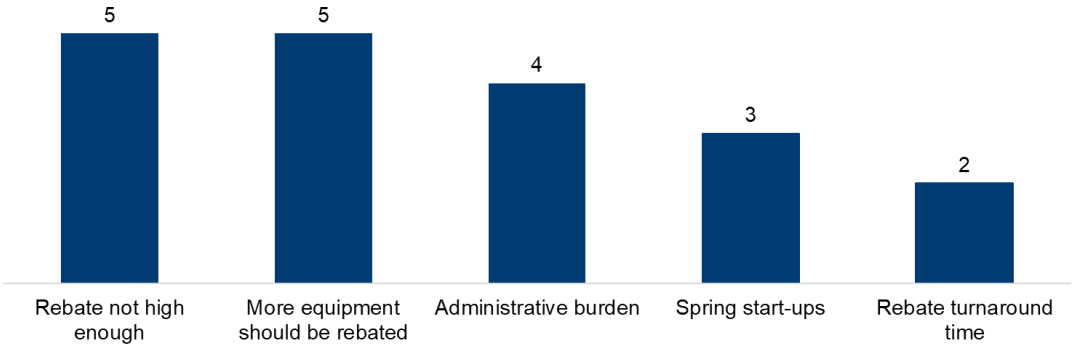
Figure 3-11. Nonparticipating Customer Product Element Barriers



Participating Trade Partner Barriers

The participating trade partners described several key barriers to participating in the product, including rebate amounts, wanting more equipment offerings, the administrative burden of product participation, spring start-ups, and rebate turnround time. Figure 3-12 shows the frequency of each barrier mentioned by participating trade partners, with rebate amounts and the specific equipment rebates cited as the most frequent product barriers to participation.

Figure 3-12. Frequency of Reported Participating Trade Partner Barriers



Participating trade partners most often cited insufficient rebate amounts and a desire for more equipment to be eligible for a rebate as barriers to product participation, with five out of eighteen participating trade partners mentioning both barriers. In particular, participating trade partners mentioned that heat pump rebates are not at the level they need to be to influence customer behavior and drive product participation. This is mirrored in the nonparticipating trade partner

findings, where eleven nonparticipating trade partners mentioned that the rebate amounts through the product were not high enough, negatively impacting their decision to participate in the product. In general, the five participating trade partners who said more equipment should be rebated through the product stated this generally, with one trade partner specifying that equipment with lower EER ratings should quality for product rebates. Another trade partner pointed out that sometimes manufactures don't supply AHRI ratings for their equipment, rather only SEER or EER ratings, and Xcel Energy should accommodate rebate specifications to the different efficiency ratings supplied by manufacturers.

While only 3 out of 18 participating trade partners (two tier 1 trade partners and one mid-tier trade partner) mentioned the product's spring start-up requirements as a barrier to product participation, it is important to note that two of these three trade partners were tier 1 trade partners, completing a total of 41 and 420 projects, respectively. The first of these tier 1 trade partners said they no longer offer air conditioner rebates in the winter because the return start-up trip costs them the time they could use to pursue new opportunities. This tier 1 trade partner described this reasoning:

> *"Find a different solution for wintertime air conditioners. [We are losing] opportunities in the spring to sell them."*

The second tier 1 trade partner who mentioned the spring start-ups as a barrier said they no longer offer the $200 air conditioner rebate to customers because the spring start-up checks lose them potential profit.

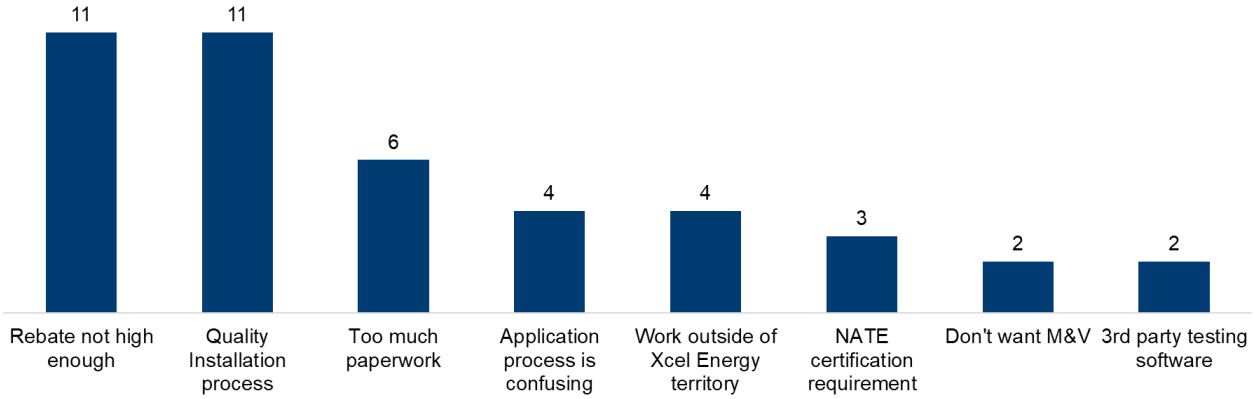
> *"In peak service [we] lost profit because of this, [we] have to spend all day […] very tedious on [our] end, can do things in shoulder season internally."*

Xcel Energy was aware of the challenge of spring start-up for trade partners and analyzed alternate methods to assess refrigerant charge during the QI process to eliminate the need for the spring start-up checks. Starting in 2022, they plan to allow trade partners to use alternate methods to assess refrigerant charge in hopes of increasing trade partner product participation by eliminating the spring-start barrier to product participation.

Nonparticipating Trade Partner Barriers

Nonparticipating trade partners described several key barriers to participating in the Residential Heating and Cooling Product. The most cited barriers to participation among nonparticipating trade partners were rebate amounts and issues with the QI process. Figure 3-13 shows the frequency of each barrier mentioned by nonparticipating trade partners, with rebate amounts and the QI process each mentioned by eleven out of thirteen nonparticipating trade partners interviewed.

Figure 3-13. Reported Nonparticipating Trade Partner Barriers



Seven nonparticipating and four low-participating trade partners mentioned rebate amounts and issues with the QI process. Relating to the QI process and its qualifications, three nonparticipating trade partners explicitly said they had issue with the NATE certification requirement for product participation. However, one low-participating trade partner stressed that although they support the QI requirements through the product, they also perform QI outside the product and also perform air sealing on their installations. This trade partner reported they lack the staff to process the rebates to increase their product participation. Four nonparticipating trade partners said that the application process was confusing. This could potentially point to a lack of awareness among nonparticipating trade partners of the new comprehensive application, along with the need to assess new opportunities to streamline the application process for trade partners. Additionally, four nonparticipating trade partners reported that they installed efficiency equipment outside of the Xcel Energy territory. One reported reason for this is that other utilities offer better equipment rebates to their customers, thus driving more installations outside of the Xcel Energy territory for trade partners. Two nonparticipating trade partners reported issues with the 3rd party testing software required for product participation. One nonparticipating trade partner mentioned that the testing software kept crashing so they were unable to complete the testing to participate in the product, while the other also mentioned the software's lack of consistency in running smoothly.

Insufficient rebate amounts and the hassle of completing paperwork were also described as reasons why nonparticipating trade partners might install qualifying equipment without a rebate. Six of the thirteen (46%) nonparticipating trade partners said they offered Xcel Energy rebates to customers; however, they all charged customers extra due to the extra time needed to submit rebates and complete the full QI protocols. Two other nonparticipating trade partners offered equipment rebates but not through the Residential Heating and Cooling Product to avoid the application paperwork, citing this as more cost-effective for their business. One of these trade partners described this reasoning:

> *"The rebate is too low, and it's not cost-effective for customers to get the rebate. [For example] they have to spend $800 extra for a $500 rebate and [for the] long-term savings of $150."*

3.3.5 Heat Pump Market Growth

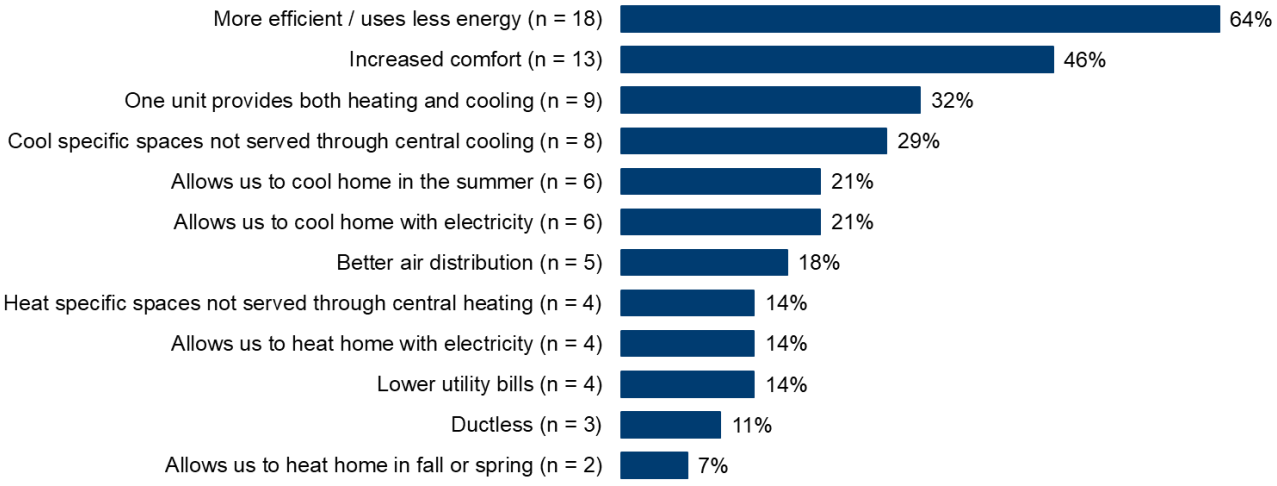
Residential Heating and Cooling Product staff were interested in understanding how to increase participation and evolve the heat pump component of the product by gathering feedback on the heat pump market from participating customer, nonparticipating customers, participating trade partners, and nonparticipating trade partners. Overall, participating customer respondents reported that the benefits of heat pumps include their efficiency, the increased comfort they provide, and the convenience of one unit providing both heating and cooling. Meanwhile, about one-third of nonparticipating customer respondents said they were familiar with heat pumps, and the majority of participating trade partners mentioned that there is growing interest in heat pumps in the HVAC market.

The next section describes participating customer perspectives on heat pumps, followed by an overview of nonparticipating customers' familiarity with heat pumps. Finally, we discuss trade partner perspectives on the Colorado heat pump market, including heat pump market challenges and the viability of a midstream rebate for mini-split heat pumps.

Participating Customer Respondents Perspectives on Heat Pumps

The evaluation team first asked participating customers who installed heat pumps through the product what they believed to be the benefits of heat pumps, allowing for multiple responses. Almost two-thirds of respondents (64%, n = 18) who installed a heat pump said the benefits of a heat pump include their efficiency/need for less energy. Respondents also mentioned the increased comfort (46%, n = 13) and the convenience of one unit providing both heating and cooling (32%, n = 9), as shown in Figure 3-14.

Figure 3-14. Participating Customer Respondents' Perceived Benefits of Heat Pumps



Understanding participating customers' perspectives of heat pumps makes it easier to understand why a potential customer may choose to install a heat pump. This information can then inform trade partners, and Xcel Energy staff, on how to discuss the benefits of heat pumps

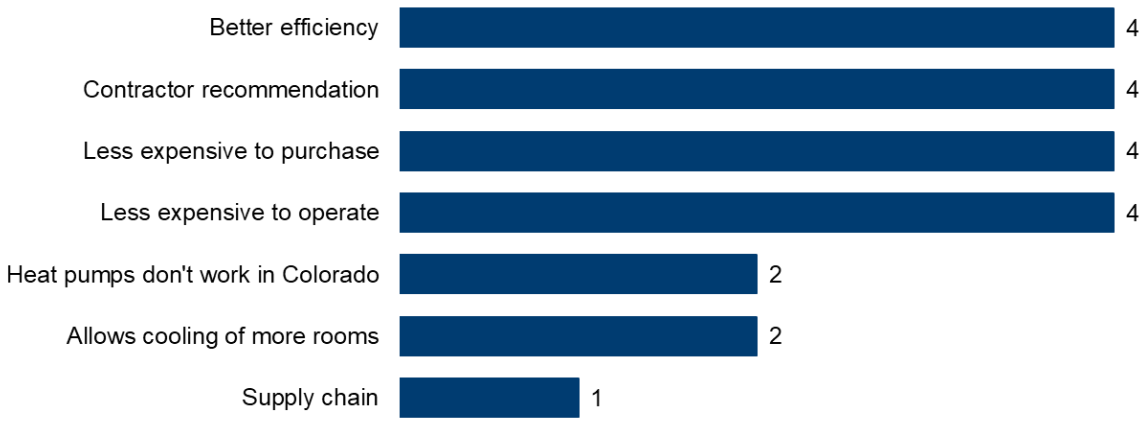
with potential product participants and potentially increase the uptake of heat pumps through the Residential Heating and Cooling Product.

Conversely, the evaluation team also asked the participating customers who installed an air conditioner if they had discussed the potential of installing a heat pump with their contractor instead. Figure 3-15 shows that 19% (n = 13) of respondents spoke to their contractor about the potential of installing a heat pump.

Figure 3-15. Participating Customers Who Discussed Heat Pumps with Their Contractor

The evaluation team asked the 13 participating customers (19%) who installed air conditioners why they chose to install their air conditioning measure, despite having discussed the potential of a heat pump with their contractor. Most respondents (31%, n=4) mentioned the better efficiency of their air conditioner equipment, their contractors' recommendation, equipment cost, and operating costs as the primary reason they installed an air conditioner over a heat pump, as shown in Figure 3-16. These results indicate a continued need to educate trade partners about heat pump efficiency and efficacy in Colorado. This also indicates that current rebate levels for heat pumps may not be sufficient to overcome installation and operating cost barriers faced by residential customers.

Figure 3-16. Participating Customer Reasons for Installing an AC Instead of a Heat Pump



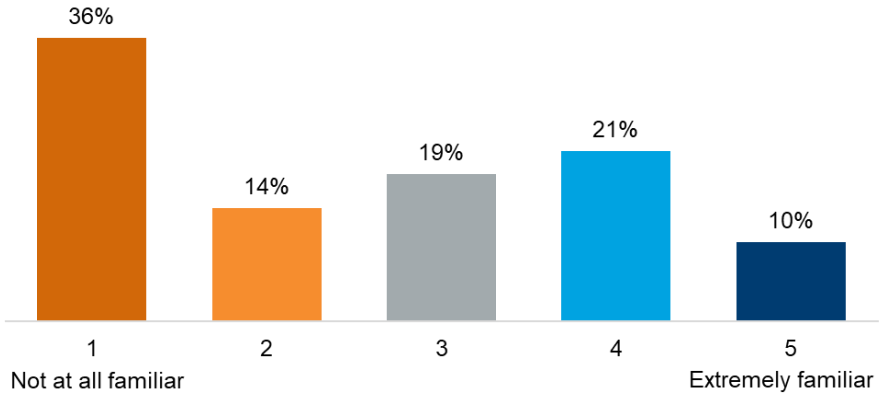
Note: Graph reports number of respondents who mentioned each reason for their AC purchase.

Nonparticipating Customer Familiarity with Heat Pumps

To better understand the awareness of heat pumps in the market, the evaluation team also asked nonparticipating customers about their familiarity with heat pumps in general. Figure 3-17

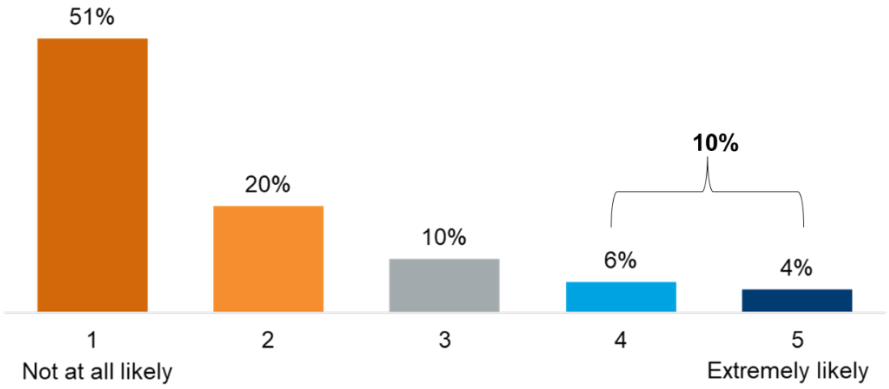
shows that about one-third of nonparticipating customers were familiar with heat-pumps (31%, n = 22), rating their familiarity a 4 or 5, on a 1-to-5 scale. Meanwhile another third (36%, n = 25) reported to not be at all familiar with heat pumps.

Figure 3-17. Nonparticipating Customers' Reported Familiarity with Heat Pumps



The evaluation team explained to nonparticipating customers that heat pumps can provide both cooling and heating using an electric source. We then asked those nonparticipating customers to rate the likelihood that they would consider installing a heat pump at their home in the next five years, on a scale of 1 to 5, with 1 being "not at all likely" and 5 being "extremely likely." Figure 3-18 shows that only 10% of respondents (n = 7) were likely to consider installing a heat pump in the next five years (i.e., rating the likelihood a 4 or 5). Five of the seven respondents (71%) who said they were likely to consider installing a heat pump said they planned to use the heat pump for their whole home.

Figure 3-18. Nonparticipating Customers' Likelihood to Install a Heat Pump in the Next Five Years



Trade Partner Perspectives of the Colorado Heat Pump Market

Through the participating and nonparticipating trade partner interviews, the evaluation team was able to collect information about trade partner perspectives on the Colorado heat pump market. The majority of trade partners, both participating and nonparticipating, described a growing interest in the market for heat pumps, with participating trade partners reporting a solid level of

familiarity with heat pump installations. However, heat pump equipment cost and electric rates in Xcel Energy territory continue to challenge the growth of the heat pump market. The following sections describe trade partners' perspectives on the heat pump market transformation, further detail about their familiarity with heat pumps, challenges experienced in the heat pump market, and the potential of a midstream rebate for mini-split heat pumps.

Market Transformation

The evaluation team asked trade partners how they expected the heat pump market to transform in Colorado. Ten of the eighteen participating trade partners and eight of the thirteen nonparticipating trade partners described a growing interest in heat pumps in the market. However, ten trade partners noted that the price of heat pump equipment is often restrictive for customers, even with the Xcel Energy rebate. Two participating trade partners described this, saying:

> *"[The] heat pump market is increasing. Rebates need to increase substantially because there is a big jump in the cost. To incent them, we need to make [heat pumps] more affordable."*

> *"Increasing [the heat pump] rebate - [it] really needs to help offset cost…, if Xcel can get it above $1,000, that would be good."*

All six peer utilities interviewed for this evaluation offer heat pumps in their residential HVAC programs, with two peers also offering cold-climate heat pumps in their programs. Despite peer utilities reporting that heat pump market transformation is not a focus of their HVAC rebate programs, they reported they may see heat pumps playing a larger role in the residential HVAC space in the future based on their current program heat pump offerings. Table 3-2 outlines the heat pump rebates offered by peer utility residential HVAC programs compared to the heat pump rebates offered through the Xcel Energy Residential Heating and Cooling Product.

Table 3-2. Peer Utility Heat Pump Measure Rebates

Heat Pumps	Xcel Energy	A	B	C	E	F
Mini-split heat pump	$500	$200	$250		$600-$1,700	
Central air source heat pump	$800		Up to $5,000			$750-$3,000
Cold-Climate heat pump	$1,000		$500-$2,000	$250 per ton		
Supplemental ductless heat pump	$600[A]	$200[B]	$250[C]		$600	
Dual fuel heat pump conversion					$1,000-$2,600	
Ground source heat pump	$1,500-$2,000 per ton		$2,850		$2,500	
Geothermal heat pump			$5,000 per 10,000 Btu/h			

Note: Utility D does offer heat pump measure rebates but does not have rebate information available on their program site.

Detailed information about peer utility heat pump offerings can be found in the peer utility appendix.

[A] Xcel Energy offers rebates for cold-climate mini-split heat pumps SEER 18+ only.

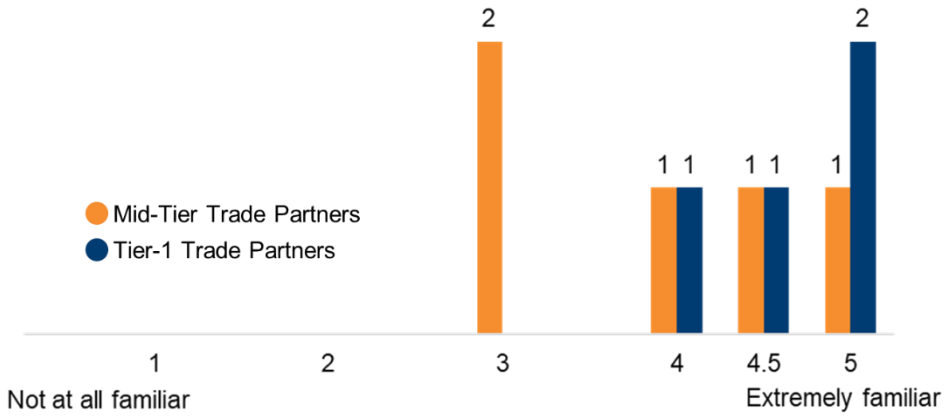
[B] Utility A offers the same rebate for heat pumps but did not specify the type of heat pumps in the interview.

[C] Utility B did not differentiate between types of mini-split heat pumps when describing rebate offerings.

Familiarity with Heat Pumps

With the increasing interest in heat pumps noted, the evaluation team asked nine participating trade partners to rate their familiarity with selling and installing heat pump technology on a scale of 1 to 5, with 1 being “not at all familiar” and 5 being “extremely familiar.” Figure 3-19 shows the familiarity ratings reported by tier 1 and mid-tier participating trade partners, with an average familiarity rating of 4.2 between the two groups. This indicates that Xcel Energy could focus more on finding opportunities to encourage trade partners to sell more heat pumps, rather than focusing efforts to simply raise awareness of heat pump technology.

Figure 3-19. Participating Trade Partner Familiarity with Heat Pumps



Challenges in the Heat Pump Market

Along with understanding trade partners' overall familiarity with heat pumps, the evaluation team also asked trade partners about challenges they face in selling heat pumps to customers. Five of the eighteen participating trade partners interviewed mentioned how the higher cost of electricity vs. natural gas in the Xcel Energy territory impacts customers' interest in heat pumps. One participating trade partner said:

> *"[We] need some help; they are so **expensive to operate,** he needs reassurance that's not the case."*

Additionally, four of the eighteen participating trade partners and six of the thirteen nonparticipating trade partners said that heat pumps only make sense on homes with existing solar. One trade partner expressed this saying:

> *"Biggest reason people buy heat pumps because they have put photovoltaic on their roof, and they know they can heat down to a certain temp for free until they hit a lower temp."*

Given that many of these trade partners viewed heat pumps as either too expensive or only making sense in homes with solar, eight participating trade partners mentioned that they do not actively market heat pumps to customers. Five of these trade partners reported that they only react to customer interest in heat pumps, further emphasizing that they do not actively market heat pumps to their customers. One tier 1 participating trade partner does not offer heat pumps through the product because the heat pump rebates are not high enough, and the cost of electricity is high in the Xcel Energy territory. This belief highlights potential changes that need to be made for there to be true growth in the heat pump market.

Another challenge, reported by four participating trade partners, is the need for additional heat pump education so they are better able to discuss heat pump options with their customers. One mid-tier trade partner emphasized their confusion surrounding heat pumps saying:

> *"[We need more] education and training for contractors so [we] can educate [the] client [about heat pumps], [and need] more references for clients who are looking at their options."*

Three nonparticipating trade partners also mentioned the need for better education surrounding heat pumps for both customers and contractors, with two trade partners saying that contractors don't know how to repair heat pumps at all. One nonparticipating trade partner said:

> *"[Need more] education and training for contractors so they can educate client[s] [about heat pumps]."*

An additional challenge, mentioned by one low-participating trade partner, is a concern that heat pumps are not well-suited for high-elevation cities like Denver. This further points to the need for additional education for trade partners regarding heat pumps, including their efficacy.

Midstream Mini-Split Rebates

The evaluation team explored the potential of going midstream with mini-split rebates by asking trade partners, if their distributor offered an instant discount on mini-split heat pumps, how many more mini-split heat pumps they would recommend to customers annually. Overall, all 11 participating trade partners who were asked this question did not think midstream mini-split rebates would have a large impact on their sales of mini-splits. However, two tier 1 participating trade partners said they would expect to sell more heat pumps with a midstream rebate than they do currently. Participating trade partners mostly mentioned the high cost of mini-split heat pumps and said the rebate would have to be substantial to see any change in customer purchasing decisions. Feedback from two participating trade partners on this potential midstream addition is below:

> *"Someone proposed this, and it was shot down. It would be extra incentive to sell more, sure. I worked with [a manufacturer] in [City X] and [City X] couldn't do it. I don't think you can get manufacturers to do this, but good luck."*

> *"Xcel's paperwork is much more efficient than distributors. If it was a sufficient discount it would help, but [I] would have to understand how much more work would be needed to gain [the] advantage from [a] rebate."*

On the nonparticipating trade partners side, seven of the nonparticipating trade partners favored the potential of a midstream mini-split heat pump offering. However, one respondent stated their participation would still depend on the other requirements around acquiring the midstream rebate through the product (e.g., third-party inspections, QI), and another was concerned that the midstream rebate would be similar to the distributor rebates for swamp coolers, which they described as "a huge pain."

4 Conclusions & Recommendations

This section presents TRC's key findings and associated recommendations regarding the Xcel Energy Residential Heating and Cooling Product in Colorado. All recommendations are based on key findings from the TRC evaluation research and are designed to reflect the context of future product years, acknowledging expected changes in the market and planned product changes.

Overall, the evaluation team found that the Residential Heating and Cooling Product is operating smoothly – both customers and trade partners were generally satisfied with their experiences with the product. The evaluation team also found that the product influenced customers to have QI conducted and to have efficient air conditioning and heat pump equipment installed within the Xcel Energy Colorado service area. Despite high satisfaction, the evaluation team identified several recommendations to further improve satisfaction and increase product influence. The remainder of this section presents key findings and recommendations.

- **Key Finding 1:** The Residential Heating and Cooling Product is influential in encouraging residential customers to adopt energy-efficient cooling measures and conduct QI. The evaluation team found a retrospective NTGR of 0.71, across all measures, with supporting qualitative data that the product helped to overcome barriers for pursuing energy efficiency projects. At the measure level, the retrospective NTGR for air conditioners was 0.73 and mini-split heat pumps was 0.57. The evaluation team did not estimate a NTGR specific to air source heat pumps because that population was too small in 2021 to calculate a representative value.
  - **Recommendation 1a:** The evaluation team recommends using a prospective NTGR of 0.73 for air conditioning equipment (both SEER 13-14 and SEER 15+). See the following related recommendations for actions relating to rebate levels and opportunities to increase participation: 2, 3a, 3b, 5b, and 7b. If the additional research from recommendation 2 is conducted, this may result in a different prospective NTGR estimate.
  - **Recommendation 1b:** The evaluation team recommends using a prospective NTGR of 0.57 NTGR for mini-split heat pumps, noting Xcel Energy's influence on this measure type will likely be unique, given its ability to support beneficial electrification opportunities. Because this result is based on a limited sample size and the heat pump market is expected to change in the coming years, TRC recommends Xcel Energy re-evaluate this value if Xcel Energy changes its program design related to mini-split heat pumps and/or if Xcel Energy sees greater participation of this measure in its product.
- **Key Finding 2: The current rebate levels for air conditioners and heat pumps are insufficient to overcome cost barriers for participation in the Residential Heating and Cooling Product**. Nonparticipating customers cited equipment and installation costs as key barriers to their participation in the product. Five of out eighteen participating trade partners and eleven of out thirteen nonparticipating trade partners also mentioned that rebate levels were not where they need to be to encourage the adoption of efficient cooling equipment, particularly heat pumps. This limits trade partners' ability to increase the number of projects they complete through the product. Additionally, some nonparticipating trade partners reported that other utilities offer better

equipment rebates to their customers, thus driving more installations outside of the Xcel Energy territory for trade partners.

- **Recommendation 2: Assess incremental cost data to determine feasibility of adjusting the rebate structure for air conditioners and heat pumps.**
  - Refer to peer utility findings for alternative rebate levels in Table 3-2.
  - Conduct NTGR research when rebate levels change to better understand its impact on customers decision-making and to better understand what rebate adjustments are needed to increase product participation and claimed product savings.
  - Conduct NTGR research on heat pump measures if and when the heat pump participant population expands. This research will inform Xcel Energy's understanding of its influence on customer decision making of heat pump purchases and identify additional barriers, beyond cost, that Xcel Energy could address if it wanted to increase its influence on heat pump sales.

- **Key Finding 3: Few customers installed heat pumps in 2021 as heat pumps were often price-restrictive for customers, even with product rebates.** In addition, trade partners reported the cost to purchase and use heat pumps was too great, particularly for customers receiving gas heat. Five participating trade partners and four nonparticipating trade partners said that heat pumps make the most sense on homes with existing solar due to the higher cost of electricity vs. natural gas in the Xcel Energy territory.
  - **Recommendation 3a: Market heat pump measures to customers who have installed solar at their homes.** Because solar customers can generate their own electricity for heating needs, rather than paying for electric or gas services for heating needs, they may be more open to purchasing and installing heat pumps compared to customers on traditional electric rates. Marketing to these customers, therefore, could result in increased heat pump adoption.
  - **Recommendation 3b: Align heat pump offering with utility-wide discussions around carbon-free goals to make the operating cost of electric heating more feasible to customers.** According to product staff, heat pumps play an important role in reaching the 2030 Xcel Energy energy savings goal. Continue the conversation surrounding electric rates to make them more friendly to customers during heating periods of the year, compared to only cooling periods of the year.
    - Ideas from Xcel Energy staff included considering rate changes for customers using electric heat and/or applying a bill credit to customers who install a heat pump to encourage additional heat pump adoption.
    - Continue supporting efficient air conditioner installation rebates until product objectives change and/or barriers of heat pumps are addressed, including customer operating costs and trade partner ability to communicate the benefits of heat pumps to their customers. Continuing air conditioner rebates can help Xcel Energy sustain its relationships with their trade partners so it can effectively engage with trade partners on heat pumps once existing barriers to expanding the heat pump market are overcome.

- **Key Finding 4: Trade partners expressed interest in additional opportunities to learn about heat pump efficacy and installation.** Four participating and three nonparticipating trade partners mentioned the need for additional tools to discuss the viability and cost of heat pumps with their customers. One mid-tier trade partner mentioned that a clearer understanding of what is considered a cold-climate heat pump and how they work is needed to educate their customers about the possibility of heat pumps in their homes.
  - **Recommendation 4: Continue providing heat pump education to trade partners.** While not limited to these topics, trade partners expressed interest in learning about heat pump efficacy outside of shoulder seasons and efficacy of heat pumps in cold and/or high-altitude environments. They also expressed interest in receiving tools to help them communicate with customers, such as fact sheets or operating cost calculators. Increased education can help address misconceptions of heat pumps, particularly within the Colorado environment, and enable greater adoption of heat pumps through the product.
- **Key Finding 5: Nonparticipating trade partners reported various challenges to participating in the product,** including complex project processes and a desire to drop NATE certification to align with rebated heating equipment. The majority of nonparticipating trade partners (n = 11) mentioned that some aspect of the QI process prevented them from bringing in more projects. Additional barriers reported included: low rebates levels, too much paperwork, confusing application, the measurement and verification portion of the product, and issues with the Xcel Energy 3rd party testing software. Specific information about the barriers faced by nonparticipating trade partners is in Section 3.3.4.
  - **Recommendation 5a: Clearly differentiate in the application** which measures require QI, and which do not, for various HVAC measures and send periodic messages to trade partners about application updates and FAQs.
  - **Recommendation 5b: Allow for alternate methods to assess refrigerant charge** during the QI process as these technologies continue to evolve. Reach out to trade partners after this change is implemented to better understand trade partner experiences with new methods.
    - Once Xcel Energy confirms that an alternative method is successful, from an energy savings perspective and trade partner usability perspective, reach out to nonparticipating trade partners to inform them of this change to support their re-engagement in the product.
  - **Recommendation 5c: Engage trade partners who are not interested in following QI procedures to encourage them to sell mini-split heat pumps, since they do not require QI.** With the majority of nonparticipating trade partners stating that some aspect of the QI process is a barrier to their product participation, they may not be aware that mini-split heat pumps can be installed, and rebated, through the product without any QI requirements. Make it clear in product information that these installations are options for trade partners who do not wish to adhere to the ACCA 5 Standard QI. This could potentially increase trade partner participation in the product and therefore, customer participation in the product, through additional mini-split heat pump installations. Consider reaching out to trade partners who were

recently dropped from the product by Xcel Energy due to their lack of compliance with the enhanced QI requirements.

- **Recommendation 5d: Drop the NATE certification for air conditioners and air source heat pumps.** As an alternative to NATE certification, Xcel Energy can use the annual QI training and testing process to have contractors sign off on committing to following QI protocols.

- **Key Finding 6: Overall, participating trade partners did not think midstream mini-split heat pump rebates would affect their sales of mini-split heat pumps.** Participating trade partners mentioned the high cost of mini-split heat pumps and said the rebate would have to be substantial to see any change in customer purchasing decisions. Only five of the thirteen nonparticipating trade partners said they would use the midstream rebate as a sales tool for mini-split heat pumps.
  - **Recommendation 6: Hold off developing a midstream mini-split heat pump offering.** Instead, focus on increasing awareness around heat pumps among customers and trade partners to encourage more adoption of the more affordable air-source heat pumps through the product. Once heat pumps are more widely adopted and accepted in the market, consider more research into the viability of a midstream mini-split heat pump offering by determining if trade partners perceptions of such an offering have changed.

March 29, 2022

Xcel Energy

Colorado Residential Heating and Cooling Product Impact & Process Evaluation

Appendices

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Appendices

Appendix A: Evaluation Plan

A.1 Evaluation Plan

Introduction

To support the 2021 process and impact evaluation of Xcel Energy efficiency products, the TRC evaluation team conducted a process and impact evaluation of the residential high efficiency air conditioning and heat pump measures rebated through the Colorado Residential Heating and Cooling Product. This memo provides the plan used for the 2021 Xcel Energy Colorado air conditioning and heat pump evaluation based on staff feedback during the evaluation kick-off meeting, staff interview findings, and review of program documentation. This evaluation plan includes the following sections:

- Product Overview
- Evaluation Overview
- Data Collection Activities and Sampling Plans
- Net-to-Gross Approach

Product Overview

The Colorado Residential Heating and Cooling Product provides prescriptive rebates for a variety of heating, cooling, and ventilation measures. The 2021 evaluation focused on the air conditioning and heat pump measures offered through the Colorado Residential Heating and Cooling Product to Xcel Energy residential customers who install qualifying air conditioning or heat pump equipment. The product is designed to interact with customers that would not participate in an air conditioning or heat pump product on their own. To achieve this objective, product staff train trade partners that primarily serve residential customers and then help trade partners and customers with the application process. Product staff will also go onsite to customer facilities to help customers identify air conditioning or heat pump projects.

To participate in the program, trade partners must be able to prove that they installed the equipment through a Quality Installation (QI) standard, defined by the Air Conditioning Contractors of America (ACCA) for air conditioners and heat pumps.[1] Trade partners must also prove their heat pump equipment is on the Qualified Products List (QPL) provided by the Northeast Energy Efficiency Partnership (NEEP). Xcel Energy hires a 3rd party to perform measurement and verification (M&V) on a sample of projects to verify whether contractors followed installation protocols. The M&V contractor sends findings to the installers to let them know how they performed on the QI inspection. QI training and testing is available to installers through a web application called Brainshark. Xcel Energy also trains installers who engage with the product through semiannual trade partner training webinars. For most rebates offered through the product, it requires installers to be North American Technician Excellence (NATE) certified.[2] To address this potential barrier of applying for NATE certification, the product will reimburse installers for NATE certification costs.

[1] The 2020 application required contractors to input data from their QI procedures. In 2021, Xcel Energy removed this section from the application form to streamline the application process.

[2] However, no QI or NATE certification is required for mini-split heat pumps or western cooling controls (WCC).

Xcel Energy implements a variety of activities to support high efficiency air conditioning and heat pump equipment in Colorado. To encourage Quality Installation practices, Xcel Energy offers trade partners a $100 incentive for QI of standard efficiency equipment and a $50 incentive for QI of high efficiency equipment. Xcel Energy also provides a range of financial incentives to encourage customers to purchase high efficiency cooling equipment. Many of the rebate levels changed in 2021, and the rebate changes are identified below.

- Lower tier (below 15 Seasonal Energy Efficiency Ratio (SEER)) air conditioner rebate for quality installation now $200 from $300.
- Air source heat pump (15+ SEER) with quality installation and back up heat source rebates now $800 from $500.
- Mini-split heat pump (S15+ SEER) rebates now $500 from $3,500.
- Added a $1000 rebate for cold-climate air source heat pumps (18+ SEER) with quality installation and back up heat source.
- Added a $600 rebate for cold-climate mini-splits (18+ SEER) with back up heat source that meets Xcel Energy's definition of cold climate heat pumps.
- Differentiation in ground source heat pump (14.1 EER Closed Loop) rebates based on previous energy source.
  - With electric resistance heat as previous heat source, $300 rebate per heating ton (up to $1,500).
  - With gas heat as their primary source previous to the ground source heat pump installation, or for new homes, $400 rebate per heating ton (up to $2,000).

In prior years, Xcel Energy required that air conditioning equipment be certified by the Air Conditioning, Heating, and Refrigeration Institute (AHRI) to ensure that it met energy efficiency specifications. However, due to market shifts stemming from COVID-19, demand outstripped supply during 2020. Therefore, Xcel Energy dropped the certification requirement and offered customers who bought uncertified equipment the equivalent of the lower tier rebate. The theory behind this change was to continue to motivate customers and trade partners to perform QI despite not being able to confirm equipment certification. Xcel Energy adapted this approach moving forward.

Xcel Energy has offered rebates for quality installation and air conditioning measures in Colorado since 2009. Figure 1 shows results from measurement and verification (M&V) findings on QI procedures through the past ten years. This figure appears to show that the program has had an impact on contractor installation behaviors overtime as the M&V pass rates have increased over time.

Figure 1. HEAC QI M&V Findings from 2010-2020

	Sizing	Airflow	Refrigerant Charge	Duct Leakage
2020 Pass Rate	97%	95%	74%	99%
2019 Pass Rate	94%	97%	81%	100%
2018 Pass Rate	100%	93%	85%	99%
2017 Pass Rate	96%	84%	84%	99%
2016 Pass Rate	94%	93%	78%	100%
2015 Pass Rate	90%	93%	66%	97%
2014 Pass Rate	78%	91%	66%	96%
2013 Pass Rate	84%	79%	69%	99%
2012 Pass Rate	84%	76%	69%	96%
2011 Pass Rate	46%	80%	48%	74%
2010 Pass Rate	62%	40%	24%	40%

Source: Group 14 (2020). "Measurement and Verification Report, Xcel Energy High Efficiency Air Conditioners". Table 3, p. 7.

In 2021, Xcel Energy revamped this product so it includes comprehensive HVAC equipment, not just air conditioning. The application process was also adjusted to make it easier for contractors to enter information into the online application form. In 2021, contractors will no longer need to enter all of the QI data. Instead, they are required to keep their QI documentation on file for review if the project is selected for M&V. This change is expected to make the application process easier for trade partners.

Table 1. CO Residential Air conditioners and Heat Pumps, January – December 2020

Strata	Units	kWh	kW	Therm
Air Conditioners (SEER 15 or greater)	4,545	3,385,258	3,117.26	394,093
Air Conditioners (SEER 13-14)*	2,227	982,168	781.96	146,125
Mini-Split Heat Pumps	408	246,421	377.79	-
Air Source Heat Pumps	59	33,390	27.91	-
Ground Source Heat Pumps	11	256,879	88.87	-
Total	**7,250**	**4,904,116**	**4,393.79**	**540,218**

Note: This is the population of participating customers who received rebates between January 2020 and December 2020. These numbers are based on aggregated data provided to TRC in March 2021.

Evaluation Overview

The 2021 evaluation consisted of a process evaluation and an impact evaluation. The process evaluation focused on customer and market actor experiences with the air conditioning and heat

pump measures, while the impact evaluation focused on estimating a net-to-gross (NTG) ratio. This section presents the objectives of the two components of the evaluation. It is followed by a more detailed description of the evaluation activities.

Process Evaluation

The evaluation team discussed process evaluation priorities during the kickoff meeting and staff interviews.[3] During those conversations, several process-related themes emerged.

- ACCA defines the QI standard for both air conditioners and heat pumps; however, contractors and customers can interpret QI to mean other things.
- NEEP (Northeast Energy Efficiency Partnership) provides the QPL that trade partners must use for their heat pump equipment.
- Xcel Energy is transforming the air conditioning and heat pump market through the product, although there are still many installations occurring outside of the product.
- Overall, customer feedback about the product has been very positive.
- Xcel Energy is re-designing its incentives to focus on heat pumps.
- QI of heat pumps is important for achieving savings and performance, however, a national quality installation standard for heat pumps does not exist.
- Starting in 2021, measures from the 2020 High Efficiency Air Conditioning product will be combined with other heating and cooling technologies into a new product called the Residential Heating and Cooling Product.

These topics are mapped to the following **objectives of the process evaluation**:

- Collected feedback on **rebate experiences** with the air condition and heat pump rebate process. This included a variety of topics including:
  - Awareness of the equipment and rebates.
  - Motivations to purchase the equipment and pursue a rebate.
  - Awareness of the ACCA QI process and interpretation of QI.
  - Feedback on the new comprehensive approach to providing residential HVAC services within one product.
  - Satisfaction with rebate processes.
- Identified **barriers to participation** in the product, particularly by investigating why trade partners and customers may install equipment outside of the product.
- **Explored ways to grow the heat pump market**. In doing so, we explored the following topics:
  - Understand how trade partners talk to their customers about the perceived benefits of heat pumps.
  - Understand whether trade partners are specializing in the types of heat pumps they install.

[3] The kickoff meeting was held in January 2021 and the staff interviews took place in February and March 2021.

- Explore potential for midstream mini-split rebates.
- Understand trade partner familiarity with the heat pump installation process and how peer utilities are supporting trade partners with learning heat pump installation processes.
- Explore what heat pump market transformation can look like.
- Research interest in heat pumps among participating customers in other DSM programs.
- Understand how peer utilities are defining and supporting cold climate heat pumps.
- Determine why heat pump trade partners appeared to have dropped out of the product in 2020.

Impact Evaluation

The objective of the impact evaluation of the air conditioning and heat pump product was to develop a net-to-gross (NTG) ratio documenting the extent to which product activities influenced customer purchasing decisions. The evaluation team proposed the use of participant self-report surveys as well as trade partner interviews to estimate the air conditioning or heat pump product NTG (both retrospective and prospective). Accordingly, the **objectives of the impact evaluation** included:

- Determine NTG ratio for air conditioning and heat pump rebates.
- Identify major drivers of free ridership.
- Assess participant spillover.
- Assess market effects of high efficiency air conditioning and heat pump rebates.

The full NTG approach is detailed in a later section of this document.

Data Collection Activities and Sampling Plans

To meet the above objectives, we conducted a variety of data collection activities. These are listed in Table 2 and explored more in this section. The evaluation team conducted interviews with Xcel Energy staff members (Table 2, Task Reference 1) to help understand specific needs for this evaluation.

For customer research, the evaluation team conducted phone surveys with participating customers (Table 2, Task Reference 2). These surveys informed prospective and retrospective NTG estimates, as well as customer-related process questions. The evaluation team also recommended completing interviews with up to 10 participating customers; the interviews followed up with participating customers who provide conflicting information during the survey research (Table 2, Task Reference 2b). The evaluation team also planned to conduct interviews with non- participating customers, defined as those customers that had heating equipment installed but not any cooling equipment. (Table 2, Task Reference 3).

For trade partner research, the evaluation team conducted phone interviews with trade partners (Table 2, Task Reference 4 and Task Reference 5) to understand their experiences with installing air conditioners and heat pumps.

Finally, peer utility benchmarking interviews (Table 2, Task Reference 6) helped Xcel Energy understand how other organizations are supporting residential heat pump measures.

Table 2. Air Conditioner/Heat Pump Research Summary

Task Ref.	Research Task	Included in Original Scope?	Sample Size	Research Objectives
1	Staff Interviews	✓	4	Inform evaluation plan
2	Participating Customer Surveys (phone)	Enhanced sample size	100	Rebate experiences, NTG
2b	Participating Customer Interviews	✓	10	Clarify conflicting NTG surveys responses
3	Nonparticipating Customer Surveys (phone)	✓	70	Barriers to participation, heat pump growth, NTG
4	Participating Trade Partner Interviews	✓	20	Rebate experiences, barriers to participation, heat pump growth, NTG
5	Recommended: Nonparticipating Trade Partner Interviews		15	Barriers to participation, heat pump growth, NTG
6	Peer Utility Benchmarking Interviews	✓	4-6 utilities	Rebate experiences (particularly with QI), Heat pump growth

1. Staff Interviews

In February and March 2021, the evaluation team conducted four interviews with Xcel Energy staff to inform this evaluation plan, discuss product goals, and review product processes, challenges, and successes. Those interviewed included the two product managers, a member of the engineering team, a trade partner manager, and the 3rd party M&V lead. These interviews were conducted over the telephone and took between 30 minutes and one hour to complete. These meetings, combined with the kickoff meeting, allowed the evaluation team to create a focused evaluation plan with defined data collection activities.

2. Participating Customer Surveys

The evaluation team used participant telephone surveys to meet both process and impact objectives. These surveys focused on the following two topics:

- **Rebate Experiences:** The evaluation team assessed how customers became aware of the air conditioning and heat pump measures to better understand how participating customers learn about the rebates. It asked customers about their awareness of and understanding of the QI process. The evaluation team assessed motivations to apply for rebates to better understand why customers wanted to participate and if any particular product elements drive motivation. The evaluation team discussed participating customers' experience with and satisfaction with various aspects of the rebate process.

- **Retrospective NTG Impacts:** The team asked participating customers questions on product attribution, meaning the impact the product had on their decision to purchase high efficiency air conditioners or heat pumps through Xcel Energy. We also asked about potential additional energy efficient equipment installed without an Xcel Energy rebate but because of their experience with the air conditioning or heat pump rebate offering.

For the participating customer survey, the evaluation team surveyed customers who received a rebate by August 31, 2021. This included customers who installed equipment in 2020 and 2021. The evaluation team initially designed its sample to be a representative mix of participants based on the variety of equipment installed through the air conditioning and heat pump rebates, however because heat pumps made up a small percentage of savings, we would have only surveyed five heat pump participants (four who installed mini-split heat pumps and one who installed an air source heat pump) if we used this approach. Because Xcel Energy wants to strategically better understand how to grow the heat pump market, the evaluation team recommended increasing the number of participants surveyed who installed heat pumps (from 4 to 20 for mini-split heat pumps and from 1 to 10 for air source heat pumps) to better understand their decision making processes (see Table 3).

Table 3. Stratification of Sample for Participating customer Survey (Jan-Dec 2020)

Strata	Total Measure kWh	Sample Size
Air Conditioners (SEER 15 or greater)	3,379,554	54
Air Conditioners (SEER 13-14.5)	982,168	16
Mini-Split Heat Pumps	246,421	20
Air Source Heat Pumps	32,811	10
Total	**4,640,954**	**100**

Note: This is table does not include ground source heat pumps or heat pumps in the miscellaneous category from Table 1.

2b. Participating Customer Interviews

The evaluation team recommended selecting up to 10 customers from the participating customer surveys and conducting in-depth interviews with these customers. These interviews were reserved for survey respondents who had conflicting responses on NTG questions so that the evaluation team could dive deeper into their decision-making processes and clarify their free-ridership and/or spillover.

3. Nonparticipating Customer Surveys

The evaluation team recommended conducting 70 nonparticipant telephone surveys to meet process objectives. For the purposes of this research, nonparticipating customers were defined

as customers who received a furnace rebate but did not receive a cooling equipment rebate since 2012, which was when Xcel Energy started tracking product participation through its data tracking tool, Salesforce. These surveys were conducted over the phone and will focus on the following three topics:

- **Barriers to participation:** The evaluation team explored why customers chose to install their air conditioner or heat pump outside of the product and understand what perceptions and barriers lead to not engaging with the product.
- **Heat pump growth:** The evaluation team explored customers' level of awareness and interest in the product. This helped to understand the influence of the air conditioning and heat pump market on customers' buying decisions and why they chose not to engage with the product.
- **Retrospective NTG Impacts:** The team asked nonparticipating customers if they installed high efficiency air conditioning or heat pump equipment due to any influence from Xcel Energy outside of the rebate process. This information supported potential spillover results among non-participants.

4. Participating Trade Partner Interviews

The evaluation team used trade partner interviews to meet both process and impact objectives. We expected to conduct 20 interviews with active trade partners. These interviews were integral for exploring the following topics.

- **Rebate Experiences:** The evaluation team explored trade partners' awareness of the equipment, product rebates, and the ACCA QI process. Trade partners feedback on the new comprehensive approach to providing residential HVAC services in one product and the potential value a comprehensive approach brought to trade partners.
- **Barriers to Participation:** The evaluation team asked participating trade partners about what they view as the biggest barriers to engaging with the product and what may motivate them to install equipment outside of the product. We determined the tools participating trade partners find most helpful in motivating customers to purchasing efficient air conditioning and heat pump equipment and performing QI, and any barriers they experienced.
- **Heat Pump Growth:** The evaluation team explored what types of heat pumps participating trade partners are installing, or if they specialize in a particular type. We gauged the potential of going midstream with mini-split rebates and discussed trade partners' familiarity with heat pump installation processes. Overall, this helped to understand what participating trade partners think the future of the heat pump market looks like.
- **Retrospective and Prospective NTG Impacts:** Finally, the team asked questions on product attribution, or the impact the product had on their decision to install and/or recommend efficient air conditioning or heat pump equipment.

The evaluation team planned to interview 20 participating trade partners as part of this effort, as shown in Table 4. In an attempt to understand trade partner influence on customer decisions, the evaluation team prioritized speaking with the top 15 active trade partners in 2020. It then supplemented remaining interviews with trade partners who pursued a mid-level of projects in 2020. The evaluation team attempted to conduct these interviews after the participating

customer surveys so that we could follow-up with trade partners that customers identified as being particularly influential to a customer's decision-making process.

Table 4. High Efficiency Air Conditioning/Heat Pump Trade Partner Target Interviews, by Interview Strata

Trade Partner Type	Strata	Target Interviews
Trade Partners	High-tier participation (Top 15)	10-15
	Mid-tier participation	5-10
	Total	**20**

5. Nonparticipating Trade Partner Interviews

The objective of the nonparticipating trade partner task was to understand why some trade partners chose not to install high efficiency air conditioning and heat pump equipment through the Xcel Energy rebates. The evaluation team collaborated with the product manager to identify 15 nonparticipating trade partners to interview, as outlined in Table 5. Roughly half had limited engagement with the product (1-2 projects completed in 2020), and the other half had completed zero projects in 2020.

- **Barriers to participation**: The evaluation team asked nonparticipating trade partners about what they view as the biggest barrier to engaging with the product and, if applicable, what motivated them to install high efficiency air conditioners or heat pumps outside of the product. Through these conversations, the evaluation team had a better understanding about why some trade partners dropped out of the product in 2020. The evaluation team also explored ways Xcel Energy can encourage increased trade partner participation in the future.
- **Heat Pump Growth:** The evaluation team explored nonparticipating trade partners' level of awareness and perceptions of heat pump products. This helped to understand how nonparticipating trade partners perceived the heat pump market and how they see their participation in the heat pump market in the future.
- **Retrospective NTG Impacts:** The team asked nonparticipating trade partners whether Xcel Energy efforts have impacted their sales of high efficiency air conditioning or heat pump equipment outside of the Xcel Energy rebates. This information supported the understanding of potential market effects Xcel Energy has had on market actors.

Table 5. High Efficiency Air Conditioning/Heat Pump Nonparticipating Trade Partner Target Interviews, by Interview Strata

Trade Partner Type	Strata	Target Interviews
Nonparticipating Trade Partners	Limited number of projects completed	7-8
	No projects completed	7-8
	Total	**15**

6. Peer Utility Benchmarking Interviews

The objective of the peer utility benchmarking task was to understand how peer utilities are approaching key issues related to implementing high efficiency residential cooling programs. The evaluation team collaborated with the product manager to identify 4-6 peer utilities to interview. It considered the following criteria when selecting peer utilities: similar program designs, programs known to require quality installation, programs that offer high efficiency air conditioning and heat pump rebates, programs that allow fuel switching, and utilities that operate in similar territories (including the geography and the number of customers).

The evaluation team worked to recruit staff in key management roles related to high efficiency residential cooling programs at peer utilities with a target sample size of four to six interviews. These interviews generally focused on the same discussion topics being explored in the interviews with Xcel Energy customers and trade partners, but emphasized exploring the heat pump market:

- **Heat pump growth:** The evaluation team assessed peer utilities' understanding of cold climate heat pumps, especially because there is no industry standard for their definition. It also asked peer utilities how familiar they are with heat pump installation processes. The evaluation team collected feedback back on what realistic heat pump market transformation looks like from the peer utilities' perspective.

Table 5 outlines the peer utilities that the evaluation team identified to include in the peer utility sample. These utilities were identified using E Source, a database of utility demand-side management programs, and were compared to the peer utility list provided by Xcel Energy. The product manager reviewed these utilities and identified additional peer utilities for consideration prior to conducting the interviews.

Table 5. Peer Utilities to Include in the Peer Utility Sample.

Utility	Heat Pumps	Quality Installation	Combo Utility	Fuel Switching	Four Seasons	Xcel Energy Peer Utility
Avista – WA	x		x	x	x	
APS	x	x				x
NV Energy	x	x	x		x	
Sacramento Municipal Utility District (SMUD)	x			x		
Black Hills Energy - CO	x		x	x	x	
Rocky Mountain Power - UT	x	x		x		
Eversource - MA	x		x		x	x
PSEG Long Island	x	x	x		x	x
Appalachian Power - VA	x	x			x	x
ConEdison	x	x	x		x	
Southern Californian Edison (SCE)	x			x		x
Ameren Illinois	x		x		x	x
PECO	x		x	x	x	x
Dominion Energy - SC	x		x			x
PPL Electric	x				x	X
DTE Energy	x		x		x	X

Note: Utilities marked as "Xcel Energy Peer Utility" appear on the Xcel Energy Peer Utility List provided to TRC in May 2020.

The evaluation team developed a peer utility interview guide that is customized to the desired benchmarking components, that was provided to Xcel Energy for approval prior to beginning any data collection. Finally, the evaluation team summarized the results of the benchmarking analysis in a summary within the final evaluation report.

Net-to-Gross Approach

The NTG assessment aimed to estimate the percent of savings achieved that can be attributed to product actions, or a NTG ratio. The NTG value included multiple metrics, which are described in the sections below. To do so, the evaluation team primarily used participant self-

report surveys, trade partner interviews, and self-report nonparticipant surveys to assess product attribution, including free ridership, spillover, and market effects metrics. The team based its methodology on the most recent Illinois Technical Reference Manual (TRM)[4] as this type of approach is used extensively in other jurisdictions both by our team and outside industry experts, and it was the basis of the NTG approach for the evaluation of the 2019 Xcel Energy Minnesota Cooling Evaluation, which estimated NTG for similar products.

The evaluation team estimated a retrospective and prospective NTG value. Using multiple sources of information, including surveys with customers and interviews with trade partners, we synthesized available data to develop the final NTG ratios to ensure that we provided the most accurate and reliable estimate of NTG. The remainder of this section presents the evaluation team's method to estimating the retrospective and prospective NTG ratios.

Retrospective NTG

The evaluation team estimated a retrospective NTG by examining free ridership, spillover, and market effects. The evaluation team relied primarily on data collected from customers, along with additional qualitative input from trade partners. The evaluation team then synthesized these results to estimate one NTG ratio for all measures in this evaluation. This section describes how the evaluation team estimated these components of the retrospective NTG ratios.

Free-ridership. Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Free-ridership is assessed on a scale from 0 to 1, where 1 indicates that the product had 100% free-ridership and all product savings would have occurred without any of the product's rebates or assistance.

To determine free-ridership, the evaluation team applied the Residential Prescriptive Rebate (With No Audit) Protocol from the Illinois TRM, and wrote specific questions to assess two free-ridership components:

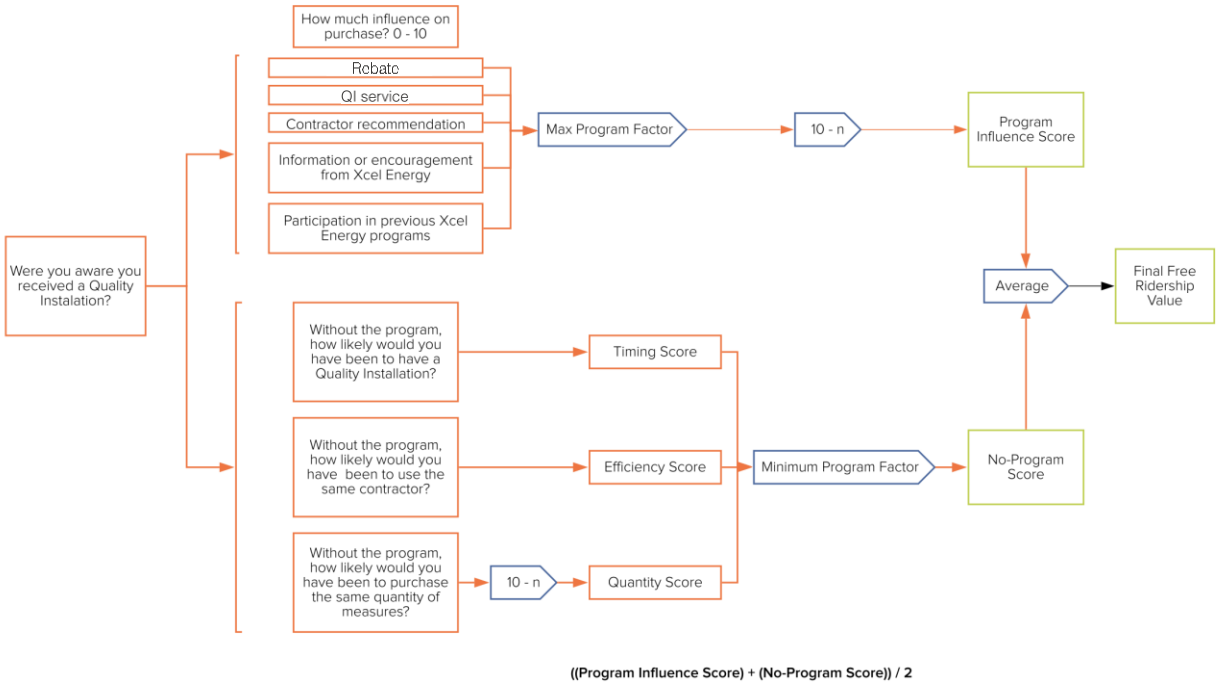
- A **Program Influence Score**, based on the participating customer's perception of the importance of various product components in their decision to carry out the energy-efficient project, including QI; and
- A **No-Program Score**, based on the participating customer's intention to carry out the energy-efficient project without product funds.

When scored, these components assessed the likelihood of free-ridership on a scale of 0 to 10. These two scores were averaged together and then adjusted to account for whether the product influenced the customer to adjust the number of measures installed. This adjustment then

[4] Illinois Energy Efficiency Stakeholder Advisory Group. Illinois Statewide Technical Reference Manual, Version 9.0, Volume 4, Attachment A: IL-NET-TO-GROSS Methodologies, Section 4. September 25, 2020. https://ilsag.s3.amazonaws.com/IL-TRM_Effective_010121_v9.0_Vol_4_X-Cutting_Measures_and_Attach_09252020_Final.pdf

produced the final free-ridership score. Figure 2 describes the logic used for calculating free-ridership for air conditioners and air source heat pumps with the quality installation component.

Figure 2. Free-Ridership with QI Calculation Methodology for Air Conditioners and Air Source Heat Pumps with Quality Installation

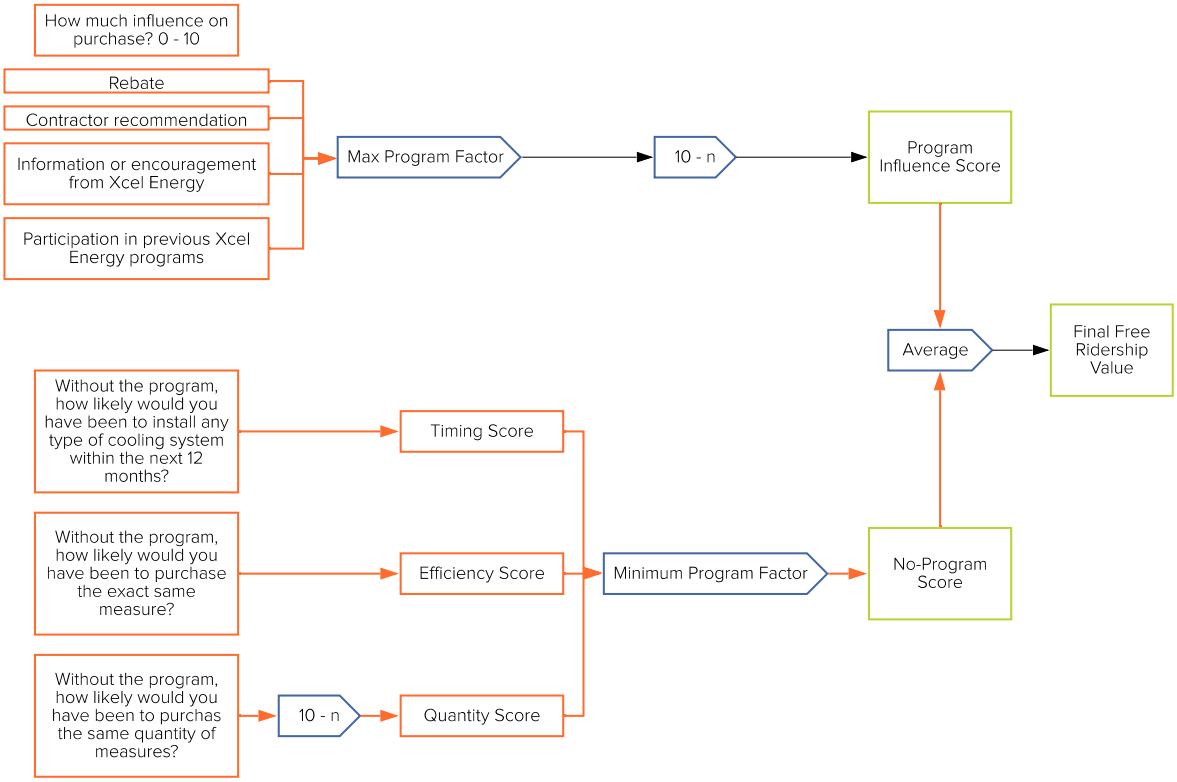


Note: The IL TRM V 9.0 includes a 0.5 free ridership multiplier for those customers that said they decided to purchase high efficiency equipment before they learned of the rebate. Instead of adding this multiplier, our approach will be to use an open end question to determine influence rather than a pre-assigned 0.5 adjustment.

The calculations for QI had three differences: (1) there was an added question at the beginning to determine if the participating customer had been aware that they had received QI; (2) there were separate questions about the rebate overall and the requirement specifically for QI for the Program Influence Score; and (3) the No-Program Score questions were altered to be relevant for QI, as seen in Figure 6.

Figure 3 describes the logic used for calculating free-ridership for mini-split heat pumps, which did not include a quality installation component.

Figure 3: Free-Ridership Calculation Methodology for Mini-Split Heat Pumps



((Program Influence Score) + (No-Program Score)) / 2

For the Program Components score, the evaluation team envisioned including the following items as Program Factors:

Program Factors:

- The availability and amount of the rebate
- The QI service provided by the technician
- The trade partner who performed the work
- Information provided to the customer through product marketing/advertising or educational materials
- Previous participation in an Xcel Energy program

The evaluation team assessed free-ridership primarily using participant self-report surveys and will integrate trade partner interviews where applicable. Specifically, when customer survey respondents rated the trade partner as highly influential on the decision to install a measure but indicated free-ridership elsewhere in the survey, the evaluation team attempted to recruit those trade partners for the interviews and assess the product's influence on their practices. The purpose of the interview was to determine if the product's influence was directed at the trade

partner, rather than the customer, and to appropriately track that influence on the project overall. The evaluation team then used qualitative adjustments for the rest of the customers.

Participant Spillover. The spillover metric represents additional savings achieved as a result of product activities, outside of rebated measure savings, by product participants. The evaluation team incorporated two measure attribution scores; the first incorporated the influence the product had on the purchase of this additional measure (measure attribution score #1), and the second incorporated likely actions taken in absence of product participation (measure attribution score #2). The spillover score, as calculated below, must be greater than five in order for the additional measure to qualify for spillover. When this criterion is met, the savings are added to product attributable savings.[5]

$$Spillover\ Score = \frac{Measure\ Attribution\ Score_1 + (10 - Measure\ Attribution\ Score_2)}{2}$$

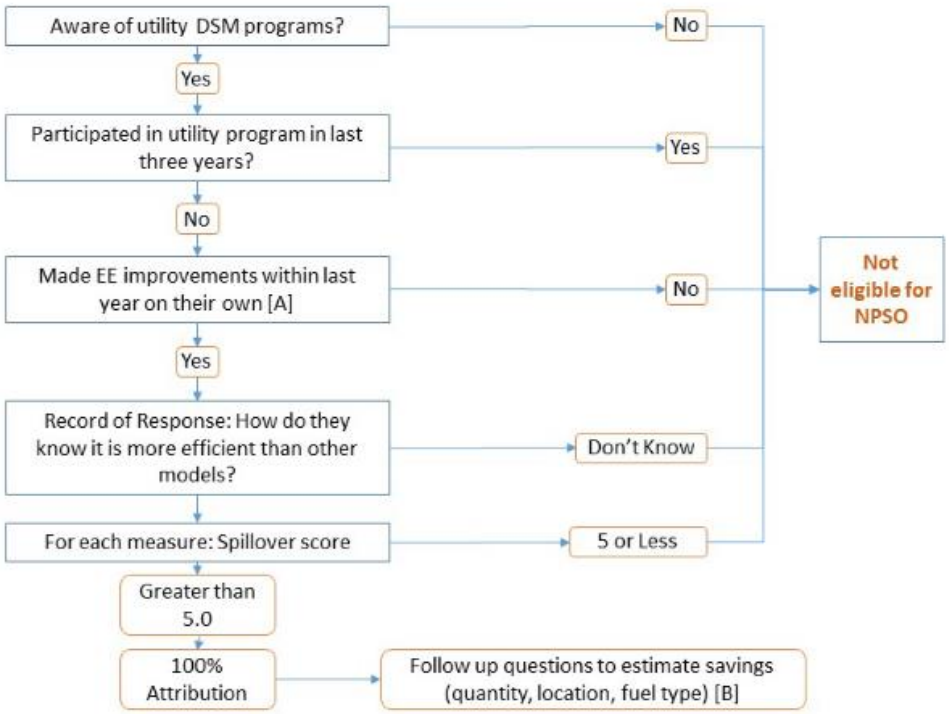
Nonparticipant Spillover. The evaluation team estimated nonparticipant spillover by using the IL TRM "Nonparticipant Spillover Measured from Customers" Protocol (NPSO Protocol).[6] We defined nonparticipants as those customers who have no record of having completed an air conditioner or heat pump project in Xcel Energy's Salesforce system (i.e., have not participated since 2012). The survey will ask nonparticipating customers if they have completed any qualifying cooling projects but did not receive a rebate.

To determine spillover-qualified equipment, the evaluation team first determined whether the customer knew about Xcel Energy's energy efficiency programs and/or marketing messages. If the customer was aware, the survey asked if they or anyone in their household made an energy efficiency improvement within the last year, and if so, what improvements they made. Responses to these questions generated a list of potential spillover measures (shown at point "[A]" in Figure 4). Customers were asked how they know the measure is more efficient than other models. If the respondent named an efficiency level that is above the minimum federal standard, or if they identified a technology (or QI) that we confirmed is above the minimum federal standard, it counted towards NPSO.

[5] IL TRM Version 9, Volume 4, page 64-65.

[6] IL TRM Version 9, Volume 4, page 66-68.

Figure 4. Non-Participant Spill Over Question Logic[7]



Note: We will use the threshold of participation since 2012, rather than the last three years, due to the longer lifespan of cooling equipment, and given when projects began being tracked in Salesforce.

Similar to participant spillover, the evaluation team incorporated two measure attribution scores; the first incorporated the influence the utility had on the purchase of this additional measure (measure attribution score #1), and the second incorporated whether the customer would have installed the measure had they not been influenced by the product (measure attribution score #2). The spillover score, as calculated below,[8] must be greater than five in order for the additional measure to qualify for spillover.

$$NPSO\ Score = \frac{Measure\ Attribution\ Score_1 + (10 - Measure\ Attribution\ Score_2)}{2}$$

Market Effects. The trade partner interviews offered important insights into market effects of the high efficiency air conditioners and heat pumps. Such "market effects" signified a transformation in the underlying structure and functioning of the market. Market effects can take many forms and may result from product impacts in a market over time. Examples of market effects include trade partners changing their business models based on the influence of the

[7] As depicted in the IL TRM Version 7, Volume 4, Figure 4-1, page 51.

[8] IL TRM Version 7, Volume 4, page 35-36.

product—for instance, a trade partner may be more likely to promote high efficiency cooling products to residential customers knowing that a rebate is available for customers. Over time, the contractor builds this into their general approach to marketing and selling cooling measures. The interviews included questions to assess any long-lasting changes to trade partner practices.

Estimating NTG Ratio. By design, our final NTG estimate recommendation included data from mixed methods research – both quantitative data and qualitative data. The initial NTG estimates for direct install and prescriptive/custom measures were calculated separately and estimated using self-reported participant responses, trade partner reported NTG interview responses, and nonparticipant survey responses. The formula to calculate the retrospective NTGR is as follows:

$$NTGR = 1 - (Free - Ridership) + (Spillover\ Ratio) + (Market\ Effects\ Adder)$$

After the initial NTG estimates were calculated, we then used the quantitative and qualitative data to construct a logical, internally consistent, and coherent narrative of product attribution that attempted to identify all possible pathways of Xcel Energy influence. We relied on the following data sources to construct the NTGR:

- Participant surveys
- Non-participant surveys
- Trade partner interviews

Based on these results, we then adjusted the NTG to create a final recommended NTG ratio that is consistent with this narrative and is informed by the overall purpose and design of the product. The final NTG recommendation was based on the professional judgment of our team after considering all available quantitative and qualitative data.

Prospective NTG

The team recommended a prospective NTG ratio that was forward-looking and reflected upcoming changes to the market and known changes to the product. While the evaluation team did not calculate a heat pump specific NTG, it provided insight to Xcel Energy to understand how NTG may change prospectively to reflect the potential for a growing role of heat pumps in the portfolio. The NTG ratio reflected any recommended adjustments to the retrospective NTG ratio based on evidence from the evaluation findings, including results from participants, trade partners, staff interviews, and peer utilities. Trade partners were asked about the importance of the rebates in driving the installation of residential high efficiency air conditioners and heat pumps in Colorado. In developing our final recommended NTG ratio, the evaluation team followed the Illinois TRM protocol which recommends that the evaluation team assess each data collection activity based on considerations of the likely bias, accuracy, and representativeness of the findings. Additionally, we used input from the staff interviews to inform potential future changes to the product and incorporated those into the final NTG estimate. We also incorporated results from the benchmarking research into prospective NTG values used in other states to inform the estimate.

Appendix B: Data Collection Documents

Appendix B contains materials related to data collection including the staff interview guide, participating customer survey instrument, nonparticipating customer survey instrument, trade partner interview guide, nonparticipating trade partner interview guide, and peer utility benchmarking guide.

B.1 Staff Interview Guide

This guide was used to interview staff associated with Xcel Energy's DSM products as part of the TRC Companies 2021 evaluation of the Xcel Energy DSM products. The interviews were semi-structured, with these questions served as a basic guide for experienced TRC Companies staff during one-on-one phone interviews. As a guide for semi-structured interviews, these questions were not necessarily asked verbatim, but served as a roadmap during the conversation.

Staff Interview Research Questions or Objectives

List the research questions that this research task is designed to address.

- Assess the extent to which the product design supports product objectives and customer service/satisfaction objectives
- Understand Xcel Energy's current offerings relating to residential high efficiency air conditioning and heat pump measures.
- Assess the degree to which product resources are sufficient to conduct product activities with fidelity to the implementation plan
- Collect staff feedback on implementation successes and challenges
- Identify themes and issues for possible revisions to the standard evaluation plan

Section A: Introduction

[For staff did not attend the kick-off meeting:] First we would like to give you some background about who we are and why we want to talk with you today. TRC Companies is an independent consulting firm that works with electric and gas utilities to review and improve product operations and delivery. Xcel Energy contracted with us to perform an evaluation of their portfolio of energy efficiency products, and we're currently in the process of conducting interviews with product managers and key staff involved in designing and delivering residential air conditioning measures to customers in Colorado. The interview objectives are to improve our understanding of Xcel Energy's DSM products and their influence on customers. We also want to understand how our research can be useful for you as Xcel Energy product staff and incorporate your priorities into our study so that the results are as useful as possible.

[ALL] Thank you for taking the time to speak with us today. My objective for this meeting today is to gain a deeper understanding of the residential air conditioning offering in Colorado, what Xcel Energy hopes to achieve through implementing this product, how it operates, and a bit about your experiences with the residential air conditioning. We are interested in asking you some questions about the residential air conditioning in Colorado so we can benefit from your knowledge and experience to improve our understanding. I have a set of questions that should

take approximately 45 minutes. We will combine the information you provide with information gathered from other interviews before reporting summarized information back to Xcel Energy.

Before I begin, is it alright if I record the conversation for note taking purposes? [RECORD IF ALLOWED AND CONFIRM YOU ARE RECORDING ONCE RECORDING BEGINS]. Thanks, we are recording now.

A1. First, can you take a moment and explain your role and scope of responsibilities with respect to the CO high efficiency air conditioning offering? [IF ALREADY KNOWN, REWORD TO CONFIRM]

Probes:

- Approximately how long have you held this position?
- What previous positions did you hold?
- Whom do you report to in the overall org structure?

Section B: Product Goals

I'd like to be sure I understand the goals of the high efficiency air conditioning offering, both overall and specific. [**Adjust questions as needed based on what has been learned from document review and kickoff meeting**.]

B1. Can you take me through the key goals for the high efficiency air conditioning offering?

[For staff outside of the Customer Solutions team] Can you take me through the key goals for the high efficiency air conditioning offering, as it relates to your role?

B1a. Can you describe the product's savings goals? Do you have specific goals for individual components of the product (e.g., upstream vs. downstream, by measure type)?

B1b. Any other, non-energy goals?

B1b1. Any more immediate goals? For example, participation goals, customer engagement goals, improving customer satisfaction? Changing customer awareness of or attitudes about energy efficiency measures?

B1b2. Any longer-term goals? For example, reducing greenhouse gas emissions? Altering market behaviors?

B2. Have any of these goals changed in the last few years?

B2a. What was the rationale for changing them?

B2b. In your opinion, how have these changes affected the product's operations or its outcomes?

B2c. Where these changes a result of internal factors (to Xcel Energy), external factors, or a combination of both?

B3. Have any of these goals changed in 2020?

B3a. What was the rationale for changing them? Probe: COVID-related changes?

B3b. In your opinion, how have these changes affected the product's operations or its outcomes?

B4. What are "indicators of success" for the high efficiency air conditioning offering?

B4a. What are interim indicators that the high efficiency air conditioning offering is or is not meetings its objectives or goals?

B5. What influences, if any, do you think the high efficiency air conditioning offering has had on the market?

Section C: Product Activities

I would like to make sure I have a solid understanding of how this product operates and talk through the different components of the product. If there are any formal documentation and/or websites that you can refer me to as we walk through these next questions, I'd appreciate getting that information.

[**TAILOR BASED ON WHAT IS ALREADY KNOWN**]

C1. Can you describe the incentives and/or tools the product uses to achieve its goals, with incentives including both monetary incentives as well as services provided directly by someone on behalf of Xcel Energy: [PROBE ANY INCONSISTENCIES WITH BACKGROUND INFO AND WHAT THEY OFFER, CONFIRM INCENTIVES].

C2. Have any of these incentives changed in the last few years?

C2a. If yes - What was the rationale for changing them?

C2b. If no- Do you anticipate any changes in the near future?

C3. What activities do product and implementer staff engage in to achieve product goals?

- Marketing?
- Financial Assistance?
- Applications?
- Technical Assistance?
- Education?
- Contractor/Trade Partner Support?
- Verification?

C3a. What tools are used to reach out to customers and/or market partners?

C3b. Are these product activities modeled on another product or set of products?

C4. Have any of these activities changed in the last few years?

C4a. What was the rationale for changing them?

C4b. In your opinion, how have these changes affected the product's operations or its outcomes?

C4c. Have you measured how these changes impacted savings or participation?

C5. What are the participation steps from a customer perspective?

Section D: Strengths and Challenges

Next, I'd like to get your feedback on how the product is running.

[TAILOR BASED ON WHAT IS ALREADY KNOWN]

D1. In your opinion, what are the strengths of the high efficiency air conditioning offering as it is currently being run?

- **D1a.** What would you say is working well in terms of product design or implementation?

D2. What are the most significant challenges for this product at this point?

D3. What feedback, if any, do you receive from customers on the product? (PROBE FOR CUSTOMER ENGAGEMENT/ CUSTOMER SATISFACTION)

D4. What do you believe are the biggest barriers to getting customers to participate in this product?

D5. Are there any specific opportunities for improvement in the design or implementation of the product? Please describe.

D6. What would you like to see changed in how the product is designed or run, if anything?

- **D6a.** Do you think there are any roadblocks preventing these changes from happening?

Section E: Resources

E1. What resources do you rely on to implement the product?

- **E1a.** Product, implementer, sales staff?
- **E1b.** Management and product direction?
- **E1c.** IT tools and data tracking tools?
- **D1d.** Other resources?

E2. Are these resources sufficient to implement the product as designed?

- **E2a**. [IF NO] How could the product design/implementation change to be more efficient?
- **E2b.** [IF NO] What additional resources, if any, would help you implement the product as designed?

E3. Have any of these product resources changed in the last few years?

- **E3a.** What was the rationale for changing them? Any COVID related changes?
- **E3b**. In your opinion, how have these changes affected the product's operations or its outcomes?

Section F: Product Tracking and Reporting

I understand that you are using Salesforce as your primary product tracking tool. I'd like to understand how product activities are tracked to understand what data might be available to us in our evaluation.

[**TAILOR BASED ON WHAT IS ALREADY KNOWN**]

F1. What kind of documentation is available for the different product? Implementation plans? Product manuals? Process maps?

F2. What kinds of data are collected for the high efficiency air conditioning offering?

F3. Are there any data that you would like to collect for the high efficiency air conditioning offering but haven't been able to?

F4. Are there any data/documentation not tracked in Salesforce that might be helpful for the evaluation?

F5. As part of our evaluation, we plan to speak to "non-participants." Do you have recommendations for how we can define a "non-participant"?

F6. [For Engineering Staff] What kind of baseline does the product use to estimate energy savings? [PROBE FOR CODE VS. COMMON PRACTICE]

Section G: Closing

G1. Based on the kickoff meeting, we are planning to prioritize:

- Focus on cooling aspects of AC and HP.
- Careful look at how we define "QI" when talking to customers and trade partners.
- Consider creating sub-samples for TP to dive into some process questions relating to 2021 program:
  - How to grow the heat pump market
  - Feedback to date on the comprehensive HVAC approach

Does this align with your understanding?

G1a. Do you have anything you would like to add to these priorities, remove from this set of priorities, or change about these priorities?

G2. Do you have particular questions that you would like to see answered by the evaluation? Why are these questions important?

G3. Do you have any other comments, concerns or suggestions about the product that we didn't discuss that you would like to make sure I know about?

G4. Do you have any peer utilities that you'd like us to include in the peer utility benchmarking interviews? Peer utilities could either include utilities that have been identified by internal or external parties as exemplary or utilities with a similar climate, customer mix, etc. to understand their practices.

G4a. What criteria is most important to you when selecting a peer utility (e.g. similar climate, similar time in market, etc.)?

G4b. What performance indicators are you interested in the evaluation benchmarking?

Thank you very much for taking the time in assisting us with this evaluation. If I come up with any additional questions that come from this interview, do you mind if I send you an email or give you a quick call?

B.2 Participating Customer Survey Instrument

To support the process evaluation of the 2021 Xcel Energy energy efficiency programs, the TRC evaluation team conducted telephone surveys with participants. For the purposes of this survey, the evaluation team defined a participating customer as any customer who purchased and received a rebate after April 1st, 2021. The research assessed key process and impact evaluation objectives, including customer perceptions/awareness, customer decision-making and barriers, product experience/satisfaction, participation in related programs, use of heat pumps, and NTG impacts.

The remainder of the introduction provides the evaluation objectives and research questions which the participant survey was designed to address, a description of the sample population and the target number of completes, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The objectives for the Colorado residential air conditioner and heat pump measures evaluation are to:

- Collect feedback on **rebate experiences** with the air conditioner and heat pump rebate process. This will include a variety of topics including:
  - Awareness of the equipment and rebates.
  - Motivations to purchase the equipment and pursue a rebate.
  - Awareness of the ACCA QI process and interpretation of QI.
  - Feedback on the new comprehensive approach to providing residential HVAC services within one product.
  - Satisfaction with rebate processes.
- Identify **barriers to participation** in the product, particularly by investigating why trade partners and customers may install equipment outside of the product.
- **Explore ways to grow the heat pump market**. In doing so, we will explore the following topics:
  - Understand how trade partners talk to their customers about the perceived benefits of heat pumps.
  - Understand whether trade partners are specializing in the types of heat pumps they install.
  - Explore potential for midstream mini-split rebates.
  - Understand trade partner familiarity with the heat pump installation process and how peer utilities are supporting trade partners with learning heat pump installation processes.
  - Explore what heat pump market transformation can look like.
  - Research interest in heat pumps among participating customers in other DSM programs.
  - Understand how peer utilities are defining and supporting cold climate heat pumps.
  - Determine why heat pump trade partners appeared to have dropped out of the product in 2020.
- Determine **NTG ratio** for air conditioning and heat pump rebates.
  - Identify major drivers of free ridership.

- Assess participant spillover.
- Assess market effects of high efficiency air conditioning and heat pump rebates.

The participant survey addresses every evaluation objective. For reference, Table 4 provides the evaluation efforts used for each objective.

Table 4: Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Participant Survey Objective
Collect feedback on the rebate experiences	Process	Participating customer surveys, and participating and nonparticipating trade partner interviews	✓
Identify barriers to participation	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the heat pump market	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	Impact	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓

Table 5 presents the research questions which this participant survey is designed to address, linking each research question to the associated evaluation objective and survey question.

Table 5: Evaluation Objective, Research Question, and Survey Question Crosswalk

Evaluation Objective	Research Question	Survey Question Number(s)
Collect feedback on the rebate experiences	• How do participants become aware of air conditioning and heat pump equipment? • How do participants become aware of air conditioning and heat pump Xcel Energy rebates? • Are participants aware of the ACCA QI process? • Do participants understand the benefits of the ACCA QI process? • Are participants satisfied with the rebate process? • What are motivations to purchasing high efficiency AC equipment and having QI completed?	Section A, C1b, C2b, D1, D2, D3, D4
Identify barriers to participation	• Did participants face any barriers to pursuing their efficient cooling upgrades? • Did participants face any barriers to pursuing the Residential Heating and Cooling Product.	C3, D7
Explore ways to grow the heat pump market	• What do heat pump participants view as the perceived benefits of heat pumps? • Did AC participants discuss viability of heat pumps with their installers? • Why did AC participants not install a heat pump?	A5, B4a, B4b, B5, C4a, C4b
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	• What influence did the Xcel Energy rebates have on participants' decision to purchase high efficiency air conditioners and heat pumps? • Did customers complete any other energy efficient upgrades without a rebate because of the Xcel Residential Heating and Cooling Product?	Section C, Section B, Section Q, Section S

Sample and Target Completes

Table 6 summarizes the total sample that was targeted for the survey, based on an expected 15% response rate. The sample was broken out by the measure installed by the participating customer: air conditioners (SEER 15 or great), air conditioners (SEER 13-14.5), mini-split heat pumps, and air source heat pumps. The number of target completes was designed to achieve results at the 90% confidence level with +/- 10% precision for the program.

Table 6: Sample Population and Target Completes by Strata (April 1, 2021-September 15, 2021)

Strata	Total Population[b]	Target Completes
Air Conditioners (SEER 15 or greater)	1,671	53
Air Conditioners (SEER 13-14.5)[a]	918	17
Mini-Split Heat Pumps	198	21
Air Source Heat Pumps	9	9
Overall	**2,796**	**100**

[a] *Equipment labeled "SEER 14.5" in the Xcel Energy database represent equipment whereby participants intended to purchase higher tier equipment, but it was unavailable due to COVID-19 related supply shortages. While there is no technical designation for SEER 14.5, Xcel Energy wanted to track these customers uniquely to understand market impacts due to supply shortages.*
[b] *April and May participating customers that used a contractor who ultimately was not allowed to pursue rebates in 2021 were removed from the participant population.*

Sample Variables

The following table includes the sample variables that were used to conduct this survey, as well as descriptions of these variables and potential codes.

Table 7: Sample Variables

Sample Variable	Variable Description	Potential Codes
Interviewer Name	Name of interviewer from Ewald and Wasserman	e.g. Katrin Ewald
MEASURE_NAMEA	The description of the specific equipment installed in the customer's home as part of the program, with article	e.g. a mini-split heat pump, an air source heat pump, a SEER 15 central air conditioner
MEASURE_NAMEB	The description of the specific equipment installed in the customer's home as part of the program, without article	e.g. mini-split heat pump; air source heat pump, SEER 15 central air conditioner
Contact	Customer name	e.g. Nicole Thomas
PROGRAM	Program description	rebate program
Phone	Phone number for customer	e.g. 555-555-5555
STRATA	Type of equipment/service rebated	1 = Air Conditioners (SEER 15 or greater)

Sample Variable	Variable Description	Potential Codes
		2 = Air Conditioners (SEER 13-14.5) 3 = Air Source Heat Pumps 4 = Mini-Split Heat Pumps
MEASURE_TYPEA	Generalized description of the equipment installed, with article	e.g. an air conditioner, a mini-split heat pump, a heat pump
MEASURE_TYPEB	Generalized description of the equipment installed, without article	e.g. air conditioner, heat pump
QUANTITY	Number of units installed	1, 2
MONTH	Month equipment was installed	e.g., February
YEAR	Year equipment was installed	2020
Like_Spillover_Measure	Energy efficient cooling equipment installed without a rebate from Xcel Energy	e.g., air source heat pump
Spillover_Measure	Non-cooling energy efficient measure installed	e.g., more efficient dishwasher

Fielding Instructions

- Attempt each record six times on different days of the week and at different times.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals (e.g., "I'm not interested", immediate hang-ups) at least once.
- The survey is considered complete when CLOSE2 is answered.
- After the survey fielding subcontractor (Ewald and Wasserman) completes 5 interviews, hold calling and output a preliminary SPSS dataset and recordings of the pretest interviews. Resume calling after TRC checks the data (usually with 1-2 working days).
- Monitor at least 10 percent of the interviews to ensure proper interview protocols (e.g., reading questions verbatim, proper probing, accurate data entry).
- Calling hours are 9 AM to 8 PM MST.

Survey Sections

- **A.** Awareness of Rebates, Heat Pumps, and Quality Installation
- **B:** Free Ridership
- **S:** Spillover
- **B.** Barriers and Motivations to Install EE Equipment & Have QI Performed
- **D:** Satisfaction and Feedback
- **H:** Demographics
- **CLOSE:** Closing

Section A: Awareness of Rebates, Heat Pumps, and Quality Installation

A0. I'd like to start by asking how you first heard about the Xcel Energy rebates for cooling equipment. Was it from…..(Read answering options. Select one)

1. Contractor,
2. Xcel Energy website,
3. Xcel Energy bill,
4. ENERGY STAR website,
5. Friends or family,
6. Or somewhere else [SPECIFY]

88. DK

99. REF

[ASK IF STRATA 4]

A1. Who installed your cooling equipment? Was it… [READ 1 – 4. Select one]

1. A contractor,
2. Yourself,
3. A friend or family member, or
4. Someone else [SPECIFY]

88. DK

99. REF

[ASK IF STRATA 3 OR 4]

A2. How did you first become aware of the potential to use heat pumps to cool or heat your home? Was it from….

(RANDOMIZE, READ ALL. SELECT ALL THAT APPLY.)

1. Prior experience with a heat pump,
2. Installer recommendations,
3. At the home improvement store,
4. Online search results,
5. Xcel Energy,
6. Social media,
7. friends and family (word of mouth),

8. Or from somewhere else [OPEN-END]

88. DK

99. REF

[ASK IF STRATA = 1 OR 2 OR 3]

A3. Now I am going to ask some questions about the installation of your equipment. To qualify for a rebate, your contractor installed your <MEASURE_TYPEB> using an enhanced installation process, known as a "Quality Installation," The Quality Installation process does not describe the equipment itself -- rather, Quality Installation improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for your home and sealing of all exposed ductwork. Were you aware that you received this enhanced installation?

1. Yes

2. No [skip to C1a]

88. DK [skip to C1a]

99. REF [skip to C1a]

[ASK IF A3 = 1]

A4. How did you first learn about the Quality Installation? (DO NOT READ OPTIONS; Select one)

1. Contractor who installed the equipment
2. Xcel Energy website
3. Xcel Energy bill
4. ENERGY STAR website
5. Friends or family
6. Other [SPECIFY]

88. DK

99. REF

[ASK IF A4 = 2, 3, 4, 5, 6]

A4a. To confirm, were you aware of Quality Installation for cooling equipment before talking to your contractor?

1. Yes

2. No

88. DK

99. REF

Section C: Barriers and Motivations to Install EE Equipment & Have QI Performed

[ASK if received rebate for high-efficiency CAC or ASHP, i.e., STRATA = 1 OR 3]

[If STRATA = 1 OR 3; ELSE SKIP TO C2a]

C1a. Now I want to ask you a few questions about the choices you made when you bought your cooling equipment. When you were in the process of purchasing this unit, at any point did you receive bids for lower efficiency or lower cost cooling equipment?

1. Yes

2. No [skip to C3]

88. DK

99. REF [skip to C3]

[ASK If C1a = 1 or 88]

C1aa. What lower efficiency or lower cost cooling equipment did you consider purchasing?

[OPEN-END]

88. DK

99. REF

[ASK If C1a = 1 or 88]

C1b. What are the reasons you chose to install the particular cooling equipment you purchased?

[DO NOT READ; SELECT ALL THAT APPLY]

1. Contractor recommendation

2. The rebate from Xcel Energy

3. The equipment is less expensive to operate (monthly cost is lower)

4. The equipment is more energy efficient
5. The equipment had better features [Specify]
6. [STRATA = 3] Heat pumps provide heating during colder times of year
7. Other (Specify): _____

88. DK

99. REF

[ASK if received rebate for Mini-Split Heat Pumps, STRATA = 4] [ELSE SKIP TO C3]

C2a. Now I want to ask you a few questions about the choices you made when you bought your cooling equipment. When you were in the process of purchasing this unit, at any point did you consider installing something else, instead of <MEASURE_NAMEA>?

1. Yes
2. No [skip to C3]

88. DK [skip to C3]

99. REF [skip to C3]

[If C2a = 1]

C2b. What are the reasons you chose to install <MEASURE_NAMEA>, rather than some other type of cooling equipment?

[DO NOT READ; SELECT ALL THAT APPLY]

1. Contractor recommendation
2. The rebate from Xcel Energy
3. Heat pumps are less expensive to operate (monthly cost is lower)
4. Heat pumps are more energy efficient
5. Allows cooling of specific rooms
6. Didn't require ductwork
7. Heat pumps provide heating during colder times of year
8. Other (Specify): _____

88. DK

99. REF

C3. Did you have any concerns when purchasing <MEASURE_NAMEA>? [DO NOT READ; ALLOW FOR MULTIPLE RESPONSE]

1. Availability of contractors willing to install equipment
2. Equipment Costs
3. Energy bill concerns
4. Technical knowledge of contractor
5. Comfort issues
6. Technical capabilities of equipment
7. No
88. DK
99. REF

[ASK IF STRATA = 1 OR 2]

C4a. Did you discuss the potential of installing a heat pump with your contractor?

1. Yes [RECORD RESPONSE IF PROVIDED]
2. No
88. DK
99. REF

[ASK IF C4a=1]

C4b. Why did you choose to install <MEASURE_NAMEA> instead of a heat pump? [DO NOT READ; ALLOW FOR MULTIPLE RESPONSE]

1. Contractor recommendation
2. Less expensive to purchase
3. Less expense to operate
4. Allows cooling of more rooms
5. No need for supplemental heat
6. Other (Specify): _____

88. DK
99. REF

Section B: Free Ridership

NOTE: QUESTIONS B1-B5 FOCUS ON ASKING ALL CUSTOMERS ABOUT THEIR DECISIONS TO PURCHASE AIR CONDITIONERS OR HEAT PUMP EQUIPMENT; HOWEVER IF A CUSTOMER INSTALLED A SEER 13/14 AIR CONDITIONER, WE ASSUME THE CUSTOMER IS INSTALLING STANDARD AIR CONDITIONING EQUIPMENT AND WILL ONLY BE ASKED THE EQUIPMENT QUESTIONS (B QUESTIONS) IF THEY DID NOT KNOW THEY RECEIVED QI.

[IF STRATA = 2 AND A3 = 1, SKIP TO Q1]

B1. In your own words, how would you describe the importance of the Xcel Energy air conditioning and heat pump rebate on your decision to purchase a <MEASURE_NAMEB>?

[RECORD VERBATIM]

88. Don't know

99. Refused

B2a. Now thinking about your decision to purchase this <MEASURE_TYPEB>, how influential was the availability of a rebate from Xcel Energy on this decision? Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential."

[INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

0. Not at all influential

…

10. Extremely influential

77. N/A

88. Don't know

99. Refused

B2b. How influential was any information or encouragement you received from Xcel Energy including information found on Xcel Energy's web site and the "Find a Contractor" tool, on your decision to purchase this equipment? This could include promotional or educational materials, or talking to someone at Xcel Energy. This could also include talking to someone else that had participated in the Xcel Energy program. Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential." [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

0. Not at all influential

…

10. Extremely influential

77. N/A

88. Don't know

99. Refused

B2c. And how influential was the contractor recommendation on your decision to purchase this equipment? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential."] [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

0. Not at all influential

…

10. Extremely influential

77. N/A

88. Don't know

99. Prefer not to answer

B2d. Had you participated in an Xcel Energy rebate or energy efficiency programs prior to this year?

1. Yes

2. No [Skip to B3]

77. N/A [Skip to B3]

88. DK [Skip to B3]

99. REF [Skip to B3]

[ASK IF B2D = 1]

B2dd. And how influential was your participation in the previous Xcel Energy program on your decision to purchase the <MEASURE_NAMEB>? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential."] [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

0. Not at all influential

…

10. Extremely influential

77. Not applicable

88. Don't know

99. Prefer not to answer

B3. Now I'd like you to imagine that the rebate program, including the rebate and any educational information, had never existed. [IF C3 =1-6 And knowing you faced challenges in purchasing the <MEASURE_NAMEB>, including [PIPE IN NO MORE THAN 2 RESPONSES FROM C3 ANSWER(S)], what is the likelihood that you would have installed any type of cooling system within the next 12 months? [Please use a scale from 0 = "Not at all likely" and 10 = "Extremely likely".]

0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

B4. Again imagining that the rebate program had never existed, [IF C3 =1-6 and you faced the same challenges concerns in purchasing the <MEASURE_NAMEB>], please rate the likelihood that you would have purchased the exact same <MEASURE_NAMEB> that you did purchase? When I say the exact same <MEASURE_NAMEB>, I mean the same model, size, and efficiency level.

0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

[IF QUANTITY > 1]

B5. Again imagining that the rebate program had never existed, please rate the likelihood that you would have purchased fewer than <QUANTITY> <MEASURE_NAMEB>s?

0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

[THE NEXT SET OF QUESTIONS FOCUS ON QUALITY INSTALLATION; ONLY ASK IF CUSTOMERS RECEIVED QI SERVICE AND ARE AWARE THEY RECEIVED SERVICE].

[ASK Q1-Q5 IF A3 = 1, 88, or 99; else skip to S1]

[ASK IF STRATA = 1 OR 2 OR 3; ELSE SKIP TO SECTION S]

Q1. In your own words, how would you describe the influence that the rebate program had on your decision to have a Quality Installation as opposed to a standard installation?

[RECORD VERBATIM]

88. Don't know

99. Refused

Q2. Now thinking about the contractor who installed the <MEASURE_TYPEB>, how likely is it that you would have selected the same contractor without the availability of the Xcel Energy rebate? Please use a scale from 0 to 10 where 0 means "not at all likely" and 10 means "extremely likely."

0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

Q2a. Did you receive quotes from more than one contractor before hiring the contractor that completed the installation?

1. Yes

2. No [Skip to Q2ab]

88. DK [Skip to Q2ab]

99. REF [Skip to Q2ab]

[If Q2a = 1]

Q2aa. Could you share the names of the companies that you got quotes from?

[OPEN-END]

Q2ab. Why did you decide to use the contractor that you hired? Was it because…

[READ RESPONSES; RANDOMIZE; SELECT ALL THAT APPLY]

1. Contractor mentioned and offers Xcel Energy rebates,
2. Contractor price,
3. Contractor personality / work well together,
4. Contractor's technical expertise,
5. Recommendation from family / friends,
6. Quality of contractor's work, OR
7. Something else (Specify): _____

88. DK

99. REF

Q2b. How influential was any information or encouragement you received from Xcel Energy including information found on Xcel Energy's web site and the "Find a Contractor" tool on your decision to have the Quality Installation? This could include promotional or educational materials, including the Xcel Energy web site, or talking to someone at Xcel Energy. This could also include talking to someone else that had participated in the Xcel Energy program. Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential." [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

1. 0. Not at all influential

…

10. Extremely influential

77. N/A

88. Don't know

99. Refused

Q2c. And how influential was the contractor recommendation on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential."] [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

1. 0. Not at all influential

…

10. Extremely influential

77. N/A

88. Don't know

99. Prefer not to answer

[IF STRATA = 2 ELSE SKIP TO Q3; NOTE: CUSTOMERS WHO INSTALLED NON-STANDARD EQUIPMENT WOULD HAVE ALREADY RECEIVED THIS QUESTION]

Q2d. Had you participated in an Xcel Energy rebate or energy efficiency programs prior to this year?

1. Yes

2. No

88. DK

99. REF

[ASK IF Q2D = 1]

Q2dd. And how influential was your participation in the previous Xcel Energy program on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential."] [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

1. 0. Not at all influential

…

10. Extremely influential

88. Don't know

99. Prefer not to answer

Q2e. And how influential was the verification that Xcel Energy performed to ensure that your contractor properly installed the cooling equipment on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential."] [INTERVIEWER NOTE: If respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

0. Not at all influential

…

10. Extremely influential

88. Don't know

99. Prefer not to answer

Q3. Now I'd like you to imagine that the rebate program had never existed, including the requirement and verification that your contractor performed quality installation, which improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for your home and sealing all exposed ductwork. What is the likelihood that you would have had a Quality Installation as opposed to a standard installation? [Please use a scale from 0 = "Not at all likely" and 10 = "extremely likely".]

0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

Q4. Again imagining that the rebate program had never existed, including the requirement and verification that your contractor performed quality installation, please rate the likelihood that you would have used the exact same contractor that you used to install the equipment?

1. 0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

[IF STRATA = 2 AND QUANTITY > 1 ELSE SKIP TO SECTION S; NOTE: ASKING Q5 ONLY TO CUSTOMERS WHO INSTALLED STANDARD EQUIPMENT SINCE OTHERS WOULD HAVE ALREADY BEEN ASKED THIS QUESTION]

Q5. Again imagining that the Xcel Energy rebate program had never existed, please rate the likelihood that you would have purchased fewer than <QUANTITY> <MEASURE_NAMEB>s.

1. 0. Not at all likely

…

10. Extremely likely

88. Don't know

99. Refused

Section S: Spillover

[ASK ALL]

S1. Since your participation in the rebate program in <MONTH> <YEAR>, have you installed any efficient cooling equipment without a rebate from Xcel Energy? When I say “efficient cooling equipment”, I mean equipment that is eligible for an Xcel Energy rebate.

1. Yes

2. No [skip to S7]

88. DK [skip to S7]

99. REF [skip to S7]

(Analysis note: “Like” Spillover)

[ASK IF S1=1, ELSE SKIP TO S7]

S2. Did the rebate program influence you in any way to make these additional improvements?

1. Yes (SPECIFY)

2. No [skip to S7]

88. DK [skip to S7]

99. REF [skip to S7]

[ASK IF S2=1, ELSE SKIP TO S7]

S3a. What type of cooling equipment did you install without a rebate? For example, was it… [READ 1 – 5, ALLOW MULTIPLE, RANDOMIZE]

1. A central air conditioner

2. Heat pump

3. Window air conditioner

4. Portable / room air conditioner [skip to S7]

5. Evaporative cooler

6. Or something else? <SPECIFY>

88. DK [skip to S7]

99. REF [skip to S7]

[Analysis note: Keeping alternative cooling options (S3a= 3, 4, 5) for fielding, but this will be classified as “unlike spillover" in analysis.]

[ASK IF S3a = 2]

S3a2. What type of heat pump did you install? [Allow multiple.]

1. Ground source heat pump

2. Air source heat pump

3. Mini-split heat pump

88. DK

99. REF

[ASK IF S3a=1, 2, 3, 5, 6; ELSE SKIP TO S7]

S4a. How many of the cooling equipment did you install? How many…[CARRY FORWARD RESPONSES FROM S3a and S3a2; DO NOT ASK ABOUT PORTABLE/ROOM AIR CONDITIONERS]

S4a_1. [if S3a = 1] Central air conditioners [NUMERIC OPEN END]

S4a_2_1. [If S3a2 = 1] Ground source heat pumps [NUMERIC OPEN END]

S4a_2_2. [if S3a2 = 2] Air source heat pumps [NUMERIC OPEN END]

S4a_2_3. [if S3a2 = 3] Mini-split heat pumps [NUMERIC OPEN END]

S4a_2_88. [if S3a2 = 88 OR 99] Heat pumps of unknown type [NUMERIC OPEN END]

S4a_3. [if S3a = 3] Window air conditioners [NUMERIC OPEN END]

S4a_5. [if S3a = 5] Evaporative cooler [NUMERIC OPEN END]

S4a_6. [if S3a = 6] <Response from S3a_6>s [NUMERIC OPEN END]

88. DK

99. REF

[ASK IF S3a = 1 , 6, OR S3a2 = 2 OR 3]

S4b. What was the SEER of the… [CARRY FORWARD RESPONSES FROM S3a and S3a2; DO NOT ASK ABOUT, WINDOW AIR CONDITIONERS, PORTABLE/ROOM AIR CONDITIONERS, OR GROUND SOURCE HEAT PUMPS] (Interviewer note: SEER ratings range from 13 to 30.)

S4b_1. [if S3a = 1] Central air conditioner(s) [NUMERIC OPEN END]

S4b_2_2. [if S3a2 = 2] Air source heat pump(s) [NUMERIC OPEN END]

S4b_2_3. [if S3a2 = 3] Mini-split heat pump(s) [NUMERIC OPEN END]

S4b_6. [if S3a = 6] <Response from S3a_6>s [NUMERIC OPEN END]

88. DK

99. REF

[ASK IF S3a = 3 OR S3a2 = 1]

S4bb. What was the EER of the… [CARRY FORWARD RESPONSES FROM S3a and S3a2]

S4bb_1. [if S3a = 3] Window Air Conditioner [NUMERIC OPEN END]

S4bb_2_1. [if S3a2 = 1] Ground source heat pump [NUMERIC OPEN END]

88. DK

99. REF

[PROGRAMMING NOTE: S4c THROUGH S6 BELOW FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST TWO MENTIONS IN S3a/S3a2. (MOST RESPONDENTS WILL NOT HAVE MULOW-PARTICIPATING TRADE PARTNERSTIPLE.) PIPE IN RELEVANT RESPONSE FROM S3a and S3a2 AS <Like_Spillover_Measure> FOR EACH ROUND THROUGH THE LOOP.]

[ASK FOR EACH ITEM SELECTED IF S3a = 1, 2, 3, 5, or 6]

[FIRST SELECTED IN S3a/S3a2, ASK S4C_1, S5, S6]

S4c_1. How do you know that the <Like_Spillover_Measure> you installed was energy efficient?

[RECORD VERBATIM]

88. DK

99. REF

S5_1. How important was your experience with the rebate program, including the equipment you installed through the program, in your decision to install the additional <Like_Spillover_Measure> on your own? Please use a scale from 0 to 10, where 0 is “not at all important” and 10 is “extremely important”.

1. [NUMERIC OPEN END (0-10)]

88. DK

99. REF

S6_1. If you had not received the rebate for <MEASURE_NAMEA> how likely is it that you would have installed this <Like_Spillover_Measure>, using a scale from 0 to 10, where 0 means

you definitely WOULD NOT have installed and 10 means you definitely WOULD have installed them?

1. [NUMERIC OPEN END (0-10)]

88. DK

99. REF

[SECOND SELECTED IN S3a/S3a2, ASK S4C_2, S5_2, S6_2]

S4c_2. How do you know that the <Like_Spillover_Measure> you installed was energy efficient?

[RECORD VERBATIM]

88. DK

99. REF

S5_2. How important was your experience with the rebate program, including the equipment you installed through the program, in your decision to install the additional <Like_Spillover_Measure> on your own? Please use a scale from 0 to 10, where 0 is “not at all important” and 10 is “extremely important”.

1. [NUMERIC OPEN END (0-10)]

88. DK

99. REF

S6_2. If you had not received the rebate for <MEASURE_NAMEA>, how likely is it that you would have installed this <Like_Spillover_Measure>, using a scale from 0 to 10, where 0 means you definitely WOULD NOT have installed and 10 means you definitely WOULD have installed them?

1. [NUMERIC OPEN END (0-10)]

88. DK

99. REF

[ASK ALL]

(Analysis note: “Un-like” Spillover)

S7. Since your participation in the rebate program in <MONTH> <Year>, have you installed any efficient Other than cooling equipment, other than cooling equipment, since you received the rebate, have you installed any efficient equipment without a rebate from Xcel Energy?

1. Yes

2. No [SKIP TO D1]

88. DK [SKIP TO D1]

99. REF [SKIP TO D1]

S8. What did you do? [DO NOT READ. MULTI-RESPONSE. PROMPT LIGHTLY WITH "ANYTHING ELSE?" SELECT EQUIPMENT THAT WAS INSTALLED OFF LIST BELOW OR SPECIFY IN OTHER]

1. Efficient light bulbs (CFLs or LEDs) [SKIP TO D1]
2. Efficient lighting fixtures
3. More efficient primary heating system (furnace, boiler)
4. Programmable or smart thermostat
5. More efficient refrigerator
6. More efficient dishwasher
7. More efficient clothes washer
8. More efficient clothes dryer
9. Efficient windows
10. Efficient doors
11. Insulation / air sealing / weatherization
12. Home energy audit [SKIP TO D1]
13. Other (specify) _____

88. DK [SKIP TO D1]

99. REF [SKIP TO D1]

[PROGRAMMING NOTE: S9A THROUGH S13 BELOW FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST TWO MENTIONS IN S8. (MOST RESPONDENTS WILL HAVE FEWER THAN THREE.) PIPE IN RELEVANT RESPONSE FROM S8 AS <Spillover_Measure> FOR EACH ROUND THROUGH THE LOOP.]

[If S8= 1 skip to D1]

[If S8 = 12 skip to D1]

[FIRST SELECTED IN S8]

S9a_1. How important was your participation in the rebate program in your consideration of the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all influential, to 10, meaning extremely influential.

0. Not at all influential

…

10. Extremely influential

88. DK

99. REF

S9b_1. If you had not participated in the rebate program, how likely is it that you still would have installed the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all likely, to 10, meaning extremely likely.

0. Not at all likely

…

10. Extremely likely

88. DK

99. REF

[ASK IF S9a_1 = 6 – 10; ELSE SKIP TO END OF LOOP]

S10_1. In a sentence or two, can you describe how the installation of the <MEASURE_NAMEB> affected your choice to install the <Spillover_Measure>?

[RECORD VERBATIM]

88. DK

99. REF

S11_1. How do you know that the <Spillover_Measure> you installed was energy efficient?

[RECORD VERBATIM]

88. DK

99. REF

S12_1. How many <Spillover_Measure>s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT.]

[RECORD NUMBER]

88. DK

99. REF

S13_1. What is the main reason you installed the <Spillover_Measure>?

[RECORD VERBATIM]

88. DK

99. REF

[SECOND SELECTED IN S8]

[If S8 = 1 skip to D1]

[If S8 = 12 skip to D1]

S9a_2. How important was your participation in the rebate program in your consideration of the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all influential, to 10, meaning extremely influential.

1. 0. Not at all influential

…

10. Extremely influential

88. DK

99. REF

S9b_2. If you had not participated in the rebate program in how likely is it that you still would have installed the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all likely, to 10, meaning extremely likely.

1. 0. Not at all likely

…

10. Extremely likely

88. DK

99. REF

[ASK IF S9a_2 = 6 – 10; ELSE SKIP TO D1]

S10_2. In a sentence or two, can you describe how the installation of the <MEASURE_NAMEB> affected your choice to install the <Spillover_Measure>?

[RECORD VERBATIM]

88. DK

99. REF

S11_2. How do you know that the <Spillover_Measure> you installed was energy efficient?

[RECORD VERBATIM]

88. DK

99. REF

S12_2. How many <Spillover_Measure>s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT.]

[RECORD NUMBER]

88. DK

99. REF

S13_2. What is the main reason you installed the <Spillover_Measure>?

[RECORD VERBATIM]

88. DK

99. REF

Section D: Benefits, Satisfaction, and Feedback

[IF S1 OR S7 = YES, READ: “For the remainder of the survey, I would like you to focus back on the cooling equipment for which you received a rebate from Xcel Energy.]

[ASK IF A3 = 1]

D1. Thinking about the Quality Installation service you received, what would you say are the benefits of a Quality Installation? [PROBE: Anything else?] [DO NOT READ, MULTIPLE ALLOWED]

1. More efficient/uses less energy
2. Lower utility bills
3. Better/more optimized performance
4. Increased comfort
5. Better air distribution
6. Better dehumidification
7. Smaller sized system/properly sized system
8. Better sealed ductwork/reduced leakage of conditioned air

9. Less dust distributed through ductwork

10. Other [SPECIFY]

88. DK

99. REF

[ASK IF STRATA = 3 OR 4]

D2. Thinking about the heat pump you received, what would you say are the benefits of a heat pump? [PROBE: Anything else?] [DO NOT READ, MULTIPLE ALLOWED]

1. More efficient/uses less energy

2. One unit provides both heating and cooling

3. Allows us to cool specific spaces not served through central cooling system

4. Allows us to heat specific spaces not served through central heating system

5. Allows us to cool home in the summer

6. Allows us to heat home in fall or spring

7. Allows us to cool home with electricity

8. Allows us to heat home with electricity

9. Lower utility bills

10. Increased comfort

11. Better air distribution

12. Better dehumidification

13. Other [SPECIFY]

88. DK

99. REF

[ASK ALL]

D3. We just talked a lot about your decisions to install your equipment, now please rate the importance of the following factors in terms of your decision to participate in the rebate program through Xcel Energy, using a 1 to 5 scale where 1 is “Not at all important” and 5 is “Very important.”

You can also tell me if something was not applicable to your experience or if you DK:

(1) Not at all important - (3) - (5) Very important 77=N/A, 88=DK 99=REF

(RANDOMIZE) (READ ALOUD)

D3a. Reducing energy use

D3b. Upgrading out-of-date equipment

D3c. Replacing faulty or failed equipment

D3d. The dollar value of the rebate offered by Xcel Energy

D3e. Reducing energy bill amounts

D3f. Information or encouragement you received from Xcel Energy

D3g. Reducing CO2 emissions/saving the environment

D3h. Working with your contractor

D3i. Recommendation from a family member/friend/neighbor

D3j. Was there any other factor that influenced your decision to apply for an Xcel Energy rebate <MEASURE_TYPEB>?

1. Yes (SPECIFY)

2. No

88. DK

99. REF

[ASK IF D3j=1]

D3j_2. How would you rate the importance of < D3j>? (1-5, 88, 99)

[ASK ALL]

D4. Please rate your satisfaction with various aspects of the rebate program of your experiences with the equipment and rebate. For each, please rate your satisfaction on a scale from 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied”, or let me know if it is not applicable to you. How would you rate your satisfaction with:

[RANDOMIZE D4a-D4F, PAUSE AFTER EACH FOR RATING, REPEAT SCALE IF NECESSARY]

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

88. DK

99. REF

D4a. The performance of the equipment you installed

D4b. [ASK IF STRATA = 1 OR 2 OR 3] The process of finding a qualified contractor

D4c. [ASK IF STRATA = 1 OR 2 OR 3 OR IF A1 = 1] The contractor that installed the equipment

D4d. The installation of the equipment

D4e. Information provided from Xcel Energy on energy efficient cooling opportunities

D4f. Information provided from Xcel Energy on the rebate process

[For any D4A – D4F < 3]

D5a – D5f. Why weren't you satisfied with <RESTORE QUESTION WORDING FROM D4A – D4F>

[FOLLOWING COMPLETION OF D4a-D4f and D5a-D5f, ask D4g, D4h, D4i in order]

D4g. The amount of time it took to receive your rebate

[ASK IF D4g < 3]

D4gg. Was there anything you are aware of that caused a delay in your rebate?

1. Yes (SPECIFY)

2. No

88. DK

99. REF

D4h. The amount of the rebate you received

[ASK IF D4h < 3]

D4h1. Was the amount of the rebate you received different from what you were expecting?

1. Yes

2. No

88. DK

99. REF

[ASK IF D4h1 =1]

D4hh. What amount were you expecting?

[Numeric open end]

88. DK

99. REF

D4i. Xcel Energy as an energy provider

[ASK ALL]

D6. Thinking about your experience from start to finish, how would you rate your satisfaction with the rebate program as a whole? (IF NEEDED: Please use the same scale from 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied”)

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

88. DK

99. REF

[If D6 = 5, 77, 88 or 99 Skip to D7]

[ASK IF D6 < 3]

D6a. Why weren’t you satisfied with your experience with the rebate program?

1. [OPEN END]

88. DK

99. REF

[ASK IF D6 = 3 or 4]

D6b. What else could program staff do to improve your satisfaction with the rebate program?

1. [OPEN END]

88. DK

99. REF

D7. Next, I am going to ask you to rate how easy or difficult the following tasks associated with the rebate program were to complete, using the same scale from 1 to 5, where 1 is “very difficult” and 5 is “very easy”. [RANDOMIZE]

D7a. Complete program applications, rebate forms, or other program paperwork

D7b. Get in touch with an Xcel Energy representative

D7c. Determine eligibility and rebate tier

D7d. Determining equipment models that are affordable within budget

D7e. The equipment installation through a contractor

D7f. Finding a contractor to complete the work

77. Not applicable [RECORD VERBATIM]

88. DK

99. REF

[For any D7A – D7F < 3]

D8a – D8f. Why wasn't it easy to <RESTORE QUESTION WORDING FROM D7A – D7F>

Section H: Demographics

Thank you for your patience; I only have a few questions left.

H1. Which of the following best describes your home? [READ 1 – 5]

1. Single-family home,
2. Single-family attached home, such as a duplex or townhome,
3. Apartment building or condo with 2-4 units,
4. Apartment building or condo with 5+ units, or
5. Mobile home

88. DK

99. REF

H2. Approximately what is your yearly household income before taxes? Please let me know when I read the category that applies to you. [READ 1 – 8]

1. < $25,000
2. $25,000 to $34,999
3. $35,000 to $49,999
4. $50,000 to $74,999
5. $75,000 to $99,999

6. $100,000 to $149,000
7. $150,000 to $199,000
8. $200,000 or more

88. DK

99. REF

B.3 Nonparticipating Customer Survey Instrument

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency programs, the TRC evaluation team conducted telephone surveys with nonparticipating customers. The evaluation team defined a nonparticipating customer as any electric or combination customer who received a furnace rebate but did not receive cooling equipment rebate since 2012, which was when Xcel Energy started tracking product participation through its data tracking tool, Salesforce. The research assessed key process and impact evaluation objectives, including customer perceptions/awareness, customer decision-making and barriers, heating fuel type, and spillover.

The remainder of the introduction provides the evaluation objectives and research questions which the nonparticipating customer survey was designed to address, a description of the sample population and the target completes, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The objectives for the Colorado residential air conditioner and heat pump measures evaluation are to:

- Collect feedback on **rebate experiences** with the air conditioner and heat pump rebate process. This will include a variety of topics including:
  - Awareness of the equipment and rebates.
  - Motivations to purchase the equipment and pursue a rebate.
  - Awareness of the ACCA QI process and interpretation of QI.
  - Feedback on the new comprehensive approach to providing residential HVAC services within one product.
  - Satisfaction with rebate processes.
- Identify **barriers to participation** in the product, particularly by investigating why trade partners and customers may install equipment outside of the product.
- **Explore ways to grow the heat pump market**. In doing so, we will explore the following topics:
  - Understand how trade partners talk to their customers about the perceived benefits of heat pumps.
  - Understand whether trade partners are specializing in the types of heat pumps they install.
  - Explore potential for midstream mini-split rebates.

  - Understand trade partner familiarity with the heat pump installation process and how peer utilities are supporting trade partners with learning heat pump installation processes.
  - Explore what heat pump market transformation can look like.
  - Research interest in heat pumps among participating customers in other DSM programs.
  - Understand how peer utilities are defining and supporting cold climate heat pumps.
  - Determine why heat pump trade partners appeared to have dropped out of the product in 2020.
- Determine **NTG ratio** for air conditioning and heat pump rebates.
- Identify major drivers of free ridership.
- Assess participant spillover.
- Assess market effects of high efficiency air conditioning and heat pump rebates.

The nonparticipating customer survey does not provide feedback on all evaluation objectives. For reference, Table 8 provides the evaluation efforts used for each objective.

Table 8: Residential Air Conditioning and Heat Pump Rebate Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Nonparticipating Customer Survey Objective
Collect feedback on the rebate experiences	Process	Participating customer surveys, and participating and nonparticipating trade partner interviews	
Identify barriers to participation	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the heat pump market	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	Impact	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓

Table 9 presents the research questions which this nonparticipating customer survey was designed to address, linking each research question to the associated evaluation objective and survey question.

Table 9: Evaluation Objective, Research Question, and Survey Question Crosswalk

Evaluation Objective	Research Question	Survey Question Number(s)
Identify barriers to participation: Understand customer decision-making and barriers to installing efficient equipment and having QI completed.	• Are customers aware of the Residential Heating and Cooling Product? • Are customers aware of the heat pumps and air conditioners rebated through the product? • Do customers understand the benefits of QI? • What are the barriers to pursuing efficient cooling upgrades or new equipment? • What are the barriers to participating in the Residential Heating and Cooling Product?	Section B, S7_1, C1, C3, C5, C6, C9b2, C9d, C10, C11, C14b, C15
Explore ways to grow the heat pump market.	• Do heating participants have air conditioning in their homes? • What is the level of interest in heat pumps among customers?	C7, C8, C13,
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects. Estimate an overall NTG ratio documenting the product's influence on customers' decisions, as well as separate NTG ratios for equipment purchase and QI.	• Did customers complete any efficient cooling measures without a rebate because of the Residential Heating and Cooling Product?	Section S

Sample Population and Target Completes

The following table summarizes the total sample that was targeted for the survey, based on an expected 2% response rate. The number of target completes was designed to achieve results at the 90% confidence level with +/- 10% precision for each stratum.

Table 10: Sample Population and Target Completes by Strata

Strata	Total Sample	Target Completes	Response Rate Required to Achieve Target Completes
Nonparticipating customers	3,500	70	2%
Overall	3,500	**70**	**2%**

Sample Variables

The following table includes the sample variables that were used to conduct this survey, as well as descriptions of these variables and potential codes.

Table 4. Sample Variables

Sample Variable	Variable Description	Potential Codes
Interviewer Name	Name of interviewer from Ewald and Wasserman	e.g. Nicole Thomas
Contact	Contact name	e.g. Hannah Justus
Phone	Phone number for contact	e.g. 555-555-5555
Spillover_Measure	Cooling equipment installed outside of the Xcel Energy program	e.g. "air source heat pump"

Fielding Instructions

- Attempt each record six times on different days of the week and at different times.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals (e.g., "I'm not interested", immediate hang-ups) at least once.
- The survey is considered complete when CLOSE1 is answered.
- After the survey fielding subcontractor (Ewald and Wasserman) completes 5 interviews, hold calling and output a preliminary SPSS dataset and recordings of the pretest interviews. Resume calling after EMI Consulting checks the data (usually with 1-2 working days).
- Monitor at least 10 percent of the interviews to ensure proper interview protocols (e.g., reading questions verbatim, proper probing, accurate data entry).
- Calling hours are 9 AM to 8 PM MST.

Survey Sections

- **S.** Spillover
- **B.** Awareness & Perceptions
- **C.** Decision-Making & Barriers to Participation
- **CLOSE:** Closing

Section S: Spillover

S1a. On a scale of 1 to 5, with 1 being “not at all familiar” and 5 being “extremely familiar”, how familiar would you say you are with Xcel Energy’s energy efficiency rebate programs?

1. NUMERIC OPEN END [1-5]
88. DK

99. REF

[ASK IF S1a = 2-5 OR 88 OR 99; IF S1a = 1, SKIP TO B1]

S1b. And using the same scale, how aware are you of Xcel Energy's rebates for residential cooling equipment such as central air conditioners and heat pumps?

1. NUMERIC OPEN END [1-5]
88. DK
99. REF

[ASK if S1b= 2-5]

S2. How did you first become aware of the Xcel Energy rebates for residential cooling equipment? **(DO NOT READ, Select one.)**

1. Contractor
2. Xcel Energy website
3. On-bill messages from Xcel Energy
4. Friends or family
5. Social media
6. Other [SPECIFY]

88. DK

99. REF

S3. In the past year, have you or anyone in your household installed an energy efficient air conditioner or heat pump?

1. Yes
2. No **[SKIP TO B1]**
88. DK **[SKIP TO B1]**
99. REF **[SKIP TO B1]**

[NOTE: ALL NONPARTICIPATING CUSTOMERS THAT INSTALLED A CENTRAL AIR CONDITIONER OR HEAT PUMP EQUIPMENT WITHIN THE PAST YEAR WILL BE ASKED SPILLOVER QUESTIONS; ALL OTHERS SKIP TO NEXT SECTION]

[ASK IF S3=1, ELSE SKIP TO B1]

S4. What type of cooling equipment did you install? **[DO NOT READ; ALLOW MULTIPLE]**

[If type of heat pump is not mentioned, PROBE: Was it a ground source, air source, or mini-split heat pump? If not sure, code as simply "heat pump."]

1. Central air conditioner

2. Window air conditioner(s)
3. Portable / room air conditioner(s)
4. Heat pump
5. Ground source heat pump
6. Air source heat pump
7. Mini-split heat pump
8. Evaporative Cooler
9. Other **<SPECIFY>**
88. DK
99. REF

[IF S4= 1,4,5,6,7; ELSE SKIP TO B1]

[PROGRAMMING NOTE: S4B THROUGH S14 BELOW FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST TWO MENTIONS IN S4, WHEN S4=1,4,5,6,7 [CENTRAL AIR CONDITIONERS OR HEAT PUMPS]. (MOST RESPONDENTS WILL NOT HAVE MULOW-PARTICIPATING TRADE PARTNERSTIPLE.) PIPE IN RELEVANT RESPONSE FROM S4 AS <Like_Spillover_Measure> FOR EACH ROUND THROUGH THE LOOP.]

[ASK FOR EACH ITEM SELECTED IF S4=1,4,5,6,7]

S4b. Who installed your **<Spillover_Measure>?**? Was it… **[READ 1 – 4]**

1. A contractor,
2. Yourself, **[SKIP TO S5_1]**
3. A friend or family member, or **[SKIP TO S5_1]**
4. Someone else **[SPECIFY] [SKIP TO S5_1]**

88. DK **[SKIP TO S5_1]**

99. REF **[SKIP TO S5_1]**

[ASK IF S4b = 1]

S4c. Could you share the name of the company that completed the installation?

[OPEN-END]

88. DK

99. REF

S5_1. Did you receive a rebate through Xcel Energy for installing **<Spillover_Measure>?**

1. Yes
2. No
88. DK
99. REF

[ASK IF S5_1 = 2; ELSE SKIP TO LOOP 2]

S6_1. When installing your heating equipment that received an Xcel Energy rebate, were you also aware that efficient cooling equipment may have also been eligible for a rebate?

1. Yes
2. No **[SKIP TO S6c_1]**
88. DK **[SKIP TO S6c_1]**
99. REF **[SKIP TO S7_1]**

[ASK IF S6_1=1]

NEW S6d_1. Are you planning to pursue a rebate for the **<Spillover_Measure**> in the next 12 months?

1. Yes **[RECORD OPEN END IF ADDITIONAL DETAIL IS PROVIDED]**
2. No
88. DK
99. REF

[IF S6_1 = 1]

S6a_1. Did the **<Spillover_Measure>** you installed qualify for the Xcel Energy cooling rebate?

1. Yes
2. No **[SKIP TO S7_1]**
88. DK **[SKIP TO S7_1]**
99. REF **[SKIP TO S7_1]**

[IF S6_a1 = 1]

S6b_1. Why did you not apply for the rebate for the **<Spillover_Measure>** you installed?

[Open ended]

88. DK99. REF

[IF S6_1 = 2/88]

S6c_1. Would you have considered different cooling equipment when you installed your **<Spillover_Measure>** if you knew that a rebate for higher efficiency equipment and optimized installation were available?

1. Yes
2. No
88. DK
99. REF

S7_1. In your own words, can you explain HOW your knowledge of the rebates or resources available through Xcel Energy influenced your decision to install the **<Spillover_Measure>**?

1. OPEN END
2. 88. DK

99. REF

S8_1. How influential was any *information or encouragement you received from Xcel Energy* on your decision to install the **<Spillover_Measure>**? This could include promotional or educational materials, or talking to someone at Xcel Energy. Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

1. NUMERIC OPEN END [0-10]
77. Not applicable
88. DK

99. REF

S9_1. Did you receive any information from contractors or retailers about any Xcel Energy rebates prior to your decision to install the **<Spillover_Measure>**?

1. Yes

2. No **[SKIP TO S10_1]**

88. DK **[SKIP TO S10_1]**

99. REF **[SKIP TO S10_1]**

[ASK IF S9_1=1]

S9b_1. How influential was any *information you received from contractors or retailers* on your decision to install the **<Spillover_Measure>**? Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can

use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

1. NUMERIC OPEN END [0-10]
88. DK
99. REF

S10_1. Prior to your decision to install the **<Spillover_Measure>**, did you hear about Xcel Energy programs or rebates through word-of-mouth? This could include talking to someone you know about Xcel Energy’s programs or hearing from someone else who had received a rebate from Xcel Energy.

1. Yes
2. No **[SKIP TO S11_1]**
88. DK **[SKIP TO S11_1]**
99. REF **[SKIP TO S11_1]**

[ASK IF S10_1=YES]

S10b_1. How influential was this *word-of-mouth from people about Xcel Energy’s programs o*n your decision to install the **<Spillover_Measure>**? Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

1. NUMERIC OPEN END [0-10]
88. DK
99. REF

S11_1. Just to make sure that we understand you correctly, please answer the following hypothetical question. If you had NOT known about rebates or resources available through Xcel Energy, would you still have installed the **<Spillover_Measure>**? Please use a scale of 0 to 10, where 0 means you definitely WOULD NOT have installed your energy efficient equipment and 10 means you definitely WOULD have done so. [NUMERIC OPEN END, 0 – 10, 88=DK, 99=REF]

S12_1. How do you know that the **<Spillover_Measure>** you installed was energy efficient?

1. OPEN-END
88. DK
99. REF

[ASK IF S4 = 1, 4, 6, 7]

S13_1. What was the SEER of the… **<Spillover_Measure>**? (Interviewer note: SEER ratings range from 13 to 30.)

1. NUMERIC OPEN END
88. DK [RECORD OPEN END RESPONSE IF GIVEN]
99. REF

[ASK IF S4 = 5]

S13_2. What was the EER of the… **<Spillover_Measure>**?

1. NUMERIC OPEN END
88. DK
99. REF

S14_1. How many **<Spillover_Measure>**s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT OR ROUND UP TO NEAREST WHOLE NUMBER AS NEEDED]

[RECORD NUMBER]
88. DK
99. REF

[PROGRAMMING NOTE, THIS IS THE END OF LOOP]

Section B: Awareness & Perceptions

[ASK ALL]

B1. Next, I'd like to understand a little more about your awareness of different cooling technologies. First, I would like to understand how familiar you are with heat pumps. During warmer weather, the heat pump functions as an air conditioner but the same equipment can also provide warmth in cooler times of the year by absorbing the heat from the air or ground and then transferring heat to the home. Before today, how familiar would you say you were with heat pumps, on a scale of 1 to 5, with 1 being not at all familiar and 5 being extremely familiar?

1. NUMERIC OPEN END [1-5] [INCLUDE OPEN END DETAIL IF PROVIDED]
88. DK
99. REF

[ASK IF B1 = 2-5]

B2. Using the same scale, how familiar are you with …

[RANDOMIZE ORDER]

B2_1. Mini-split heat pumps?

B2_2. Ground source heat pumps? [INTERVIEWER NOTE: THIS IS THE SAME AS GEO-THERMAL HEAT PUMP]

B2_3. Air source heat pumps?

1. NUMERIC OPEN END [1-5]
88. DK
99. REF

[ASK ALL]

B2A. Knowing that heat pumps can provide both cooling and heating using an electric source, what is the likelihood you would consider installing a heat pump at your home in the next five years, on a scale of 1 to 5, with 1 being not at all likely and 5 being extremely likely?

1. NUMERIC OPEN END [1-5]
88. DK
99. REF

[IF B2A>3 and B2A != 88, 99, ELSE SKIP TO B3]

B2A_1. Would you plan to use the heat pump to cool or heat your whole house or a portion of your house?

1. Whole house
2. Portion of home
3. Other [SPECIFY]
88. DK
99. REF

B3. For cooling equipment, there is an enhanced installation process, known as a “Quality Installation.” The Quality Installation process does not describe the equipment itself -- rather, it is a specific process for **how** the equipment is **installed** in your home. This process ensures that the equipment is properly sized. In addition, contractors are required to test the airflow, refrigerant charge and ductwork after the installation to ensure optimal efficiency. Before today, had you ever heard of this enhanced installation process for air conditioners and heat pumps?

1. Yes
2. No **[SKIP TO C1]**
88. DK **[SKIP TO C1]**
99. REF **[SKIP TO C1]**

[ASK IF B3 = 1 AND S4=1,4,5,6 AND S4b=1]

B3a. Did your contractor use the Quality Installation process to install your new cooling equipment?

1. Yes
2. No
88. DK
99. REF

B4. How did you first learn about Quality Installation? (Select one)

1. Contractor
2. Xcel Energy website
3. Xcel Energy bill
4. ENERGY STAR website
5. Friends or family
6. Any other mention of Xcel Energy [SPECIFY]
7. Other [SPECIFY]
88. DK
99. REF

B5. What would you say are the benefits of a Quality Installation? [**PROBE:** Anything else?] (DO NOT READ. ALLOW MULTIPLE RESPONSES) [INTERVIEW NOTE: IF YOU ARE UNSURE, PLEASE SELECT 10 AND ADD VERBATIM]

1. More efficient/uses less energy
2. Lower utility bills
3. Works better/optimized performance
4. Increased comfort
5. Better air distribution
6. Better dehumidification
7. Smaller sized system/properly sized system
8. Ductwork is sealed/reduced leakage of conditioned air
9. Less dust distributed through ductwork
10. Other [SPECIFY]
88. DK
99. REF

Section C. Decision-Making & Barriers to Participation

C1. Do you remember seeing or hearing about any rebates for energy efficient appliances or home upgrades in the past year or two?

1. Yes
2. No **[SKIP TO C3]**
88. DK **[SKIP TO C3]**
99. REF **[SKIP TO C3]**

[IF C1 = 1]

C1a. Were the rebates that you heard about related to energy efficient cooling equipment?

1. Yes
2. No [SPECIFY]
88. DK
99. REF

[IF C1 = 1]

C2. Please list/tell me what organizations or types of companies offer such rebates, as best as you know or can remember. These companies could include Xcel Energy and or somewhere else. [INTERVIEWER: RECORD VERBATIM]

[OPEN END]
88. DK
99. REF

[IF C2 != 88/99]

C2a (same page as C2). [INTEVIEWER: DO NOT READ] Was Xcel Energy mentioned in C2?

1. Yes
2. No

[ASK C3 IF C2a = 2]; i.e. Xcel Energy not mentioned in C2]

C3. Prior to today, have you received any information from Xcel Energy on services they provide to customers to help them save energy?

1. Yes
2. No **[SKIP TO C7]**
88. DK **[SKIP TO C7]**
98. REF **[SKIP TO C7]**

C4. About how often would you say you receive tips or information from Xcel Energy on ways to save on energy or rebate offers the company provides? Is it generally...

1. Daily
2. Weekly
3. Monthly
4. A few times a year
5. Yearly
6. Less than yearly
7. Not at all **[SKIP TO C7]**
88. DK **[SKIP TO C7]**

99. REF **[SKIP TO C7]**

[ASK If C4 < 7]

C5. Where do you see information from Xcel Energy about saving energy?

[**DO NOT READ**. Select all that apply. If interviewer is unsure how to code, select 12 and record verbatim.]

1. Bill insert
2. Home energy report
3. Xcel Energy Website
4. Billboard or other outdoor advertisement
5. Digital / web advertisement (not on the Xcel Energy Website).
6. Television advertisement
7. Radio advertisement
8. Contractor
9. Colleague
10. Social media
11. Xcel Energy representative
12. Other _____
88. DK
99. REF

[ASK IF C1a = 1]

C6. Where did you hear about the cooling equipment rebates offered by Xcel?

[**DO NOT READ**. Select all that apply]

1. Bill insert
2. Home energy report
3. Xcel Energy Website
4. Billboard or other outdoor advertisement
5. Digital / web advertisement (not on the Xcel Energy Website).
6. Television advertisement
7. Radio advertisement
8. Contractor
9. Colleague
10. Social media
11. Xcel Energy representative

12. Other _____

88. DK

99. REF

[ASK IF S3 = 1, ELSE SKIP TO C15]

C7. When the weather is hot, do you use air conditioning equipment in your home?

1. Yes
2. No

88. DK

99. REF

[ASK IF C7 = 1; ELSE SKIP TO C15]

C8. What is the primary type of air conditioning equipment used to cool your home? **[SELECT ONE]**

[If type of heat pump is not mentioned, PROBE: Is it a ground source, air source, or mini-split heat pump? If not sure, code as simply "heat pump."]

1. Central air conditioner
2. Window air conditioner(s) **[SKIP TO C12]**
3. Portable / room air conditioner(s) **[SKIP TO C12]**
4. Heat pump
5. Ground source heat pump
6. Air source heat pump
7. Mini-split heat pump
8. Evaporative cooler **[SKIP TO C12]**
9. Other **<SPECIFY> [SKIP TO C12]**

88. DK **[SKIP TO C12]**

99. REF **[SKIP TO C12]**

[ASK IF C8 = 1 or 4, 5, 6, OR 7; ELSE SKIP TO C12]

C9. Approximately when did you install this equipment? **[READ 1-4]**

1. 1. Less than 5 years ago
2. At least 5 years ago but less than 10
3. At least 10 years ago but less than 15 **[SKIP TO C10]**
4. 15 or more years ago **[SKIP TO C10]**

88. DK **[SKIP TO C10]**

99. REF **[SKIP TO C10]**

[ASK IF C9 = 1-2]

C9b. Was this high efficiency equipment you installed?

1. Yes
2. No **[SKIP TO C9b4]**

88. DK **[SKIP TO C9b4]**

99. REF **[SKIP TO C9b4]**

C9b1. What does “high efficiency” mean to you?

1. OPEN-END

88. DK

99. REF

[SKIP IF S4b_1=2 OR S4b_2=2]

C9b2. Did the contractor who installed your cooling equipment mention that Xcel Energy offers rebates for cooling equipment?

1. YES
2. NO

88. DK

99. REF

[IF C9b2 = 1]

C9b2_1. Did the contractor offer you an instant equipment rebate instead of asking you to fill out the paperwork from Xcel Energy?

1. Yes
2. No

88. DK

99. REF

C9b3. Why did you not apply for the rebate for the air conditioning equipment you installed?

1. OPEN-END

88. DK

99. REF

[ASK IF (C9b = 2 or 88 or 99) OR (C9b = 1 AND S1b = 1 or 88)]

C9b4. Would you have considered different cooling equipment if you knew that a rebate for quality installed air conditioning equipment were available?

1. Yes
2. No

88. DK

99. REF

[ASK IF C9b = 2]

C9d. What are the main reasons you did not install high efficiency cooling equipment?

1. [OPEN END]

DK

REF

[ASK IF C9 = 3, 4, 88, or 99]

C10. Have you considered upgrading to more efficient cooling equipment?

1. Yes
2. No

88. DK **[SKIP TO C11b]**

99. REF **[SKIP TO C15]**

[ASK IF C10 = 1 OR 2]

C11. What are the main reasons you upgraded your heating equipment but **<IF C10 = 1:** "have not upgraded"; **IF C10 = 2:** "have not considered upgrading"**>** your cooling equipment?

[Open ended]

88. DK

99. REF

[ASK IF C10 = 88]

C11b. Is there a specific reason why you are unsure about upgrading to more efficient cooling equipment?

[Open ended]

88. DK

99. REF

[ASK IF C10 = 2 OR 88 OR 99]

C11c. Would you consider upgrading your cooling equipment in the next two years if you knew that a rebate for higher efficiency equipment and optimized installation were available?

1. Yes
2. No

88. DK

99. REF

[ASK IF C8 = 2, 3 , OR 8]

C12. Have you ever considered upgrading to a central air conditioner?

1. Yes
2. No
88. DK
99. REF

[ASK IF C8= 1, 2, 3, 8]

C13. Prior to this conversation, have you ever considered upgrading to a heat pump?

1. Yes
2. No
88. DK
99. REF

[ASK IF C12 OR C13 = 2 OR 88 OR 99]

C14. Would you consider upgrading your cooling equipment in the next two years if you knew that a rebate for higher efficiency equipment with optimized installation were available?

1. Yes
2. No
88. DK
99. REF

[IF C14 = 2 OR 88]

C14a. How old is your cooling equipment?

[Open ended]

88. DK
99. REF

[ASK IF C14 = 88]

C14b. Is there a specific reason why you are unsure about upgrading to more efficient cooling equipment if you knew that a rebate for higher efficiency equipment with quality installation were available?

[Open ended]

88. DK
99. REF

[ASK IF S1b = 1 - 5]

C15. Next I'm going to read you a list of factors that may have been a challenge for you to participating in Xcel Energy's cooling equipment rebate program.

On a scale from 1 to 5, where 1 is “not at all a challenge” and 5 is “very much a challenge”, please indicate the extent to which you see the following as a challenge to participating in Xcel Energy’s cooling equipment rebate program.

You can also tell me if something was not applicable to your experience or if you DK

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

88. DK

99. REF

[RANDOMIZE ORDER, ANCHOR C14i LAST]

C15a. Lack of knowledge regarding efficient cooling equipment

C15b. Lack of knowledge regarding rebate amounts

C15c. Lack of knowledge regarding quality installation

C15d. Amount of time it takes to install equipment

C15e. Finding a qualified contractor to perform equipment installations

C15f. Your preferred contractor does not offer the rebates

C15g. Amount of paperwork

C15h. Equipment cost

C15i. Installation cost

C15j. Is there any other factor that you see as a challenge to participating in Xcel Energy’s cooling equipment rebate program?

1. Yes, specify (C15j_OTH)

2. No (SKIP TO CLOSE1)

88. DK (SKIP TO CLOSE1)

99. REF (SKIP TO CLOSE1)

[ASK IF C15j = 1]

C15j_1. On a scale from 1 to 5, where 1 is “not at all a challenge” and 5 is “very much a challenge”, please indicate the extent to which you see **<C15j_OTH>** as a challenge to participating in Xcel Energy’s cooling equipment rebate program.

Closing

CLOSE1. These are all the questions I have. [THANK AND TERMINATE]

B.4 Participating Trade Partner Interview Guide

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency products, members of the TRC evaluation team conducted in-depth telephone interviews with participating trade partners. This guide presents the questions that were covered in the in-depth interviews of trade partners who participated in the Colorado residential air conditioner and heat pump product.

The evaluation team planned to interview 20 trade partners as part of this effort, as shown in Table 14. In an attempt to understand trade partner influence on customer decisions, the evaluation team prioritized speaking with the top 15 active trade partners in 2021 (as of August 31, 2021). It then supplemented remaining interviews with trade partners who pursued a mid-level of projects in 2021 (as of August 31, 2021). The evaluation team attempted to conduct these interviews after the participating customer surveys so that we could follow-up with trade partners that customers identified as being particularly influential to a customer's decision-making process.

Table 11. High Efficiency Air Conditioning/Heat Pump Trade Partner Target Interviews, By Interview Strata

Trade Partner Type	Strata	Population	Target Interviews
Trade Partners	High-tier participation (Top 15)	12	8-12
	Mid-tier participation		8-12
	Total		**20**

The remainder of the introduction provides the research questions which this guide was designed to address and fielding instructions for the interviewers.

Evaluation Objectives

The objectives for the Colorado residential air conditioner and heat pump evaluation are to:

- Collect feedback on **rebate experiences** with the air conditioner and heat pump rebate process. This will include a variety of topics including:
  - Awareness of the equipment and rebates.
  - Motivations to purchase the equipment and pursue a rebate.
  - Awareness of the ACCA QI process and interpretation of QI.
  - Feedback on the new comprehensive approach to providing residential HVAC services within one product.
  - Satisfaction with rebate processes.
- Identify **barriers to participation** in the product, particularly by investigating why trade partners and customers may install equipment outside of the product.
- **Explore ways to grow the heat pump market**. In doing so, we will explore the following topics:
  - Understand how trade partners talk to their customers about the perceived benefits of heat pumps.
  - Understand whether trade partners are specializing in the types of heat pumps they install.
  - Explore potential for midstream mini-split rebates.

  - Understand trade partner familiarity with the heat pump installation process and how peer utilities are supporting trade partners with learning heat pump installation processes.
  - Explore what heat pump market transformation can look like.
  - Research interest in heat pumps among participating customers in other DSM programs.
  - Understand how peer utilities are defining and supporting cold climate heat pumps.
- Determine **NTG ratio** for air conditioning and heat pump rebates.
  - Identify major drivers of free ridership.
  - Assess participant spillover.
  - Assess market effects of high efficiency air conditioning and heat pump rebates.

The trade partner interviews addressed every evaluation objective. For reference, Table 15 provides the evaluation efforts used for each objective.

Table 12. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Trade Partner Interview Objective
Collect feedback on the rebate experiences	Process	Participating customer surveys, and participating and nonparticipating trade partner interviews	✓
Identify barriers to participation	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the heat pump market	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	Impact	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓

The evaluation team used trade partner interviews to help address both process and impact objectives. These interviews addressed the following topics within each objective:

- **Rebate Experiences:** The evaluation team will explore trade partners' awareness of the equipment, product rebates, and the ACCA QI process. Trade partners feedback on the new comprehensive approach to providing residential HVAC services in one product and the potential value a comprehensive approach brings to trade partners.
- **Barriers to Participation:** The evaluation team will ask trade partners about what they view as the biggest barriers to engaging with the product and what may motivate them to install equipment outside of the product. We will determine the tools trade partners find most helpful in motivating customers to purchasing efficient air conditioning and heat pump equipment and performing QI, and any barriers they experience.
- **Heat Pump Growth:** The evaluation team will explore what types of heat pumps trade partners are installing, or if they specialize in a particular type. We will gauge the potential of going midstream with mini-split rebates and discuss trade partners' familiarity with heat pump installation processes. Overall, this will help to understand what trade partners think the future of the heat pump market looks like.
- **Retrospective and Prospective NTG Impacts:** Finally, the team will ask questions on product attribution, or the impact the product had on their decision to install and/or recommend efficient air conditioning or heat pump equipment.

Table 16 presents the link between each evaluation objective, research question, and interview question.

Table 13. Interview Questions by Research Question Addressed

Evaluation Objective	Research Question	Interview Question Number(s)
	Are trade partners' aware of QI processes for ACs and HPs?	D1, D2, E3
	What tools do trade partners find most helpful in motivating customers to purchase efficient air conditioning and heat pump equipment and perform QI?	E1, E2, E3, E8, E9, E10, E13
Rebate Experiences	How do trade partners become aware of the Xcel Energy Comprehensive HVAC rebates and what motivates them to pursue rebates?	C1, C2
	Do trade partners have feedback on the new comprehensive approach to providing residential HVAC services in one product?	S10
	Does the comprehensive approach bring value to trade partners?	S11

Evaluation Objective	Research Question	Interview Question Number(s)
Barriers to Participation	What do trade partners view as the biggest barriers to engaging with the product?	C3, A6b, D10
	Why do trade partners install equipment outside of the product?	E1a, E13b/c, E14
	What barriers do trade partners face in motivating customers to purchase efficient air conditioning and heat pump equipment and perform QI?	E1, E2aa, E2bb, E9a
Heat Pump Growth	What types of heat pumps are trade partners installing? Do they specialize in particular types?	F1, F2
	Are trade partners interested in a midstream rebate for mini-split heat pumps?	F7
	What are trade partners' familiarity with heat pump installation processes?	D2a, D2ab
	What are trade partner perceptions of the future of the heat pump market?	F3-F9
NTG Impacts	What impact has the product had on trade partners' decisions to install and/or recommend efficient air conditioning or heat pump equipment and to follow quality installation best practices?	Section H, D3
	How has Xcel Energy changed their business practices?	

Fielding Instructions

We will attempt to schedule interviews via email if email addresses are available. We will supplement email recruiting efforts with telephone calls as needed.

The following fielding guidelines should be used for trade partner recruiting and interviews:

- Attempt to reach each trade partner six times on different days of the week and at different times.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals [e.g., "I'm not interested", immediate hang-ups] at least once.
- Calling hours are 7 AM to 5 PM ST.
- Record interviews

Interview Sections

- **A.** Background and Program Familiarity

- **H:** Program Influence on the Market
- **C:** Motivations/Barriers for Trade Partners
- **F:** Perceptions/Awareness: Heat Pumps
- **D:** Perceptions/Awareness: Quality Installation
- **E:** Trade Partner Marketing
- **S:** Satisfaction and Program Experiences
- **J:** Closing

Section A: Background and Program Familiarity

Thank you for agreeing to talk with me today. I expect this conversation to take about half an hour. To help me capture your responses accurately, is it okay if I record this call? The recording will be used for my note-taking purposes only. It won't be shared with Xcel Energy.

Do you have any questions before I start?

First, I want to take a few minutes to better understand your role and set the stage for the rest of the questions.

A1. How long have you been in your current role? **[IF < 5 YEARS]** What was your previous role? [**PROBE TO MAKE SURE WE ARE TALKING TO:** Owner, Sales Manager, Sales Person].]

A2. Can you describe how much involvement you typically have with the rebate program? This would include interaction with Xcel Energy staff, filling out program paperwork, providing invoices, or fulfilling other requirements.

a. Generally, do rebates go directly to customers or are they sent to you?

b. **[IF DIRECTLY TO CUSTOMERS]** What prevents you from offering an equipment discount to the customer and receiving the rebate payment from Xcel Energy later?

   i. **[If timing of rebate receipt is a barrier]** What would be a reasonable timeline to receive the rebate, from invoice verification of the final application to receiving the rebate?

F1. One last question to help me understand your perspectives, do you have experience installing heat pumps? If not, do others at your company have experience installing heat pumps?

Section D: Perceptions/Awareness: Quality Installation

D1. To qualify for Xcel Energy's cooling rebates for air conditioners and heat pumps, an enhanced installation process, known as a "Quality Installation" must occur. The Quality Installation process does not describe the equipment itself -- rather, Quality Installation improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for a home and sealing of all exposed ductwork. Xcel Energy

defines Quality Installation as installation that follows procedures documented in ACCA Standard 5. Are you familiar with the "Quality Installation ACCA Standard 5 protocols"?

[IF D1 = YES]

D1b. Do you have experience following the "Quality Installation ACCA Standard 5 protocols?

[IF D1b = NO, IF D1b = YES SKIP D2]

D1bb. Do others at your company have experience performing Quality Installation, according to the ACCA Standard 5 protocols?

[IF INTERVIEWEE UNDERSTANDS QI (D1 = YES), OTHERWISE SKIP TO D3]

D2. What are the steps you take when completing a Quality Installation for air conditioners that are different from a standard installation?

D2_1. What software do you use to perform the load calculations?

D2_2. What tools do you use to measure air flow?

D2_3. What steps do you take to verify the refrigeration charge?

[ASK IF CONTRACTORS INSTALL HEAT PUMPS, F1=YES]

D2a. What additional steps do you take when completing a Quality Installation for air source heat pumps that are different from a standard installation?

D2ab. What have been your experiences setting up a heat pump to work properly with a back-up heating system?

[ASK ALL]

Section H: Program Influence on the Market

Now, I will ask some questions about the relative importance of the Xcel Energy offering in your recommendation to pursue high efficiency measures and installations. I understand that the market recently has been quite different due to the impacts of the supply chain issues. Try to think about your experiences in a “normal” year.

NEW H1. How would you describe the influence that the rebate program had on your decision to recommend 15 SEER central air conditioners (and above)?

H1a. How has that changed in 2021, if at all?

NEW H2. Lastly, how would you describe the influence that the Xcel Energy air conditioner and heat pump offering had on your decision to use procedures that meet the Quality Installation procedures for your customers?

PROBE: necessary evil to go back to summer (30-40 installs in winter, we have a list to get back to; will call the complainer; not a huge deal). In area w/- rebate, still go back

NEW H3. How would you describe the influence that the rebate program had on your decision to recommend heat pumps?

H3a. How has that changed in 2021, if at all?

Now, we are going to talk through a number of different scenarios to understand how they impact the type of equipment you sell.

SCENARIO 1: STATUS QUO

H4. First, thinking about the current market,

a. About what percent of the central air conditioners you sell are at least 15 SEER?

b. About what percent of the heat pumps you sell are at least 15 SEER?

c. About what percent of the central air conditioners you sell use procedures that meet the Quality Installation ACCA 5 Standards?

   a. What percentage of these installations do you complete a Manual J load calculation?

   b. What percentage of these installations do you seal all exposed ductwork?

   c. What percentage of these installations do you measure airflow and sub-cool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

d. What percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

SCENARIO 2: HISTORICAL PERSPECTIVE

H6. Now, I want you to think back to before you started participating in the program:

a. What percent of the central air conditioners you sold were installed using the procedures that meet the Quality Installation ACCA 5 Standards?

   a. For what percentage of these installations would you complete a Manual J load calculation?

   b. For what percentage of these installations would you seal all exposed ductwork?

   c. For what percentage of these installations would you measure airflow and subcool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

b. What percent of the air source heat pumps you sold were installed using the procedures that meet the Quality Installation ACCA 5 Standards?

SCENARIO 3: NO REBATE PROGRAM

H7. Now imagine that the Xcel Energy rebate program were not available today, and you were not able to offer rebates for cooling equipment or have any program support.

a. About what percent of the central air conditioners you sell do you think would be at least 15 SEER?

b. About what percent of the heat pumps you sell do you think would be at least 15 SEER?

c. If Quality Installation were not required, what percent of the central air conditioners you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

   a. For what percentage of these installations would you complete a Manual J load calculation?

   b. For what percentage of these installations would you seal all exposed ductwork?

   c. For what percentage of these installations would you measure airflow and subcool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

d. If Quality Installation were not required, what percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards? a Quality Installation? What effect would that have on your business?

e. What effects would this have on your business? **[PROBE:** employees, sales techniques, number of clients, time it takes to sell projects]

[INTERVIEWER NOTE: CHECK FOR CONSISTENCY IN RESPONSES. SEEK CLARITY AS NEEDED.]

H8. Do you do any work for customers served by another utility? In what regions? About what percent of the cooling equipment you sell in this region is considered energy efficient? [PROBE: 15 SEER or higher]

H9. About what percent of the cooling equipment installations you perform in this other region use procedures that meet the Quality Installation ACCA 5 Standards?

Section S: Satisfaction and Program Experiences

Now, I'd like to talk more specifically about your experiences with the rebate program.

Using a scale from 1 to 5, where 1 is extremely dissatisfied and 5 is extremely satisfied, please rate your satisfaction with the following items:

S1. Your **overall satisfaction** with the rebate program? 4

[ASK ONLY IF S1 < 5]

S1a. What could Xcel Energy do to increase your satisfaction with the rebate program? [**PROBE:** as needed for specific factor]

[ASK ALL]

S2. What is the rebate program doing well that they should keep doing?

S3. What can Xcel Energy do to increase your participation in the rebate program? (Probe for efficient equipment and QI.)

S4. In April, Xcel Energy combined its air conditioning and heating rebates under one rebate form. What do you like or dislike about having all the HVAC offerings under one rebate form?

[PROBE: easier to find eligible equipment? more efficient rebate processing?]

S5. Are there any challenges you have experienced with participating in the rebate program? (Probe for details.)

S6. Do you have any other feedback to provide Xcel Energy about this change to offering one rebate program?

Section C: Motivations/Barriers for Trade Partners

C1. How did you initially learn about opportunities to participate in the rebate program?

C2. What is the main reason you pursue rebates through the Xcel Energy rebate program?

C3. What, if anything, about the rebate program keeps you from participating more?

[SKIP D4 IF INTERVIEWEE ISN'T FAMILIAR WITH QUALITY INSTALLATION AND COMPANY DOESN'T OFFER VARYING INSTALLATION SERVICES]

D4. What, if anything, would enable your company to complete more of the in-depth installation services defined by the ACCA Standard 5 protocols (Quality Installation)? [**PROBE:** e.g., certification requirements, customer understanding of QI, and cost barriers]

Section E: Trade Partner Marketing

Now, I have some questions about customer motivations and how you sell efficient equipment to customers.

E1a. What tools or resources from Xcel Energy have you found to be the most helpful in selling efficient air conditioning equipment? [**PROBE** for the role of Quality Installation]

E1aa. Do you face any challenges in using these tools or resources?

E1b. What tools or resources from Xcel Energy have you found to be the most helpful in selling heat pumps? [PROBE for the role of Quality Installation]

E1bb. Do you face any challenges in using these tools or resources? [IF YES] What are those challenges?

E2. Do you explain the difference between standard installation and the more detailed installation services defined by the ACCA Standard 5 protocols to your customers? (If so: How do you explain it, and what do you tell them about the differences?)

E3. What tools or resources have you found to be the most helpful in selling the more detailed installation services defined by the ACCA Standard 5 protocols?

E9a. Do you face any challenges in using these tools or resources?

E4. How influential are the equipment rebates as opposed to the requirement to perform Quality Installation in selling rebate-eligible projects to your customers? How do you use the rebate in your sales process? How important is the rebate to customers in their decision (in a normal year)?

E4a. Is Quality Installation a competitive advantage for your company?

[IF YES]

How do you use quality installation to close sales with customers?

[ASK ALL]

E5. Do you promote the rebate program with your customers? If so: How?

E6. Have you ever sold any efficient cooling equipment to Xcel Energy residential customers without submitting an application for the rebate?

a. How frequently does this happen?

b. What are the reasons why?

c. For how many of those projects do you perform a the more detailed installation services defined by the ACCA Standard 5 protocols?

d. What would need to change for you to submit applications for these projects? (Probe: Is there anything Xcel Energy could do to help ensure applications are submitted for all eligible projects?)

Section F: Perceptions/Awareness: Heat Pumps

[IF TRADE PARTNER INSTALLS HEAT PUMPS, F1=YES]

F1a. What types of heat pumps does your company have experience installing?

PROBE: Air source heat pumps, Ground source heat pumps, Mini-split heat pumps (ducted and ductless), Cold climate heat pumps

IF MULTIPLE: Does your company specialize in a certain type of heat pump?

IF COLD CLIMATE: What do you use to define as a cold climate heat pump?

F2. How experienced are you and your company in selling and installing heat pump technology on a scale from 1 – 5, with 1 being not at all experienced (i.e., no experience with the technology) and 5 being very experienced (the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

F3. What do you see as the primary benefits of heat pump technology in Colorado?

F4. What do you see as the primary drawbacks of heat pump technology in Colorado?

F5. What do you tell customers about the perceived benefits of heat pumps?

F6. If your distributor offered an instant discount on mini-split heat pumps, how many more mini-split heat pumps would your company recommend to customers annually? What percentage of these savings would you pass on to the customer?

F7. What percentage of your customers do you think will buy heat pumps instead of air conditioners five years from now?

F8. What needs to change, if anything, to make heat pumps more viable to residential customers? [IF NEEDED examples could include equipment costs, electricity costs, more viable cold climate technology, policies, carbon-free electricity]

Section J: Closing

J1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences working with the rebate program?

J2. Those are all the questions I have today. [THANK AND TERMINATE]

B.5 Nonparticipating Trade Partner Interview Guide

To support the process and impact evaluation of the 2021 Xcel Energy efficiency products, members of the TRC evaluation team conducted in-depth telephone interviews with nonparticipating trade partners. This guide presents the questions covered in the in-depth interviews of trade partners who had little to no participation in the Colorado residential air conditioner and heat pump product.

The evaluation team collaborated with the product manager to identify 15 nonparticipating trade partners to interview, as outlined in Table 5. Roughly half had limited engagement with the product (1-2 projects completed since June 1st, 2021), and the other half completed zero projects in 2021.

Table 14. High Efficiency Air Conditioning/Heat Pump Nonparticipating Trade Partner Target Interviews, By Interview Strata

Trade Partner Type	Strata	Population	Target Interviews
Trade Partners	Limited number of projects completed (1-3)	180	7-8
	No projects completed	50	7-8
	Total	230	15

The remainder of the introduction provides the research questions which this guide was designed to address and fielding instructions for the interviewers.

Evaluation Objectives

The objectives for the Colorado residential air conditioner and heat pump measures evaluation are to:

- Collect feedback on **rebate experiences** with the air conditioning and heat pump rebate process. This will include a variety of topics including:
  - Awareness of the equipment and rebates.
  - Motivations to purchase the equipment and pursue a rebate.
  - Awareness of the ACCA QI process and interpretation of QI.
  - Feedback on the new comprehensive approach to providing residential HVAC services within one product.
  - Satisfaction with rebate processes.
- Identify **barriers to participation** in the product, particularly by investigating why trade partners and customers may install equipment outside of the product.
- **Explore ways to grow the heat pump market**. In doing so, we will explore the following topics:
  - Understand how trade partners talk to their customers about the perceived benefits of heat pumps.
  - Understand whether trade partners are specializing in the types of heat pumps they install.
  - Explore potential for midstream mini-split rebates.

  - Understand trade partner familiarity with the heat pump installation process and how peer utilities are supporting trade partners with learning heat pump installation processes.
  - Explore what heat pump market transformation can look like.
  - Research interest in heat pumps among participating customers in other DSM programs.
  - Understand how peer utilities are defining and supporting cold climate heat pumps.
  - Determine why heat pump trade partners appeared to have dropped out of the product in 2020.
- Determine **NTG ratio** for air conditioning and heat pump rebates.
  - Identify major drivers of free ridership.
  - Assess participant spillover.
  - Assess market effects of high efficiency air conditioning and heat pump rebates.

The nonparticipating trade partner interviews did not address every evaluation objective. For reference, Table 15 provides the evaluation efforts used for each objective.

Table 15. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Nonparticipating Trade Partner Interview Objective
Collect feedback on the rebate experiences	Process	Participating and nonparticipating customer surveys, and participating trade partner interviews	
Identify barriers to participation	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the heat pump market	Process	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	Impact	Participating and nonparticipating customer surveys, and participating and nonparticipating trade partner interviews	✓

The evaluation team used nonparticipating trade partner interviews to meet both process and impact objectives. These interviews were integral for the following three evaluation objectives: barriers to participation, heat pump growth, and NTG impacts.

- **Barriers to Participation**: The evaluation team will ask nonparticipating trade partners about what they view as the biggest barrier to engaging with the product and, if applicable, what motivates them to install high efficiency air conditioners or heat pumps outside of the product. Through these conversations, the evaluation team will have a better understanding about why some trade partners dropped out of the product in 2020. The evaluation team will also explore ways Xcel Energy can encourage increased trade partner participation in the future.
- **Heat Pump Growth:** The evaluation team will explore nonparticipating trade partners' level of awareness and perceptions of heat pump products. This will help to understand how nonparticipating trade partners perceive the heat pump market and how they see their participation in the heat pump market in the future.
- **NTG Impacts:** The team will ask nonparticipating trade partners whether Xcel Energy efforts have impacted their sales of high efficiency air conditioning or heat pump equipment outside of the Xcel Energy rebates. This information will support the understanding of potential market effects Xcel Energy has had on market actors.

Table 16 presents the link between each evaluation objective, research question, and interview question.

Table 16. Interview Questions by Research Question Addressed

Evaluation Objective	Research Question	Interview Question Number(s)
Barriers	What do trade partners view as the biggest barriers to engaging with the product? What motivates them to install high efficiency equipment outside of the product?	Section B; Section D
	What motivated trade partners to stop participating in the program?	
	What are trade partner awareness, interpretations, and perceptions of Quality Installation?	
Heat Pump Growth	What are trade partner awareness of heat pumps and heat pump installations?	Section H
	What are trade partner perceptions of heat pumps?	
NTG Impacts	What is the impact of the product on contractors' sales of high efficiency air conditioning or heat pump equipment outside of the Xcel Energy rebates?	Section M

Fielding Instructions

We will attempt to schedule interviews via email if email addresses are available. We will supplement email recruiting efforts with telephone calls as needed.

The following fielding guidelines should be used for nonparticipating trade partner recruiting and interviews:

- Attempt to reach each trade partner six times on different days of the week and at different times.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals [e.g., "I'm not interested", immediate hang-ups] at least once.
- Calling hours are 7 AM to 5 PM MST.
- Record interviews

Interview Sections

- **A:** Introduction/Background Information
- **M:** Program Influence on the Market
- **H:** Perceptions/Awareness: Heat Pumps
- **D:** Perceptions/Awareness: Quality Installation
- **B:** Barriers for Trade Partners
- **I:** Closing

Section A: Introduction/Background Information

Thank you for agreeing to talk with me today. I expect this conversation to take about half an hour. To help me capture your responses accurately, is it okay if I record this call? The recording will be used for my note-taking purposes only. It won't be shared with Xcel Energy.

Do you have any questions before I start?

First, I want to take a few minutes to better understand your role and set the stage for the rest of the questions.

A1. How long have you been in your current role? [IF < 5 YEARS] What was your previous role? [**PROBE:** Owner, Sales Manager, Engineer, Contractor, Field Technician, Project Manager, etc.]

A2. What are your primary responsibilities at COMPANY NAME?

A5. How many employees does your company have?

Section D: Perceptions/Awareness: Quality Installation

D1. Are you familiar with the "Quality Installation ACCA Standard 5 protocols, which is an installation process that is intended to improve the efficiency of cooling equipment and includes a load calculation to make sure the equipment is properly sized of a home and sealing of all exposed ductwork?

[IF D1 = NO]

D1a. Do others at your company have experience performing Quality Installation according to the ACCA Standard 5 protocols?

[IF D1 = YES]

D1b. Do you have experience following the "Quality Installation ACCA Standard 5 protocols?

[IF D1b = NO]

D1bb. Do others at your company have experience performing Quality Installation, according to the ACCA Standard 5 protocols?

[IF D1bb = NO, IF D1bb = YES SKIP D2]

D1bbb. Why does your company not perform Quality Installation?

[IF D1a = YES or D1b = YES, OTHERWISE SKIP TO NEXT SECTION]

D2. What prompted your company to start offering Quality Installation?

D2a. What are the steps you take when completing a Quality Installation for air conditioners that are different from a standard installation?

D2ai. What software do you use to perform the load calculations?

D2aii. What tools do you use to measure air flow?

D2aiii. What steps do you take to verify the refrigeration charge?

D2aiv. When you install an air conditioner unit in the winter, what steps do you take to ensure the installation was performed according to ACCA Standard 5 protocols (since the outside temperature would be below 70 degrees at the time of the installation)?

Do you do anything differently if you were installing in the winter vs. summer?

Do you install heat pumps?

D2b. What additional steps do you take when completing a Quality Installation for heat pumps that are different from a standard installation?

D2ab. What have been your experiences setting up the heat pump to work properly with the back-up heating system?

D10. What, if anything, would enable your company to complete the more in-depth installation services defined by the ACCA Standard 5 protocols? (Probe for certification requirements, customer understanding of QI, and cost barriers.)

D11. What do you perceive as the value to customers in offering the more in-depth installation services defined by the ACCA Standard 5 protocols? Is this a competitive advantage for your company and a part of your sales practice? Is this different from when you participated in the program?

Section M: Program Influence on the Market

Next, I'm going to ask some question about the type of equipment you sell to customers.

[SCENARIO 1: STATUS QUO]

H4. Thinking about the current market,

e. About what percent of the central air conditioners you sell are at least 15 SEER?

f. About what percent of the heat pumps you sell are at least 15 SEER?

g. About what percent of the central air conditioners you sell use procedures that meet the Quality Installation ACCA 5 Standards?

a. What percentage of these installations do you complete a Manual J load calculation?

b. What percentage of these installations do you seal all exposed ductwork?

c. What percentage of these installations do you measure airflow and sub-cool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

h. What percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

M4. Does the Xcel Energy rebate program impact your business practices in any way? (i.e. learning about new equipment, availability of equipment, market acceptance of equipment)

PROBE:

a. Impact on SEER levels?

b. Impact on heat pumps sales?

c. Impact on whether they follow procedures that meeting the Quality Installation ACCA 5 standards.

M5. Do you do any work for customers served by another utility? In what regions? About what percent of the cooling equipment you sell in this region is considered energy efficient? [PROBE: 15 SEER or higher]

[ASK IF M5=YES]

M5a. About what percent of the cooling equipment installations you perform in this other region are the in-depth installation (Quality Installation) service?

Section B: Barriers for Trade Partners

B0. Are you aware of the Xcel Energy rebates for air conditioners? What about for heat pumps?

[IF NOT AWARE, SKIP TO B4]

B1. What is the *main reason* you have not pursued [more] residential cooling rebates through the Xcel Energy rebate program? [PROBE for barriers: QI procedures, trade partner registration requirements, rebate application]

Are there *other* reasons?

B1a. What are your thoughts about the rebate application process through the rebate program?

B2. [IF SELLING HIGH EFFICIENCY EQUIPMENT] What motivates you to sell and install high efficiency air conditioners and heat pumps without the rebate from Xcel Energy?

[ASK IF TRADE PARTNER WAS FORMERLY PART OF PROGRAM, IF NOT SKIP TO NEXT SECTION]

B3. We understand you have pursued cooling rebates in the past, but you haven't had any recent projects. Why did you choose to no longer pursue cooling rebates through the Xcel Energy rebate program?

[Probe: Did the April 2021 decrease in the rebate amount for 13 and 14 SEER air conditioners impact your ability to perform QI for customers? Did the rebate decrease impact your decision not to apply for the rebate?]

B4. What about the Xcel Energy rebate program would need to change for you to pursue rebates through Xcel Energy? What about the rebate offering for heat pumps?

Section H: Perceptions/Awareness: Heat Pumps

H1. How experienced are you and your company in selling and installing heat pump technology on a scale from 1 – 5, with 1 being not at all experienced (i.e., no experience with the technology) and 5 being very experienced (the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

[IF EXPERIENCED]

H1a. What types of heat pumps does your company have experience installing? [**PROBE:** Air source heat pumps, Ground source heat pumps, Mini-split heat pumps, Cold climate heat pumps]

IF MULTIPLE: Does your company specialize in a certain type of heat pump?

IF COLD CLIMATE: What do you use to define as a cold climate heat pump?

H3. What do you see as the primary benefits of heat pump technology in Colorado?

H4. What do you see as the primary drawbacks of heat pump technology in Colorado?

H5. In what situations would you recommend a customer install a heat pump?

H5a. What do you tell customers about the perceived benefits of heat pumps?

H6. Are there situations where would you recommend against installing a heat pump? (Probe for details.)

H7. If the same equipment discounts were offered instantly through a distributor, rather than the rebate application process, how many more *mini-split* heat pumps would your company recommend to customers annually? What percentage of these savings would you pass on to customers?

H8. What percentage of your customers do you think will buy heat pumps instead of air conditioners five years from now?

H8a. Do you expect a rapid growth in the next 1-3 years or will it take more time?

H9. What needs to change, if anything, to make heat pumps more viable to residential customers? [IF NEEDED examples could include equipment costs, electricity costs, more viable cold climate technology, policies, carbon-free electricity]

Section I: Closing

I1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences installing high efficiency air conditioners and heat pumps?

I2. Those are all the questions I have today. [THANK AND TERMINATE]

B.6 Peer Utility Benchmarking Interview Guide

To support the process and impact evaluation of the 2021 Xcel Energy efficiency products, the TRC evaluation team will benchmark the Xcel Energy products against peer utilities. The objective of the benchmarking is to identify opportunities to improve the Xcel Energy products based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the product in context with the performance of other utilities. To conduct the benchmarking, the evaluation team will conduct secondary research on the peer utilities identified and perform in-depth interviews with program managers at the peer utilities.

This document presents the in-depth utility interview guide for Colorado residential air conditioner and heat pump measures within the Residential Heating and Cooling Product. Interviews will be conducted with four to six of Xcel Energy's peer utilities detailed in Table 17 below. Target respondents are managers of high efficiency air conditioner and heat pump energy efficiency programs.

Table 17: List of Peer Utilities

Utility	Program Name
Avista – WA	Residential - Energy Efficiency Rebate Program
Arizona Public Service Electric (APS)	Residential - AC Upgrade Rebate
NV Energy	PowerShift by NV Energy
Sacramento Municipal Utility District (SMUD)	Advanced Home Solutions
Black Hills Energy - CO	Colorado electric residential rebates
Rocky Mountain Power - UT	Residential - Wattsmart® Incentives
Eversource - MA	Residential central air conditioning & central heat pump rebates
PSEG Long Island	Home Comfort Program

Appalachian Power - VA	Appalachian Power Virginia eScore Program
ConEdison	Electric Heating and Cooling Technology for Homeowners and Renters
Southern Californian Edison (SCE)	Heat Pump Rebates & Incentives
Ameren - IL	Residential - Heating & Cooling Rebates
PECO	Residential - Heating & Cooling Rebates
Dominion Energy - SC	Residential - Rebates for Heating & Cooling System Replacements
PPL Electric	PPL Electric Utilities Energy Efficiency Rebates
DTE Energy	Residential - Replacement Rebates

Table 18 shows the objectives for the overall evaluation and indicates which of these objectives will be addressed by the peer utility interviews.

Table 18. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Peer Utility Interview Guide Objective
Collect feedback on the rebate experiences	Process	Participating and non-participating customer surveys, and participating and non-participating trade partner interviews	✓
Identify barriers to participation	Process	Participating and non-participating customer surveys, and participating and non-participating trade partner interviews	
Explore ways to grow the heat pump market	Process	Participating and non-participating customer surveys, and participating and non-participating trade partner interviews	✓

Evaluation Objective	Impact or Process Objective	Research Activity	Peer Utility Interview Guide Objective
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects	Impact	Participating and non-participating customer surveys, and participating and non-participating trade partner interviews	✓

Error! Reference source not found. identifies the interview questions related to each key p erformance indicator.

Table 3: Mapping of interview questions to indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings goals	• 2020 program energy savings goals (MWh) • 2020 program's savings (MWh) • 2020 total energy efficiency portfolio goal (MWh)	B2, B4, B5
Program budget cost of acquisition (e.g. $/MWh, $/Mcf)	• 2020 program budget • 2020 total gross energy savings for each peer program	B4, B6
Customer Participation Levels	• Number of incentive applications submitted 2020	B1
Net-to-gross ratios (NTGRs)	• NTG methods	B3
Total resource cost test (TRC) values	• TRC values	B7

Error! Not a valid bookmark self-reference. identifies the interview questions related to each contextual theme.

Table 4: Mapping of interview questions to contextual themes

Contextual themes	Data Needed	Interview Question
Program description	• Overall program objectives, implementation strategies, customer types targeted for participation • List of measures and their efficiency levels, incentive levels • Program staffing, the length of time of program operation, any recent changes that have been made to the program, and future outlook.	A1, A2, A4, A5, C1
Net-to-gross (NTG) savings approach	• NTG method, ratio applied, calculation details	B3
Rebate experiences	• Methods used to increase program awareness to new and existing customers • Methods to engage trade partners • Methods used to discuss and promote quality installation with customers and trade partners	C1, C2
Explore ways to grow heat pump market	• Understanding of whether utilities offer mid-stream rebates for mini-split heat pumps. • Understanding of how utilities support trade partners with understanding the heat pump installation process. • Understanding of how utilities define and support cold climate heat pumps. • Understanding what heat pump market transformation looks like.	A3, A4, A5, A6, C2

Recruiting Instructions

The research team plans to send advance emails to any program managers with available emails. This email will contain an explanation of the research, as well as both an Xcel Energy and TRC contact person the utility can reach out to if they have additional questions or would like to schedule an interview at their convenience.

Potential respondents will be recruited by consultants on the research team who will be conducting interviews and have been trained on the purpose and goals of the Colorado residential air conditioner and heat pump measure evaluation. The research team will be as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews when possible to accommodate busy utility schedules. The research team will leave a voicemail or receptionist message on the first attempt whenever possible, and then use discretion to determine any additional messages left on subsequent attempts. The research team will strive to attempt to contact each peer utility a minimum of 4 times before giving up on that particular contact, but depending on each unique situation, the research team may need to attempt some contacts more times to ultimately reach the correct person.

Section A: KPIs/Program Design

A1. First, we'd like to talk through the basic design and organization of your program. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

Can you describe your program at a high level?

a. What are the program's overall objectives?

b. Have there been any recent changes to the program?

c. What will the program be like in the near future?

A2. Next, I'd like to talk about your program's efficiency incentives. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH. CAN ASK QUESTIONS BELOW OR ASK RESPONDENT IF OK TO FOLLOW UP VIA EMAIL]**

a. What types of measures do you offer? PROBE**:**

i. Prescriptive/Custom?

ii. Separate vs combined rebates for equipment and QI?

iii. Heat Pumps and/or ACs?

iv. Comprehensive offering or only cooling?

b. Can you recommend a web page or other resource where I can find a list of your available measures and their incentive values?

i. If "NO": What specific measures are offered? What are the incentive levels for each measure?

A3. With regards to heat pumps,

a. Do you or have you considered a mid-stream rebate for mini-split heat pumps? [Why/why not]

b. Do you have an incentive for cold climate heat pumps?

i. How do you define cold climate heat pumps?

ii. What role do cold climate heat pumps play in the portfolio? Do you expect that to change in the future?

iii. Are you supporting cold climate heat pump technology in any other way?

c. Do you require trade partners to follow heat pump installation protocols?

i. [IF yes] What protocols do trade partners need to follow?

ii. [IF yes] Do you offer any type of incentive for trade partners to follow heat pump installation procedures?

A4. [IF Offer QI] With regards to Quality Installation, for which measures do you offer Quality Installation (or Verified Installation)?

a. Is Quality Installation required or is there an additional incentive for QI?

i. Probe for differences between ACs vs HPs

ii. What requirements must be met for a customer to receive a quality installation through the program (trade partner qualification? documentation?)

[IF QI not offered:] With regards to Quality Installation, have you considered offering Quality Installation for AC and/or heat pump measures? Why do you not/no longer offer Quality Installation?

A5. What do you use as baseline for the air conditioner and heat pump measures?

a. When calculating savings, how do you handle the replacement of gas heating systems with electric heat pumps?

A6. My last question with regards to the program design, is what does market transformation for heat pumps look like?

a. Would all houses have heat pumps or only electrically/delivered fuels have heat pumps?

b. What steps or regulatory mechanisms would be needed to reach market transformation?

c. When would you expect to see market transformation?

Section B: Savings goals/cost

Next, I'd like to talk about the participation and energy savings achieved through the program in 2020.
[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH. CAN ASK QUESTIONS BELOW OR ASK RESPONDENT IF OK TO FOLLOW UP VIA EMAIL]

B1. How many units were rebated in 2020?

a. What were your participation goals (# of units) in 2020?

B2. What were the program's energy savings goals in 2020? (MWh, MW, therm)?

B3. Are these goals based on gross or net savings?

a. Did/will you apply a NTG ratio to these savings?

b. What NTG ratio do you use?

c. What methods are used to calculate NTG ratio?

d. Are NTG ratios estimated at the program level, measure level, or both?

B4. How much net/gross energy savings did the program report in 2020 (MWh, MW, therm)?

B5. What was the total energy efficiency portfolio goal in 2020 (MWh, MW, therm)?

B6. We'd like to know more about the budget or total operating costs of your program to get a sense of the utility cost of energy savings. Ideally, this includes program incentives, salaries of program staff (including support staff who may not work on the project full-time), marketing, consulting, and other overhead.

a. What is the program's total operating budget?

b. If sub-programs exist, how does this break down between sub-programs?

B7. What type of cost effectiveness test is applied to the program?

a. If Total Resource Cost Test (TRC), what was the TRC in 2020?

b. If Utility Cost Test (UCT), what was the UCT in 2020?

Section C: Program Participation

Next, I'd like to talk about program outreach and marketing.
[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]

C1. What steps does the utility take to engage potential program participants?

Probe as needed: What marketing practices do you use to increase customer awareness of the program?

a. What has been the most effective?

b. What has been the least effective?

c. Do you target certain types of customers?

C2. Next, I'd like to talk about the program's trade allies.

a. Approximately how many trade allies are active in the program?

b. What proportion of trade allies install heat pumps?

c. What activities do program staff conduct to engage trade allies?

Probes: Provide training?
Require registration?
Support connections between contractors and customers?

d. What type of support is offered, if any, specifically in helping trade partners better understand heat pump installation processes?

e. What roles do trade allies play in driving customer participation in the program?

f. What have you found to be the most effective ways of engaging trade allies to drive participation in the program?

g. Do you engage distributors? How? Why?

Section D: Closing

D1. Great! Thank you so much for your time. Those are all the questions we have for you today. Before we finish, do you have any questions for me, or anything else you would like to add?

Appendix C: Data Collection Findings

Appendix C contains materials related to data collection findings including staff interview findings, participating customer survey results, nonparticipating customer survey results, trade partner interview results, nonparticipating trade partner interview results, and peer utility benchmarking results.

C.1 Staff Interview Findings

This guide was used to interview staff associated with Xcel Energy's DSM products as part of the TRC Companies 2021 evaluation of the Xcel Energy DSM products. The interviews were semi-structured, with these questions served as a basic guide for experienced TRC Companies staff during one-on-one phone interviews. As a guide for semi-structured interviews, these questions were not necessarily asked verbatim, but served as a roadmap during the conversation.

Introduction

To support the 2021 process and impact evaluation of residential high efficiency air conditioning (AC) and heat pump measures as part of the Residential Heating and Cooling Product in Colorado, the TRC Companies (TRC) evaluation team conducted telephone interviews with key staff managing and implementing rebates for residential high efficiency AC and heat pump measures. The interview objectives were to collect staff feedback on product experiences and evaluation priorities. Members of the TRC evaluation team interviewed the following key staff managing and implementing the products. When the Product Manager desired feedback from more than one staff member within a team, the evaluation team conducted the interview as a group.

Xcel Energy Staff:

- Two Product Managers
- Engineering team member
- Trade partner manager

Group14 Engineering Staff (implementer):

- M&V Lead

This memo contains our summary of the key takeaways, a description of the product, an inventory of the product's strengths and barriers, and feedback on evaluation priorities.

Key Takeaways

Below are key takeaways from staff experiences with the air conditioning and heat pump measures of the Residential Heating and Cooling Product. These key takeaways provide a summary of the products' context and feedback received during both the kick-off meeting and the subsequent staff interviews.

- The term "Quality Installation" is used by ACCA (Air Conditioning Contractors of America) in their QI 5 Standards, which Xcel Energy uses. ACCA defines the QI standard for both air conditioners and heat pumps. However, QI means different things in the contractor community. Because QI is easily misunderstood, the evaluation team will need to work closely with the implementation team when developing data collection instruments about QI awareness and experiences.
- Xcel Energy has a major initiative to transform the AC/heat pump market through the program. This is a paradigm shift for the contractor and supplier community, and customer engagement is soon to begin.
- Similar to other DSM programs, there are still many AC/heat pump installations occurring outside of the program.
- Staff report that customer feedback about the product has been very positive.
- Xcel Energy is re-designing its rebates to focus on heat pumps.
- Quality installation of heat pumps is important for achieving savings and performance. The ACCA heat pump QI includes QI measures defined in the air conditioning QI protocols as well as heat pump installation best practices, such as back-up heat source controls.
- Starting in 2021, measures from the 2020 High Efficiency Air Conditioning product will be combined with other heating and cooling technologies into a new product called the Residential HVAC Product.

Product Activities, Goals, and Resources

The following bullets present the evaluation team's understanding of the product based on staff interview results and review of available product documentation.

Goals and Objectives

In 2021, Xcel Energy staff identified the following goals and objectives for the product:

- Increase program participation.
- Increase heat pump sales/rebates.
  - Change market perception of heat pumps.
  - Drive market toward electrification.
- The 2021 Residential HVAC program has an energy savings goal of 14 GWh. While this goal encompasses many measures, it relies on a relatively similar amount of savings from air conditioning and heat pump measures compared to the 2020 High Efficiency Air Conditioning product goal. In 2021, heat pumps comprise a larger share of the goal compared to air conditioning.

Table 19 presents the 2020 achievements and its achievements compared to the planned goal.

Table 19. 2020 Achievement for the AC High Efficiency Air Conditioning Product:

Source	Participants *(% of Goal)*	Net kW *(% of Goal)*	Net kWh *(% of Goal)*	Net Dth *(% of Goal)*	Budget *(% of Goal)*	Net Benefits *(% of Goal)*
Electric	7,247 *(136%)*	2,964 *(110%)*	3,671,977 *(143%)*	--	$2,892,657 *(102%)*	$1,358,658 *(170%)*
Gas[a]	5,763 *(197%)*			35,860 *(185%)*	$606,107 *($140)*	$1,585,340 *(203%)*

[a] *Gas savings are realized when a gas furnace is present and uses the same ducts sealed through the QI process.*

Activities

Xcel Energy implements a variety of activities to support residential high efficiency air conditioning and heat pump equipment in Colorado.

- Xcel Energy provides a range of rebates to encourage customers to purchase high efficiency cooling equipment, and trade incentives to encourage trade partner participation. Many of the rebate levels changed in 2021, these changes are identified in the next set of bullets.
- Trade partners must be able to prove they installed equipment through a QI standard (ACCA for air conditioners and NEEP for heat pumps) for all rebated equipment except mini-split heat pumps.
- Xcel Energy hires a 3rd party to perform M&V on a sample of the projects. The M&V contractor sends findings to the installers to let them know how they performed on the QI inspection.
- Xcel Energy offers a trade incentive to encourage Quality Installation practices. It provides a $100 incentive to trade partners for standard efficiency equipment and a $50 incentive to trade partners for higher efficiency equipment. Trade partners are allowed to give the rebate to the customer. The standard efficiency equipment incentive is higher because the energy savings potential is greater compared to the higher efficient air conditioners.
- Xcel Energy offers semiannual trade partner training webinars.
- Xcel Energy requires trade partners to hold NATE certification if they are to install any of the air conditioning and heat pump measures except for mini-split heat pumps. To encourage trade partners to pursue NATE certification, Xcel Energy will reimburse trade partners for the cost of the NATE ASHP service certification examination in 2021.
- Xcel Energy requires trade partners to participate in annual QI training and testing through an online learning management platform called Brainshark.

Xcel Energy made the following changes to the product in 2021:

- In prior years, Xcel Energy required that air conditioning equipment be certified by the Air Conditioning, Heating, and Refrigeration Institute (AHRI) to ensure that it met energy efficiency specifications. However, due to market shifts stemming from COVID-19, demand outstripped supply during 2020. Therefore, Xcel Energy dropped the certification requirement and offered customers who bought uncertified equipment the

equivalent of the lower tier rebate. The theory behind this change was to continue to motivate customers and trade partners to perform QI despite not being able to confirm equipment certification. Xcel Energy is adapting this approach moving forward.

- In 2021, Xcel Energy revamped its product so that all residential HVAC equipment are offered through one comprehensive HVAC product.
- Xcel adjusted their application process in 2021:
  - Xcel Energy made changes to its process to make it easier for contractors to enter information into the application form.
  - In 2021, contractors will no longer need to enter all of the QI data in the rebate application. Instead, they are required to keep their QI documentation on file for review if the project is selected for M&V. This change is expected to make the application process easier for trade partners.
- Xcel Energy made the following changes to its rebate levels in 2021 to encourage more customers to install heat pumps:
  - Lower tier (below 15 SEER) AC rebate for quality installation now $200 from $300.
  - Air source heat pump (15+ SEER) with quality installation and back up heat source rebates now $800 from $500.
  - Mini-split heat pump (15+ SEER) rebates now $500 from $300.
  - Added a $1,000 rebate for cold-climate air source heat pumps (18+ SEER) with quality installation and back up heat source.
  - Added a $600 rebate for cold-climate mini-splits (18+ SEER) with back up heat source that meets Xcel Energy's definition of cold climate heat pumps.
  - Differentiation in ground source heat pump (14.1 EER Closed Loop) rebates based on previous energy source.
    - With electric resistance heat as previous heat source, $300 rebate per heating ton (up to $1,500).
    - With gas heat as their primary source previous to the ground source heat pump installation, or for new homes, $400 rebate per heating ton (up to $2,000).

Resources

Xcel Energy utilizes a variety of resources to support high efficiency air conditioning and heat pump equipment in Colorado.

- Xcel Energy relies on the following tools to train trade partners in the product and its measures:
  - Brainshark is an online tool used to train trade partners regarding quality installation.
  - Webinars (or in-person events pending COVID-19 restrictions) for ongoing product training (coming in 2021).
  - NATE certification to ensure trade partners are knowledgeable in HVAC equipment.
- Xcel Energy uses rebates to overcome financial barriers faced by market actors:
  - Rebates for equipment and quality installations.

- Reimbursement to trade partners for NATE air source heat pump exam.
- Incentives to trade partners to help extra time spent fulfilling program requirements.

- Xcel Energy relies on trade partners to sell rebates to their customers.
  - Xcel Energy relies on a core group of trade partners to perform a majority of installations. In 2020, the top 15 trade partners accounted for 63% of the overall AC/heat pump rebate volume.
- Xcel Energy relies on an M&V contractor who performs the equipment and QI inspections.
- Xcel Energy relies on the following industry groups to help define standards to apply to the rebate offerings:
  - ACCA for QI standards for air conditioners and heat pumps.
  - Northeast Energy Efficiency Partnership (NEEP) and AHRI to define equipment eligible for a rebate.

Product Strengths and Challenges

During interviews, staff identified the following strengths and challenges to implementing high efficiency air conditioning and heat pump products in Colorado in 2020 and 2021. In addition to the interview findings, staff provided documentation from an internal staff discussion, held in the first quarter of 2021, that identified additional strengths and challenges related to heat pumps. Findings from the internal discussions are grouped together at the end of each list.

Strengths

- The product is meeting and exceeding its rebate goals.
- Xcel Energy considers themselves a leader in transforming the air conditioning market in Colorado and a leader in helping to commercialize heat pumps to a wider customer base in Colorado.
- The rebates are seen as a great marketing tool for trade partners.
- Staff reported a positive relationship with its M&V contractor, noting that they are very knowledgeable about assessing QI.
- In 2021, Xcel Energy will not require QI results to be submitted as part of the application. Staff expects this to eliminate a large barrier to participation.
- Staff identified a number of strengths related to their relationship with trade partners:
  - Trade partners are well engaged and seen as a backbone to the program's success.
  - Every trade partner must have a NATE certified technician complete online training annually. They can be certified in AC service, AC installation, ASHP service, or ASHP installation. Any one of these certifications allows the technician to install equipment through the program. This on-going training helped Energy have assurance that trade partners are performing QI, understand the rebates and the required paperwork.
  - Staff reported that the Brainshark training tool works well, citing that it is interactive and requires trade partners to answer questions throughout the training.

- Contractors in the program know there is potential for their work to be inspected, therefore they tend to perform QI well.
- Trade partners commonly use the online application.

- Xcel Energy product staff identified and documented the following additional strengths during an internal discussion they had in 2021:
  - The product has a generous budget for beneficial electrification measures.
  - Xcel Energy is positioned to build on its successful relationship with air conditioning trade partners to support the heat pump industry.
  - Air source heat pump technology has been in the market for years. So while the equipment is new to many customers, the technology is not new.
  - Xcel Energy expects to rely on its AC installers to become early proponents of selling heat pumps to their customers. This is because participating contractors are already NATE certified and familiar with the Xcel Energy rebate structure.
  - Xcel Energy also expects to reach out to prior participating customers in other DSM and renewable programs to serve as their “early adopter” population for heat pumps because staff have found these customers to be more inclined to install additional energy efficiency measures, and therefore they may be more willing to install heat pumps.
  - Contractors that are already NATE certified for air conditioning are not required to apply for a separate certification for heat pumps (and vice versa). This makes it easier for more contractors to participate in the product.
  - Mini-split heat pump manufacturer engagement is high.

Challenges

- Program staff reported the paperwork associated with program participation can be challenging for trade partners because it is time consuming.
- Program staff reported the AHRI equipment certification process is time consuming for trade partners to collect; however, it is necessary for them to receive the higher rebate offered through the program.
- Program staff reported timing of QI inspections is not ideal. Some customers have to wait several months to receive their rebate because installers and the M&V contractor must finish the QI process during warmer months, which could be months after the installation.
- Inspections during the contractors’ busy season (summer) can be challenging for the contractors to attend. Attendance is optional but ideal as it is a learning opportunity.
- The COVID-19 pandemic complicated the QI inspection process due to safety concerns of home contractor visits. Customers had to be willing to have the M&V contractor enter their home or had to have a smart phone to video chat with the M&V contractor for their inspection. To address this challenge, the M&V contractor sent additional introductory letters to customers to meet their sample size goal.
- The COVID-19 pandemic impacted communications between program staff and trade partners. Program staff was unable to visit trade partners, either at a scheduled time or spontaneously, and maintain their high degree of in-person relationships.

- The program staff reported customers and some trade partners have negative perceptions of heat pumps, which can influence customers buying decisions. These negative perceptions center on whether the heat pumps can provide sufficient heat in the winter months to justify the equipment costs.
- Program staff reported that it is difficult to find good trainers to give webinars and lead Brainshark trainings for their certification program. The program would benefit from additional industry experts leading the certification trainings.
- Xcel Energy provides limited outreach specific to this product. Program relies mostly on trade partners to market the program. However, trade partners tend not to market to customers until their equipment breaks.
- Staff have found it hard to engage new contractors to adhere to QI certification and obtain NATE certification.
- While staff report trade partner engagement is strong, they recognize they are not capturing the full market potential and are only engaging roughly three-quarters of air conditioning contractors. Xcel Energy staff have found that these trade partners are not interested in the extra time required to be NATE certified, adopt QI best practices, or follow-through with the paperwork.
- Cost of high efficiency equipment is higher than traditional air conditioners.
- Top participating trade partners continue to substantially outperform less active trade partners.
- Xcel Energy did not have a trade incentive for ground source heat pumps in 2020 but will have one starting April 1, 2021.
- Contractors need to learn how to sell heat pumps to their customers, particularly the nuances related to dual controls with back-up heating sources.

- Xcel Energy product staff identified and documented the following additional weaknesses during an internal discussion they had in 2021.
  - Customers and contractors need to better understand “the why” for installing heat pumps.
  - Customers and contractors have limited knowledge of time-of-use (TOU) rates.
  - Customers face unclear bill impacts from installing measures, particularly with the addition of solar panels.
  - Trade allies' knowledge of heat pump technology is questionable, and their adoption rate is low.
  - Trade allies fear follow-up service calls on air source heat pumps.
  - Customer knowledge of heat pumps is low.
  - Staff feel uncertainties around what is happening in the HVAC market outside of the sales rebated through the product.
  - Need to find a way to teach contractors how they can tell the clean energy future story in a way customers will care about it.

- There is a lack of a "QI best practice for HPs" industry standard and heat pump QI best practices are not well known.
- Cold climate heat pumps are new; contractors must learn how to prove specifications.
- Tracking beneficial electrification budget may be challenging.
- There can be technical challenges with air-source heat pumps in high country climate zones (zones 5-6-7).
- Staff need to identify good technical trainers.
- Customer advisory services do not necessarily have language to support customers calling to seek help with electrification opportunities.

Feedback on Evaluation Priorities

During interviews, staff identified research topics they would like the evaluation to address. The following bullets compile these topics along with additional topics that the evaluation team identified based on staff interview findings. The evaluation team will consider these research topics when prioritizing portfolio-wide evaluation needs and as able, incorporate them into the final evaluation plan for the 2021 evaluation of Colorado high efficiency air conditioner and heat pump measures.

- Estimate net-to-gross, being careful to define quality installation clearly and effectively.
- Understand why some heat pump trade partners dropped out of the product in 2020.
- Understand whether contractors are installing all types of heat pumps or specializing in a particular type.
- Explore ways to convince energy efficiency participants from other products to install heat pumps since they may be more likely to install new energy efficiency technologies.
- Understand barriers to customer and trade partner participation and how Xcel Energy can overcome them.
- Focus peer research on understanding cold climate heat pumps and whether backup heat is needed for cold climate heat pumps, especially because there is no industry standard for their definition.
- Explore potential of going midstream with mini-split rebates.
- Explore ways to grow heat pump market.
- Collect feedback on the comprehensive HVAC approach.
- Understand if peer utilities and trade partners are familiar with heat pump installation processes.
- Understand what realistic market transformation looks like for heat pumps.

C.2 Participating Customer Survey Results

To support the process and impact evaluation of the 2021 Xcel Energy efficiency products, members of the TRC evaluation team are conducting in-depth telephone interviews with Trade Partners. This guide presents the questions to be covered in the in-depth interviews of trade partners who have participated in the Colorado residential air conditioner and heat pump product.

Section A: Awareness of Rebates, Heat Pumps, and Quality Installation

A0. I'd like to start by asking how you first heard about the Xcel Energy rebates for cooling equipment. Was it from…..(Read answering options. Select one)

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Contractor	43	80%	14	78%	1	50%	16	62%	74	74%
Xcel Energy website	5	9%	1	6%	1	50%	4	15%	11	11%
Xcel Energy bill	2	4%	2	11%	0	0%	1	4%	5	5%
ENERGY STAR website	0	0%	0	0%	0	0%	0	0%	0	0%
Friends or family	0	0%	0	0%	0	0%	1	4%	1	1%
Somewhere else [SPECIFY]	4	7%	1	6%	0	0%	4	15%	9	9%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[ASK IF STRATA 4]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
A contractor	0	0%	0	0%	0	0%	26	100%	26	100%
Yourself	0	0%	0	0%	0	0%	0	0%	0	0%
A friend or family member	0	0%	0	0%	0	0%	0	0%	0	0%
Someone else	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**0**	**0%**	**0**	**0%**	**26**	**100%**	**0**	**0%**

[ASK IF STRATA 3 OR 4]

A2. How did you first become aware of the potential to use heat pumps to cool or heat your home? Was it from….

(RANDOMIZE, READ ALL. SELECT ALL THAT APPLY.)

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Friends and family (word of mouth)	0	0%	0	0%	1	33%	9	28%	10	29%
Prior experience with a heat pump	0	0%	0	0%	0	0%	9	28%	9	26%
Installer recommendations	0	0%	0	0%	0	0%	5	16%	5	14%
Online search results	0	0%	0	0%	1	33%	4	13%	5	14%
Somewhere else [SPECIFY]	0	0%	0	0%	0	0%	5	16%	5	14%
Xcel Energy	0	0%	0	0%	1	33%	0	0%	1	3%
At the home improvement store	0	0%	0	0%	0	0%	0	0%	0	0%
Social media	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**0**	**0%**	**3**	**100%**	**32**	**100%**	**35**	**100%**

[ASK IF STRATA = 1 OR 2 OR 3]

A3. Now I am going to ask some questions about the installation of your equipment. To qualify for a rebate, your contractor installed your <MEASURE_TYPEB> using an enhanced installation process, known as a “Quality Installation,” The Quality Installation process does not describe the equipment itself -- rather, Quality Installation improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for your home and sealing of all exposed ductwork. Were you aware that you received this enhanced installation?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	39	72%	13	72%	2	100%	0	0%	54	73%
No	14	26%	4	22%	0	0%	0	0%	18	24%
DK	1	2%	1	6%	0	0%	0	0%	2	3%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**0**	**0%**	**74**	**100%**

[ASK IF A3 = 1]

A4. How did you first learn about the Quality Installation? (DO NOT READ OPTIONS; Select one)

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Contractor who installed the equipment	35	90%	11	85%	1	50%	0	0%	47	87%
Xcel Energy website	2	5%	0	0%	1	50%	0	0%	3	6%
Xcel Energy bill	0	0%	0	0%	0	0%	0	0%	0	0%
ENERGY STAR website	0	0%	0	0%	0	0%	0	0%	0	0%
Friends or family	0	0%	1	8%	0	0%	0	0%	1	2%
Other [SPECIFY]	2	5%	1	8%	0	0%	0	0%	3	6%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**39**	**100%**	**13**	**100%**	**2**	**100%**	**0**	**0%**	**54**	**100%**

[ASK IF A4 = 2, 3, 4, 5, 6]

A4a. To confirm, were you aware of Quality Installation for cooling equipment before talking to your contractor?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	4	100%	1	50%	1	100%	0	0%	6	86%
No	0	0%	1	50%	0	0%	0	0%	1	14%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	4	100%	2	100%	1	100%	0	0%	7	100%

Section C: Barriers and Motivations to Install EE Equipment & Have QI Performed

[ASK if received rebate for high-efficiency CAC or ASHP, i.e., STRATA = 1 OR 3]

[If STRATA = 1 OR 3; ELSE SKIP TO C2a]

C1a. Now I want to ask you a few questions about the choices you made when you bought your cooling equipment. When you were in the process of purchasing this unit, at any point did you receive bids for lower efficiency or lower cost cooling equipment?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	33	61%	0	0%	1	50%	0	0%	34	61%
No	19	35%	0	0%	1	50%	0	0%	20	36%
DK	2	4%	0	0%	0	0%	0	0%	2	4%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**0**	**0%**	**2**	**100%**	**0**	**0%**	**56**	**61%**

[ASK If C1a = 1 or 88]

C1aa. What lower efficiency or lower cost cooling equipment did you consider purchasing?

Verbatim comments redacted for participant privacy.

[ASK If C1a = 1 or 88]

C1b. What are the reasons you chose to install the particular cooling equipment you purchased?

[DO NOT READ; SELECT ALL THAT APPLY]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Other [SPECIFY]	22	34%	0	0%	0	0%	0	0%	22	33%
The equipment is more energy efficient	18	28%	0	0%	1	50%	0	0%	19	28%
Contractor recommendation	8	12%	0	0%	1	50%	0	0%	9	13%
The rebate from Xcel Energy	8	12%	0	0%	0	0%	0	0%	8	12%
The equipment is less expensive to operate (monthly cost is lower)	5	8%	0	0%	0	0%	0	0%	5	7%
The equipment had better features [SPECIFY]	4	6%	0	0%	0	0%	0	0%	4	6%
Heat pumps provide heating during colder times of year	0	0%	0	0%	0	0%	0	0%	0	0%
Somewhere else [SPECIFY]	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Equipment upfront cost	0	0%	0	0%	0	0%	0	0%	0	0%
Brand / Product reviews	0	0%	0	0%	0	0%	0	0%	0	0%
Replace old equipment	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**65**	**100%**	**0**	**0%**	**2**	**100%**	**0**	**0%**	**67**	**100%**

[ASK if received rebate for Mini-Split Heat Pumps, STRATA = 4] [ELSE SKIP TO C3]

C2a. Now I want to ask you a few questions about the choices you made when you bought your cooling equipment. When you were in the process of purchasing this unit, at any point did you consider installing something else, instead of <MEASURE_NAMEA>?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	0	0%	0	0%	0	0%	7	27%	7	27%
No	0	0%	0	0%	0	0%	19	73%	19	73%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	0	0%	0	0%	0	0%	**26**	**100%**	**26**	**100%**

[If C2a = 1]

C2b. What are the reasons you chose to install <MEASURE_NAMEA>, rather than some other type of cooling equipment?

[DO NOT READ; SELECT ALL THAT APPLY]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Heat pumps are less expensive to operate (monthly cost is lower)	0	0	0	0	0	0	1	6%	1	6%
Heat pumps are more energy efficient	0	0	0	0	0	0	5	29%	5	29%
Allows cooling of specific rooms	0	0	0	0	0	0	5	29%	5	29%
Didn't require ductwork	0	0	0	0	0	0	1	6%	1	6%
Other	0	0	0	0	0	0	5	29%	5	29%
Total	**0**	**0%**	**0**	**0%**	**0**	**0%**	**17**	**100%**	**17**	**100%**

C3. Did you have any concerns when purchasing <MEASURE_NAMEA>? [DO NOT READ; ALLOW FOR MULTIPLE RESPONSE]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
No	44	79%	18	100%	2	100%	16	59%	80	78%
Equipment Costs	4	7%	0	0%	0	0%	8	30%	12	12%
Technical capabilities of equipment	3	5%	0	0%	0	0%	3	11%	6	6%
Comfort issues	3	5%	0	0%	0	0%	0	0%	3	3%
Energy bill concerns	2	4%	0	0%	0	0%	0	0%	2	2%
Availability of contractors willing to install equipment	0	0%	0	0%	0	0%	0	0%	0	0%
Technical knowledge of contractor	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**56**	**100%**	**18**	**100%**	**2**	**100%**	**27**	**100%**	**103**	**100%**

[ASK IF STRATA = 1 OR 2]

C4a. Did you discuss the potential of installing a heat pump with your contractor?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	12	22%	1	6%	0	0%	0	0%	13	18%
No	40	74%	16	89%	0	0%	0	0%	56	78%
DK	2	4%	1	6%	0	0%	0	0%	3	4%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**0**	**0%**	**0**	**0%**	**72**	**100%**

[ASK IF C4a=1]

C4b. Why did you choose to install <MEASURE_NAMEA> instead of a heat pump? [DO NOT READ; ALLOW FOR MULTIPLE RESPONSE]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Other [SPECIFY]	7	41%	1	33%	0	0%	0	0%	8	40%
Less expensive to purchase	3	18%	1	33%	0	0%	0	0%	4	20%
Contractor Recommendation	3	18%	0	0%	0	0%	0	0%	3	15%
Less expensive to operate	2	12%	1	33%	0	0%	0	0%	3	15%
Allows cooling of more rooms	2	12%	0	0%	0	0%	0	0%	2	10%
No need for supplemental heat	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Heat pumps don't work in Colorado	0	0%	0	0%	0	0%	0	0%	0	0%
Supply chain	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**17**	**100%**	**3**	**100%**	**0**	**0%**	**0**	**0%**	**20**	**100%**

Section B: Free Ridership

[IF STRATA = 2 AND A3 = 1, SKIP TO Q1]

B1. In your own words, how would you describe the importance of the Xcel Energy air conditioning and heat pump rebate on your decision to purchase a <MEASURE_NAMEB>?

Verbatim comments redacted for participant privacy.

B2a. Now thinking about your decision to purchase this <MEASURE_TYPEB>, how influential was the availability of a rebate from Xcel Energy on this decision? Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “extremely influential.”

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	3	6%	2	40%	0	0%	4	15%	9	10%
1	0	0%	0	0%	0	0%	1	4%	1	1%
2	4	7%	0	0%	0	0%	1	4%	5	6%
3	5	9%	0	0%	0	0%	3	12%	8	9%
4	4	7%	1	20%	0	0%	3	12%	8	9%
5	8	15%	1	20%	0	0%	3	12%	12	14%
6	2	4%	0	0%	0	0%	2	8%	4	5%
7	6	11%	1	20%	0	0%	5	19%	12	14%
8	12	22%	0	0%	0	0%	3	12%	15	17%
9	4	7%	0	0%	1	50%	0	0%	5	6%
10	6	11%	0	0%	1	50%	1	4%	8	9%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	9	0%
Total	**54**	**100%**	**5**	**100%**	**2**	**100%**	**26**	**100%**	**87**	**100%**

B2b. How influential was any information or encouragement you received from Xcel Energy including information found on Xcel Energy’s web site and the “Find a Contractor” tool, on your decision to purchase this equipment? This could include promotional or educational materials or talking to someone at Xcel Energy. This could also include talking to someone else that had participated in the Xcel Energy program. Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If respondent does

not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	12	22%	1	20%	1	50%	8	31%	22	25%
1	4	7%	0	0%	0	0%	0	0%	4	5%
2	2	4%	0	0%	0	0%	3	12%	5	6%
3	4	7%	0	0%	0	0%	2	8%	6	7%
4	2	4%	1	20%	0	0%	1	4%	4	5%
5	5	9%	0	0%	0	0%	1	4%	6	7%
6	2	4%	0	0%	0	0%	1	4%	3	3%
7	1	2%	0	0%	0	0%	2	8%	3	3%
8	3	6%	0	0%	0	0%	3	12%	6	7%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	3	6%	1	20%	1	50%	0	0%	5	6%
NA	14	26%	2	40%	0	0%	5	19%	21	24%
Don't know	2	4%	0	0%	0	0%	0	0%	2	2%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**5**	**100%**	**2**	**100%**	**26**	**100%**	**87**	**100%**

B2c. And how influential was the contractor recommendation on your decision to purchase this equipment? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential."] [INTERVIEWER NOTE: If respondent does

not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	1	2%	1	20%	0	0%	4	15%	6	7%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	1	2%	0	0%	0	0%	0	0%	1	1%
3	2	4%	0	0%	0	0%	0	0%	2	2%
4	0	0%	0	0%	0	0%	1	4%	1	1%
5	5	9%	0	0%	0	0%	2	8%	7	8%
6	0	0%	0	0%	0	0%	2	8%	2	2%
7	6	11%	1	20%	1	50%	2	8%	10	11%
8	12	22%	0	0%	0	0%	9	35%	21	24%
9	10	19%	0	0%	1	50%	2	8%	13	15%
10	15	28%	3	60%	0	0%	4	15%	22	25%
NA	2	4%	0	0%	0	0%	0	0%	2	2%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**5**	**100%**	**2**	**100%**	**26**	**100%**	**87**	**100%**

B2d. Had you participated in an Xcel Energy rebate or energy efficiency programs prior to this year?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	15	28%	0	0%	1	50%	7	27%	23	26%
No	35	65%	4	80%	1	50%	18	69%	58	67%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
DK	4	7%	1	20%	0	0%	1	4%	6	7%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**5**	**100%**	**2**	**100%**	**26**	**100%**	**87**	**100%**

[ASK IF B2D = 1]

B2dd. And how influential was your participation in the previous Xcel Energy program on your decision to purchase the <MEASURE_NAMEB>? [IF NEEDED, Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “extremely influential.”] [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	7	47%	0	0%	0	0%	2	29%	9	39%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	2	29%	2	9%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	1	7%	0	0%	0	0%	1	14%	2	9%
6	1	7%	0	0%	0	0%	0	0%	1	4%
7	2	13%	0	0%	0	0%	0	0%	2	9%
8	2	13%	0	0%	1	100%	0	0%	3	13%
9	2	13%	0	0%	0	0%	1	14%	3	13%
10	0	0%	0	0%	0	0%	1	14%	1	4%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**15**	**100%**	**0**	**0%**	**1**	**100%**	**7**	**100%**	**23**	**100%**

B3. Now I’d like you to imagine that the rebate program, including the rebate and any educational information, had never existed. [IF C3 =1-6 And knowing you faced challenges in purchasing the <MEASURE_NAMEB>, including [PIPE IN NO MORE THAN 2 RESPONSES FROM C3 ANSWER(S)], what is the likelihood that you would have installed any type of cooling

system within the next 12 months? [Please use a scale from 0 = “Not at all likely” and 10 = “Extremely likely”.]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	1	2%	0	0%	0	0%	0	0%	1	1%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	2	4%	0	0%	0	0%	0	0%	2	2%
5	0	0%	0	0%	0	0%	1	4%	1	1%
6	2	4%	0	0%	0	0%	3	12%	5	6%
7	2	4%	0	0%	1	50%	2	8%	5	6%
8	2	4%	0	0%	0	0%	2	8%	4	5%
9	3	6%	0	0%	0	0%	2	8%	5	6%
10	42	78%	5	100%	1	50%	16	62%	64	74%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	54	100%	5	100%	2	100%	26	100%	0	0%
Total	**1**	**2%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**87**	**100%**

B4. Again imagining that the rebate program had never existed, [IF C3 =1-6 and you faced the same challenges concerns in purchasing the <MEASURE_NAMEB>], please rate the likelihood that you would have purchased the exact same <MEASURE_NAMEB> that you did

purchase? When I say the exact same <MEASURE_NAMEB>, I mean the same model, size, and efficiency level.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	2	4%	0	0%	0	0%	0	0%	2	2%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	2	4%	0	0%	0	0%	1	4%	3	3%
3	0	0%	0	0%	0	0%	1	4%	1	1%
4	3	6%	0	0%	0	0%	0	0%	3	3%
5	5	9%	0	0%	0	0%	2	8%	7	8%
6	4	7%	0	0%	0	0%	2	8%	6	7%
7	4	7%	1	20%	0	0%	3	12%	8	9%
8	7	13%	0	0%	0	0%	4	15%	11	13%
9	6	11%	0	0%	0	0%	2	8%	8	9%
10	21	39%	3	60%	2	100%	10	38%	36	41%
Don't know	0	0%	1	20%	0	0%	1	4%	2	2%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**5**	**100%**	**2**	**100%**	**26**	**100%**	**87**	**100%**

[IF QUANTITY > 1]

B5. Again imagining that the rebate program had never existed, please rate the likelihood that you would have purchased fewer than <QUANTITY> <MEASURE_NAMEB>s?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	1	100%	0	0%	0	0%	1	50%	2	67%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	0	0%	0	0%	0	0%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	0	0%	0	0%	0	0%	1	50%	1	33%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**1**	**100%**	**0**	**0%**	**0**	**0%**	**2**	**100%**	**3**	**67%**

[THE NEXT SET OF QUESTIONS FOCUS ON QUALITY INSTALLATION; ONLY ASK IF CUSTOMERS RECEIVED QI SERVICE AND ARE AWARE THEY RECEIVED SERVICE].

[ASK Q1-Q5 IF A3 = 1, 88, or 99; else skip to S1]

[ASK IF STRATA = 1 OR 2 OR 3; ELSE SKIP TO SECTION S]

Q1. In your own words, how would you describe the influence that the rebate program had on your decision to have a Quality Installation as opposed to a standard installation?

Verbatim comments redacted for participant privacy.

Q2. Now thinking about the contractor who installed the <MEASURE_TYPEB>, how likely is it that you would have selected the same contractor without the availability of the Xcel Energy

rebate? Please use a scale from 0 to 10 where 0 means “not at all likely” and 10 means “extremely likely.”

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	1	3%	1	7%	1	50%	0	0%	3	5%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	1	3%	0	0%	0	0%	0	0%	1	2%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	3	8%	1	7%	0	0%	0	0%	4	7%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	3	21%	0	0%	0	0%	3	5%
8	4	10%	1	7%	0	0%	0	0%	5	9%
9	5	13%	0	0%	0	0%	0	0%	5	9%
10	26	65%	8	57%	1	50%	0	0%	35	63%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**40**	**100%**	**14**	**100%**	**2**	**100%**	**0**	**0%**	**56**	**100%**

Q2a. Did you receive quotes from more than one contractor before hiring the contractor that completed the installation?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	27	68%	6	43%	0	0%	0	0%	33	59%
No	12	30%	7	50%	2	100%	0	0%	21	38%
DK	1	3%	1	7%	0	0%	0	0%	2	4%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**40**	**100%**	**14**	**100%**	**2**	**100%**	**0**	**0%**	**56**	**100%**

[If Q2a = 1]

Q2aa. Could you share the names of the companies that you got quotes from?

Verbatim comments redacted for participant privacy.

Q2ab. Why did you decide to use the contractor that you hired? Was it because…

[READ RESPONSES; RANDOMIZE; SELECT ALL THAT APPLY]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Something else [SPECIFY]	23	22%	10	30%	2	33%	0	0%	35	24%
Contractor price	18	17%	7	21%	1	17%	0	0%	26	18%
Quality of contractor's work	19	18%	4	12%	2	33%	0	0%	25	17%
Contractor mentioned and offers Xcel Energy rebates	12	11%	3	9%	1	17%	0	0%	16	11%
Contractor personality / work well together	12	11%	4	12%	0	0%	0	0%	16	11%
Contractor's technical expertise	14	13%	2	6%	0	0%	0	0%	16	11%
Recommendation from family / friends	9	8%	3	9%	0	0%	0	0%	12	8%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**107**	**100%**	**33**	**100%**	**6**	**100%**	**0**	**0%**	**146**	**100%**

Q2b. How influential was any information or encouragement you received from Xcel Energy including information found on Xcel Energy's web site and the "Find a Contractor" tool on your decision to have the Quality Installation? This could include promotional or educational materials, including the Xcel Energy web site, or talking to someone at Xcel Energy. This could also include talking to someone else that had participated in the Xcel Energy program. Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential." [INTERVIEWER NOTE: If respondent does not understand the meaning of the

"influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	16	44%	7	70%	1	50%	0	0%	24	50%
1	1	3%	0	0%	0	0%	0	0%	1	2%
2	3	8%	0	0%	0	0%	0	0%	3	6%
3	4	11%	0	0%	0	0%	0	0%	4	8%
4	0	0%	1	10%	0	0%	0	0%	1	2%
5	2	6%	0	0%	0	0%	0	0%	2	4%
6	0	0%	1	10%	0	0%	0	0%	1	2%
7	3	8%	0	0%	0	0%	0	0%	3	6%
8	4	11%	0	0%	0	0%	0	0%	4	8%
9	1	3%	0	0%	0	0%	0	0%	1	2%
10	2	6%	1	10%	1	50%	0	0%	4	8%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**36**	**100%**	**10**	**100%**	**2**	**100%**	**0**	**0%**	**48**	**100%**

Q2c. And how influential was the contractor recommendation on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "Extremely influential."] [INTERVIEWER NOTE: If respondent does

not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	3	8%	0	0%	0	0%	0	0%	3	6%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	1	7%	0	0%	0	0%	1	2%
3	0	0%	1	7%	0	0%	0	0%	1	2%
4	1	3%	0	0%	0	0%	0	0%	1	2%
5	2	5%	1	7%	1	50%	0	0%	4	7%
6	2	5%	1	7%	0	0%	0	0%	3	6%
7	4	11%	0	0%	0	0%	0	0%	4	7%
8	4	11%	1	7%	0	0%	0	0%	5	9%
9	6	16%	3	21%	0	0%	0	0%	9	17%
10	16	42%	6	43%	1	50%	0	0%	23	43%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**38**	**100%**	**14**	**100%**	**2**	**100%**	**0**	**0%**	**54**	**100%**

[IF STRATA = 2 ELSE SKIP TO Q3; NOTE: CUSTOMERS WHO INSTALLED NON-STANDARD EQUIPMENT WOULD HAVE ALREADY RECEIVED THIS QUESTION]

Q2d. Had you participated in an Xcel Energy rebate or energy efficiency programs prior to this year?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	0	0%	3	21%	0	0%	0	0%	3	21%
No	0	0%	11	79%	0	0%	0	0%	11	79%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**14**	**100%**	**0**	**0%**	**0**	**0%**	**14**	**100%**

[ASK IF Q2D = 1]

Q2dd. And how influential was your participation in the previous Xcel Energy program on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “Extremely influential.”] [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	0	0%	1	33%	0	0%	0	0%	1	33%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	1	33%	0	0%	0	0%	1	33%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	0	0%	1	33%	0	0%	0	0%	1	33%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**3**	**100%**	**0**	**0%**	**0**	**0%**	**3**	**100%**

Q2e. And how influential was the verification that Xcel Energy performed to ensure that your contractor properly installed the cooling equipment on your decision to have the Quality Installation? [IF NEEDED, Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “Extremely influential.”] [INTERVIEWER NOTE: If respondent does not

understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	0	0%	6	43%	0	0%	0	0%	6	43%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	1	7%	0	0%	0	0%	1	7%
3	0	0%	4	29%	0	0%	0	0%	4	29%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	1	7%	0	0%	0	0%	1	7%
7	0	0%	1	7%	0	0%	0	0%	1	7%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	1	7%	0	0%	0	0%	1	7%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**14**	**100%**	**0**	**0%**	**0**	**0%**	**14**	**100%**

Q3. Now I'd like you to imagine that the rebate program had never existed, including the requirement and verification that your contractor performed quality installation, which improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for your home and sealing all exposed ductwork. What is the likelihood that you

would have had a Quality Installation as opposed to a standard installation? [Please use a scale from 0 = “Not at all likely” and 10 = “extremely likely”.]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	2	5%	2	14%	0	0%	0	0%	4	7%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	1	7%	0	0%	0	0%	1	2%
3	1	3%	1	7%	0	0%	0	0%	2	4%
4	2	5%	0	0%	0	0%	0	0%	2	4%
5	8	20%	0	0%	0	0%	0	0%	8	14%
6	3	8%	1	7%	0	0%	0	0%	4	7%
7	4	10%	2	14%	0	0%	0	0%	6	11%
8	3	8%	1	7%	0	0%	0	0%	4	7%
9	3	8%	1	7%	0	0%	0	0%	4	7%
10	13	33%	5	36%	2	100%	0	0%	20	36%
Don't know	1	3%	0	0%	0	0%	0	0%	1	2%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**40**	**100%**	**14**	**100%**	**2**	**100%**	**0**	**0%**	**56**	**100%**

Q4. Again imagining that the rebate program had never existed, including the requirement and verification that your contractor performed quality installation, please rate the likelihood that you would have used the exact same contractor that you used to install the equipment?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	0	0%	0	0%	1	50%	0	0%	1	2%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	1	3%	0	0%	0	0%	0	0%	1	2%
4	1	3%	0	0%	0	0%	0	0%	1	2%
5	3	8%	0	0%	0	0%	0	0%	3	5%
6	2	5%	0	0%	0	0%	0	0%	2	4%
7	1	3%	1	7%	0	0%	0	0%	2	4%
8	4	10%	2	14%	0	0%	0	0%	6	11%
9	5	13%	1	7%	0	0%	0	0%	6	11%
10	23	58%	10	71%	1	50%	0	0%	34	61%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**40**	**100%**	**14**	**100%**	**2**	**100%**	**0**	**0%**	**56**	**100%**

[IF STRATA = 2 AND QUANTITY > 1 ELSE SKIP TO SECTION S; NOTE: ASKING Q5 ONLY TO CUSTOMERS WHO INSTALLED STANDARD EQUIPMENT SINCE OTHERS WOULD HAVE ALREADY BEEN ASKED THIS QUESTION]

Q5. Again imagining that the Xcel Energy rebate program had never existed, please rate the likelihood that you would have purchased fewer than <QUANTITY> <MEASURE_NAMEB>s.

No data

Section S: Spillover

[ASK ALL]

S1. Since your participation in the rebate program in <MONTH> <YEAR>, have you installed any efficient cooling equipment without a rebate from Xcel Energy? When I say "efficient cooling equipment", I mean equipment that is eligible for an Xcel Energy rebate.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	0	0%	0	0%	0	0%	1	4%	1	1%
No	54	100%	18	100%	2	100%	25	96%	99	99%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	54	100%	18	100%	2	100%	26	100%	**100**	**100%**

[ASK IF S1=1, ELSE SKIP TO S7]

S2. Did the rebate program influence you in any way to make these additional improvements?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes [SPECIFY]	0	0	0	0	0	0	0	0%	0	0%
No	0	0	0	0	0	0	1	100%	1	100%
DK	0	0	0	0	0	0	0	0%	0	0%
REF	0	0	0	0	0	0	0	0%	0	0%
Total	**0**	**0%**	**0**	**0%**	**0**	**0%**	**1**	**100%**	**1**	**100%**

[ASK IF S2=1, ELSE SKIP TO S7]

S3a. What type of cooling equipment did you install without a rebate? For example, was it… [READ 1 – 5, ALLOW MULTIPLE, RANDOMIZE]

No Data

[Analysis note: Keeping alternative cooling options (S3a= 3, 4, 5) for fielding, but this will be classified as "unlike spillover" in analysis.]

[ASK IF S3a = 2]

S3a2. What type of heat pump did you install? [Allow multiple.]

No Data

[ASK IF S3a=1, 2, 3, 5, 6; ELSE SKIP TO S7]

S4a. How many of the cooling equipment did you install? How many…[CARRY FORWARD RESPONSES FROM S3a and S3a2; DO NOT ASK ABOUT PORTABLE/ROOM AIR CONDITIONERS]

S4a_1. [if S3a = 1] Central air conditioners [NUMERIC OPEN END]

No Data

S4a_2_1. [If S3a2 = 1] Ground source heat pumps [NUMERIC OPEN END]

No Data

S4a_2_2. [if S3a2 = 2] Air source heat pumps [NUMERIC OPEN END]

No Data

S4a_2_3. [if S3a2 = 3] Mini-split heat pumps [NUMERIC OPEN END]

No Data

S4a_2_88. [if S3a2 = 88 OR 99] Heat pumps of unknown type [NUMERIC OPEN END]

No Data

S4a_3. [if S3a = 3] Window air conditioners [NUMERIC OPEN END]

No Data

S4a_5. [if S3a = 5] Evaporative cooler [NUMERIC OPEN END]

No Data

S4a_6. [if S3a = 6] <Response from S3a_6>s [NUMERIC OPEN END]

No Data

[ASK IF S3a = 1 , 6, OR S3a2 = 2 OR 3]

S4b. What was the SEER of the… [CARRY FORWARD RESPONSES FROM S3a and S3a2; DO NOT ASK ABOUT, WINDOW AIR CONDITIONERS, PORTABLE/ROOM AIR CONDITIONERS, OR GROUND SOURCE HEAT PUMPS] (Interviewer note: SEER ratings range from 13 to 30.)

S4b_1. [if S3a = 1] Central air conditioner(s) [NUMERIC OPEN END]

No Data

S4b_2_2. [if S3a2 = 2] Air source heat pump(s) [NUMERIC OPEN END]

No Data

S4b_2_3. [if S3a2 = 3] Mini-split heat pump(s) [NUMERIC OPEN END]

No Data

S4b_6. [if S3a = 6] <Response from S3a_6>s [NUMERIC OPEN END]

No Data

[ASK IF S3a = 3 OR S3a2 = 1]

S4bb. What was the EER of the… [CARRY FORWARD RESPONSES FROM S3a and S3a2]

S4bb_1. [if S3a = 3] Window Air Conditioner [NUMERIC OPEN END]

No Data

S4bb_2_1. [if S3a2 = 1] Ground source heat pump [NUMERIC OPEN END]

No Data

[PROGRAMMING NOTE: S4c THROUGH S6 BELOW FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST TWO MENTIONS IN S3a/S3a2. (MOST RESPONDENTS WILL NOT HAVE MULOW-PARTICIPATING TRADE PARTNERSTIPLE.) PIPE IN RELEVANT RESPONSE FROM S3a and S3a2 AS <Like_Spillover_Measure> FOR EACH ROUND THROUGH THE LOOP.]

[ASK FOR EACH ITEM SELECTED IF S3a = 1, 2, 3, 5, or 6]

[FIRST SELECTED IN S3a/S3a2, ASK S4C_1, S5, S6]

S4c_1. How do you know that the <Like_Spillover_Measure> you installed was energy efficient?

[RECORD VERBATIM]

No Data

S5_1. How important was your experience with the rebate program, including the equipment you installed through the program, in your decision to install the additional <Like_Spillover_Measure> on your own? Please use a scale from 0 to 10, where 0 is “not at all important” and 10 is “extremely important”.

No Data

S6_1. If you had not received the rebate for <MEASURE_NAMEA> how likely is it that you would have installed this <Like_Spillover_Measure>, using a scale from 0 to 10, where 0 means you definitely WOULD NOT have installed and 10 means you definitely WOULD have installed them?

No Data

[SECOND SELECTED IN S3a/S3a2, ASK S4C_2, S5_2, S6_2]

S4c_2. How do you know that the <Like_Spillover_Measure> you installed was energy efficient?

No Data

S5_2. How important was your experience with the rebate program, including the equipment you installed through the program, in your decision to install the additional <Like_Spillover_Measure> on your own? Please use a scale from 0 to 10, where 0 is “not at all important” and 10 is “extremely important”.

No Data

S6_2. If you had not received the rebate for <MEASURE_NAMEA>, how likely is it that you would have installed this <Like_Spillover_Measure>, using a scale from 0 to 10, where 0 means you definitely WOULD NOT have installed and 10 means you definitely WOULD have installed them?

No Data

[ASK ALL]

(Analysis note: “Un-like” Spillover)

S7. Since your participation in the rebate program in <MONTH> <Year>, have you installed any efficient Other than cooling equipment, other than cooling equipment, since you received the rebate, have you installed any efficient equipment without a rebate from Xcel Energy?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	2	4%	3	17%	0	0%	1	4%	6	6%
No	52	96%	15	83%	2	100%	25	96%	94	94%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

S8. What did you do?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Other [SPECIFY]	1	25%	3	75%	0	0%	0	0%	4	40%
More efficient clothes washer	1	25%	0	0%	0	0%	1	50%	2	20%
More efficient clothes dryer	1	25%	0	0%	0	0%	1	50%	2	20%
Efficient light bulbs (CFLs or LEDs)	0	0%	1	25%	0	0%	0	0%	1	10%
More efficient dishwasher	1	25%	0	0%	0	0%	0	0%	1	10%
Efficient lighting fixtures	0	0%	0	0%	0	0%	0	0%	0	0%
More efficient primary heating system (furnace, boiler)	0	0%	0	0%	0	0%	0	0%	0	0%
Programmable or smart thermostat	0	0%	0	0%	0	0%	0	0%	0	0%
More efficient refrigerator	0	0%	0	0%	0	0%	0	0%	0	0%
Efficient windows	0	0%	0	0%	0	0%	0	0%	0	0%
Efficient doors	0	0%	0	0%	0	0%	0	0%	0	0%
Insulation / air sealing / weatherization	0	0%	0	0%	0	0%	0	0%	0	0%
Home energy audit	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**4**	**100%**	**4**	**100%**	**0**	**0%**	**2**	**100%**	**10**	**100%**

[If S8= 1 skip to D1]

[If S8 = 12 skip to D1]

[FIRST SELECTED IN S8]

S9a_1. How important was your participation in the rebate program in your consideration of the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all influential, to 10, meaning extremely influential.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	2	100%	2	100%	0	0%	1	100%	0	0%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	0	0%	0	0%	0	0%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	1	20%
10	0	0%	0	0%	0	0%	0	0%	4	80%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**2**	**100%**	**2**	**100%**	**0**	**0%**	**1**	**100%**	**5**	**100%**

S9b_1. If you had not participated in the rebate program, how likely is it that you still would have installed the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all likely, to 10, meaning extremely likely.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	0	0%	0	0%	0	0%	0	0%	0	0%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	0	0%	0	0%	0	0%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	1	50%	0	0%	0	0%	0	0%	1	20%
10	1	50%	2	100%	0	0%	1	100%	4	80%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**2**	**100%**	**2**	**100%**	**0**	**0%**	**1**	**100%**	**5**	**100%**

[ASK IF S9a_1 = 6 – 10; ELSE SKIP TO END OF LOOP]

S10_1. In a sentence or two, can you describe how the installation of the <MEASURE_NAMEB> affected your choice to install the <Spillover_Measure>?

No Data

S11_1. How do you know that the <Spillover_Measure> you installed was energy efficient?

No Data

S12_1. How many <Spillover_Measure>s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT.]

No Data

S13_1. What is the main reason you installed the <Spillover_Measure>?

No Data

[SECOND SELECTED IN S8]

[If S8 = 1 skip to D1]

[If S8 = 12 skip to D1]

S9a_2. How important was your participation in the rebate program in your consideration of the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all influential, to 10, meaning extremely influential.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	1	100%	1	100%	0	0%	1	100%	3	100%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	0	0%	0	0%	0	0%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**1**	**100%**	**1**	**100%**	**0**	**0%**	**1**	**100%**	**3**	**100%**

S9b_2. If you had not participated in the rebate program in how likely is it that you still would have installed the <Spillover_Measure>? Please answer using a scale from 0, meaning not at all likely, to 10, meaning extremely likely.

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
0	0	0%	0	0%	0	0%	0	0%	0	0%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	0	0%	0	0%	0	0%	0	0%	0	0%
6	0	0%	0	0%	0	0%	0	0%	0	0%
7	0	0%	0	0%	0	0%	0	0%	0	0%
8	0	0%	0	0%	0	0%	0	0%	0	0%
9	0	0%	0	0%	0	0%	0	0%	0	0%
10	1	100%	1	100%	0	0%	1	100%	3	100%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**1**	**100%**	**1**	**100%**	**0**	**0%**	**1**	**100%**	**3**	100%

[ASK IF S9a_2 = 6 – 10; ELSE SKIP TO D1]

S10_2. In a sentence or two, can you describe how the installation of the <MEASURE_NAMEB> affected your choice to install the <Spillover_Measure>?

No Data

S11_2. How do you know that the <Spillover_Measure> you installed was energy efficient?

No Data

S12_2. How many <Spillover_Measure>s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT.]

No Data

S13_2. What is the main reason you installed the <Spillover_Measure>?

No Data

Section D: Benefits, Satisfaction, and Feedback

[IF S1 OR S7 = YES, READ: "For the remainder of the survey, I would like you to focus back on the cooling equipment for which you received a rebate from Xcel Energy.]

[ASK IF A3 = 1]

D1. Thinking about the Quality Installation service you received, what would you say are the benefits of a Quality Installation? [PROBE: Anything else?] [DO NOT READ, MULTIPLE ALLOWED]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Other [SPECIFY]	23	30%	5	20%	0	0%	0	0%	28	26%
More efficient / uses less energy	16	21%	5	20%	2	33%	0	0%	23	21%
Better/more optimized performance	13	17%	5	20%	1	17%	0	0%	19	18%
Lower utility bills	7	9%	3	12%	1	17%	0	0%	11	10%
Smaller sized system/properly sized system	5	7%	2	8%	0	0%	0	0%	7	7%
Increased comfort	2	3%	3	12%	1	17%	0	0%	6	6%
Better sealed ductwork/reduced leakage of conditioned air	5	7%	0	0%	1	17%	0	0%	6	6%
DK	3	4%	2	8%	0	0%	0	0%	5	5%
Better air distribution	1	1%	0	0%	0	0%	0	0%	1	1%
Better dehumidification	1	1%	0	0%	0	0%	0	0%	1	1%
Less dust distributed through ductwork	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**76**	**100%**	**25**	**100%**	**6**	**100%**	**0**	**0%**	**107**	**100%**

[ASK IF STRATA = 3 OR 4]

D2. Thinking about the heat pump you received, what would you say are the benefits of a heat pump? [PROBE: Anything else?] [DO NOT READ, MULTIPLE ALLOWED]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
More efficient / uses less energy	0	0%	0	0%	1	14%	16	21%	17	20%
Other [SPECIFY]	0	0%	0	0%	0	0%	10	13%	10	12%
Increased comfort	0	0%	0	0%	1	14%	8	11%	9	11%
One unit provides both heating and cooling	0	0%	0	0%	1	14%	7	9%	8	10%
Allows us to cool specific spaces not served through central cooling system	0	0%	0	0%	0	0%	8	11%	8	10%
Allows us to cool home in the summer	0	0%	0	0%	0	0%	6	8%	6	7%
Allows us to cool home with electricity	0	0%	0	0%	1	14%	5	7%	6	7%
Allows us to heat specific spaces not served through central heating system	0	0%	0	0%	1	14%	3	4%	4	5%
Allows us to heat home with electricity	0	0%	0	0%	1	14%	3	4%	4	5%
Lower utility bills	0	0%	0	0%	0	0%	4	5%	4	5%
Better air distribution	0	0%	0	0%	0	0%	4	5%	4	5%
Allows us to heat home in fall or spring	0	0%	0	0%	1	14%	1	1%	2	2%
DK	0	0%	0	0%	0	0%	1	1%	1	1%
Better dehumidification	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**0**	**0%**	**0**	**0%**	**7**	**100%**	**76**	**100%**	**83**	**100%**

[ASK ALL]

D3. We just talked a lot about your decisions to install your equipment, now please rate the importance of the following factors in terms of your decision to participate in the rebate program through Xcel Energy, using a 1 to 5 scale where 1 is “Not at all important” and 5 is “Very important.”

You can also tell me if something was not applicable to your experience or if you DK:

(1) Not at all important - (3) - (5) Very important 77=N/A, 88=DK 99=REF

(RANDOMIZE) (READ ALOUD)

D3a. Reducing energy use

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	2	4%	0	0%	0	0%	3	12%	5	5%
2	0	0%	0	0%	0	0%	1	4%	1	1%
3	4	7%	3	17%	0	0%	1	4%	8	8%
4	13	24%	4	22%	0	0%	5	19%	22	22%
5	33	61%	11	61%	2	100%	13	50%	59	59%
NA	2	4%	0	0%	0	0%	2	8%	4	4%
Don't know	0	0%	0	0%	0	0%	1	4%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3b. Upgrading out-of-date equipment

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	2	4%	0	0%	0	0%	3	12%	5	5%
2	1	2%	0	0%	0	0%	2	8%	3	3%
3	4	7%	0	0%	0	0%	2	8%	6	6%
4	5	9%	4	22%	1	50%	1	4%	11	11%
5	30	56%	11	61%	0	0%	7	27%	48	48%
NA	12	22%	3	17%	1	50%	11	42%	27	27%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3c. Replacing faulty or failed equipment

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	3	6%	0	0%	0	0%	2	8%	5	5%
2	2	4%	0	0%	0	0%	1	4%	3	3%
3	3	6%	0	0%	0	0%	3	12%	6	6%
4	5	9%	3	17%	1	50%	1	4%	10	10%
5	29	54%	12	67%	0	0%	6	23%	47	47%
NA	12	22%	3	17%	1	50%	13	50%	29	29%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3d. The dollar value of the rebate offered by Xcel Energy

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	7	13%	4	22%	0	0%	5	19%	16	16%
2	3	6%	2	11%	0	0%	3	12%	8	8%
3	13	24%	5	28%	0	0%	8	31%	26	26%
4	14	26%	4	22%	0	0%	3	12%	21	21%
5	17	31%	3	17%	2	100%	7	27%	29	29%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3e. Reducing energy bill amounts

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	2	4%	0	0%	0	0%	3	12%	5	5%
2	2	4%	0	0%	0	0%	3	12%	5	5%
3	4	7%	2	11%	0	0%	3	12%	9	9%
4	14	26%	4	22%	0	0%	5	19%	23	23%
5	31	57%	12	67%	2	100%	9	35%	54	54%
NA	1	2%	0	0%	0	0%	2	8%	3	3%
Don't know	0	0%	0	0%	0	0%	1	4%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3f. Information or encouragement you received from Xcel Energy

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	17	31%	7	39%	0	0%	6	23%	30	30%
2	11	20%	1	6%	0	0%	3	12%	15	15%
3	2	4%	0	0%	0	0%	2	8%	4	4%
4	3	6%	1	6%	0	0%	1	4%	5	5%
5	7	13%	2	11%	1	50%	3	12%	13	13%
NA	14	26%	6	33%	1	50%	10	38%	31	31%
Don't know	0	0%	1	6%	0	0%	1	4%	2	2%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3g. Reducing CO2 emissions/saving the environment

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	6	11%	2	11%	0	0%	2	8%	10	10%
2	2	4%	2	11%	0	0%	1	4%	5	5%
3	4	7%	2	11%	0	0%	3	12%	9	9%
4	13	24%	3	17%	0	0%	2	8%	18	18%
5	28	52%	9	50%	2	100%	16	62%	55	55%
NA	1	2%	0	0%	0	0%	2	8%	3	3%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3h. Working with your contractor

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	1	50%	2	8%	3	3%
2	0	0%	1	6%	0	0%	2	8%	3	3%
3	7	13%	3	17%	0	0%	5	19%	15	15%
4	14	26%	3	17%	0	0%	6	23%	23	23%
5	32	59%	11	61%	1	50%	10	38%	54	54%
NA	1	2%	0	0%	0	0%	1	4%	2	2%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3i. Recommendation from a family member/friend/neighbor

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	10	19%	5	28%	1	50%	6	23%	22	22%
2	2	4%	0	0%	0	0%	1	4%	3	3%
3	5	9%	2	11%	0	0%	2	8%	9	9%
4	3	6%	1	6%	0	0%	1	4%	5	5%
5	9	17%	2	11%	0	0%	8	31%	19	19%
NA	25	46%	8	44%	1	50%	8	31%	42	42%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3j. Was there any other factor that influenced your decision to apply for an Xcel Energy rebate <MEASURE_TYPEB>?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes [SPECIFY]	4	7%	0	0%	0	0%	3	12%	7	7%
No	50	93%	18	100%	2	100%	23	88%	93	93%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D3j_2_other How important was d3j [other]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	0	0%	0	0%	0	0%	0	0%	0	0%
4	0	0%	0	0%	0	0%	0	0%	0	0%
5	4	100%	0	0%	0	0%	3	100%	7	100%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**4**	**100%**	**0**	**0%**	**0**	**0%**	**3**	**100%**	**7**	**100%**

[ASK ALL]

D4. Please rate your satisfaction with various aspects of the rebate program of your experiences with the equipment and rebate. For each, please rate your satisfaction on a scale from 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied”, or let me know if it is not applicable to you. How would you rate your satisfaction with:

[RANDOMIZE D4a-D4F, PAUSE AFTER EACH FOR RATING, REPEAT SCALE IF NECESSARY]

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

88. DK

99. REF

D4a. The performance of the equipment you installed

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	1	2%	0	0%	0	0%	0	0%	1	1%
3	1	2%	1	6%	0	0%	3	12%	5	5%
4	7	13%	3	17%	0	0%	4	15%	14	14%
5	44	81%	13	72%	2	100%	18	69%	77	77%
NA	0	0%	1	6%	0	0%	0	0%	1	1%
Don't know	1	2%	0	0%	0	0%	1	4%	2	2%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D4b. [ASK IF STRATA = 1 OR 2 OR 3] The process of finding a qualified contractor

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	2	4%	0	0%	0	0%	0	0%	2	3%
2	1	2%	1	6%	0	0%	0	0%	2	3%
3	7	13%	3	17%	0	0%	0	0%	10	14%
4	13	24%	4	22%	1	50%	0	0%	18	24%
5	30	56%	9	50%	1	50%	0	0%	40	54%
NA	1	2%	0	0%	0	0%	0	0%	1	1%
Don't know	0	0%	1	6%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**0**	**0%**	**74**	**100%**

D4c. [ASK IF STRATA = 1 OR 2 OR 3 OR IF A1 = 1] The contractor that installed the equipment

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	1	4%	1	1%
2	1	2%	1	6%	0	0%	0	0%	2	2%
3	3	6%	0	0%	0	0%	1	4%	4	4%
4	10	19%	4	22%	0	0%	7	27%	21	21%
5	40	74%	13	72%	2	100%	17	65%	72	72%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D4d. The installation of the equipment

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	1	4%	1	1%
2	1	2%	1	6%	0	0%	0	0%	2	2%
3	4	7%	1	6%	0	0%	2	8%	7	7%
4	15	28%	4	22%	0	0%	7	27%	26	26%
5	34	63%	12	67%	2	100%	16	62%	64	64%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D4e. Information provided from Xcel Energy on energy efficient cooling opportunities

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	1	2%	1	6%	0	0%	1	4%	3	3%
2	3	6%	0	0%	0	0%	1	4%	4	4%
3	6	11%	4	22%	0	0%	4	15%	14	14%
4	5	9%	1	6%	0	0%	6	23%	12	12%
5	18	33%	5	28%	2	100%	7	27%	32	32%
NA	19	35%	6	33%	0	0%	7	27%	32	32%
Don't know	2	4%	1	6%	0	0%	0	0%	3	3%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D4f. Information provided from Xcel Energy on the rebate process

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	3	12%	3	3%
2	3	6%	0	0%	0	0%	0	0%	3	3%
3	5	9%	5	28%	0	0%	3	12%	13	13%
4	6	11%	0	0%	0	0%	3	12%	9	9%
5	22	41%	7	39%	2	100%	9	35%	40	40%
NA	18	33%	6	33%	0	0%	8	31%	32	32%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[For any D4A – D4F < 3]

D5a – D5f. Why weren't you satisfied with <RESTORE QUESTION WORDING FROM D4A – D4F>

[FOLLOWING COMPLETION OF D4a-D4f and D5a-D5f, ask D4g, D4h, D4i in order]

D4g. The amount of time it took to receive your rebate

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	2	4%	0	0%	0	0%	1	4%	3	3%
2	1	2%	2	11%	0	0%	0	0%	3	3%
3	7	13%	1	6%	0	0%	2	8%	10	10%
4	14	26%	2	11%	0	0%	5	19%	21	21%
5	28	52%	12	67%	2	100%	15	58%	57	57%
NA	1	2%	1	6%	0	0%	3	12%	5	5%
Don't know	1	2%	0	0%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[ASK IF D4g < 3]

D4gg. Was there anything you are aware of that caused a delay in your rebate?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes [SPECIFY]	3	100%	0	0%	0	0%	1	100%	4	67%
No	0	0%	1	50%	0	0%	0	0%	1	17%
DK	0	0%	1	50%	0	0%	0	0%	1	17%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**3**	**100%**	**2**	**100%**	**0**	**0%**	**1**	**100%**	**6**	**100%**

D4h. The amount of the rebate you received

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	4	7%	5	28%	0	0%	2	8%	11	11%
3	7	13%	2	11%	0	0%	5	19%	14	14%
4	12	22%	4	22%	0	0%	8	31%	24	24%
5	30	56%	7	39%	2	100%	11	42%	50	50%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	1	2%	0	0%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[ASK IF D4h < 3]

D4h1. Was the amount of the rebate you received different from what you were expecting?

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Yes	0	0%	3	60%	0	0%	0	0%	3	27%
No	4	100%	2	40%	0	0%	2	100%	8	73%
DK	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**4**	**100%**	**5**	**100%**	**0**	**0%**	**2**	**100%**	**11**	**100%**

[ASK IF D4h1 =1]

D4hh. What amount were you expecting?

No Data

D4i. Xcel Energy as an energy provider

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	1	2%	1	6%	0	0%	1	4%	3	3%
2	2	4%	2	11%	0	0%	3	12%	7	7%
3	9	17%	3	17%	0	0%	0	0%	12	12%
4	15	28%	5	28%	0	0%	12	46%	32	32%
5	25	46%	7	39%	2	100%	10	38%	44	44%
NA	1	2%	0	0%	0	0%	0	0%	1	1%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	1	2%	0	0%	0	0%	0	0%	1	1%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[ASK ALL]

D6. Thinking about your experience from start to finish, how would you rate your satisfaction with the rebate program as a whole? (IF NEEDED: Please use the same scale from 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied”)

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	2	11%	0	0%	1	4%	3	3%
3	2	4%	2	11%	0	0%	3	12%	7	7%
4	17	31%	5	28%	0	0%	8	31%	30	30%
5	34	63%	9	50%	2	100%	14	54%	59	59%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	1	2%	0	0%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	54	100%	18	100%	2	100%	26	100%	**100**	**100%**

[If D6 = 5, 77, 88 or 99 Skip to D7]

[ASK IF D6 < 3]

D6a. Why weren’t you satisfied with your experience with the rebate program?

Verbatim comments redacted for participant privacy.

[ASK IF D6 = 3 or 4]

D6b. What else could program staff do to improve your satisfaction with the rebate program?

Verbatim comments redacted for participant privacy.

D7. Next, I am going to ask you to rate how easy or difficult the following tasks associated with the rebate program were to complete, using the same scale from 1 to 5, where 1 is “very difficult” and 5 is “very easy”. [RANDOMIZE]

D7a. Complete program applications, rebate forms, or other program paperwork

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	0	0%	0	0%	0	0%	1	4%	1	1%
3	5	9%	1	6%	0	0%	3	12%	9	9%
4	1	2%	1	6%	1	50%	1	4%	4	4%
5	38	70%	13	72%	1	50%	17	65%	69	69%
NA	10	19%	3	17%	0	0%	4	15%	17	17%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D7b. Get in touch with an Xcel Energy representative

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	0	0%	0	0%	0	0%	0	0%
2	2	4%	1	6%	0	0%	1	4%	4	4%
3	4	7%	0	0%	0	0%	2	8%	6	6%
4	2	4%	1	6%	0	0%	2	8%	5	5%
5	8	15%	1	6%	0	0%	2	8%	11	11%
NA	37	69%	15	83%	2	100%	19	73%	73	73%
Don't know	1	2%	0	0%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D7c. Determine eligibility and rebate tier

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	1	2%	0	0%	0	0%	0	0%	1	1%
2	0	0%	0	0%	0	0%	0	0%	0	0%
3	5	9%	0	0%	0	0%	4	15%	9	9%
4	6	11%	2	11%	1	50%	5	19%	14	14%
5	36	67%	14	78%	1	50%	15	58%	66	66%
NA	6	11%	1	6%	0	0%	2	8%	9	9%
Don't know	0	0%	1	6%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D7d. Determining equipment models that are affordable within budget

D7e. The equipment installation through a contractor

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	0	0%	1	6%	0	0%	0	0%	1	1%
2	1	2%	0	0%	0	0%	1	4%	2	2%
3	5	9%	0	0%	0	0%	5	19%	10	10%
4	9	17%	3	17%	0	0%	6	23%	18	18%
5	39	72%	14	78%	2	100%	14	54%	69	69%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

D7f. Finding a contractor to complete the work

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
1	1	2%	0	0%	0	0%	0	0%	1	1%
2	3	6%	1	6%	0	0%	3	12%	7	7%
3	9	17%	2	11%	0	0%	3	12%	14	14%
4	10	19%	2	11%	1	50%	5	19%	18	18%
5	31	57%	13	72%	1	50%	15	58%	60	60%
NA	0	0%	0	0%	0	0%	0	0%	0	0%
Don't know	0	0%	0	0%	0	0%	0	0%	0	0%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

[For any D7A – D7F < 3]

D8a – D8f. Why wasn't it easy to <RESTORE QUESTION WORDING FROM D7A – D7F>

Verbatim comments redacted for participant privacy.

Section H: Demographics

H1. Which of the following best describes your home? [READ 1 – 5]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Single-family home,	45	83%	14	78%	2	100%	23	88%	84	84%
Single-family attached home, such as a duplex or townhome,	7	13%	2	11%	0	0%	2	8%	11	11%
Apartment building or condo with 2-4 units,	0	0%	1	6%	0	0%	0	0%	1	1%
Apartment building or condo with 5+ units, or	2	4%	0	0%	0	0%	1	4%	3	3%
Mobile home?	0	0%	0	0%	0	0%	0	0%	0	0%
DK	0	0%	1	6%	0	0%	0	0%	1	1%
REF	0	0%	0	0%	0	0%	0	0%	0	0%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

H2. Approximately what is your yearly household income before taxes? Please let me know when I read the category that applies to you. [READ 1 – 8]

Response	AC SEER 15+		AC (SEER 13-14.5)		Air source heat pump		Mini-split heat pump		Total	
	n	%	n	%	n	%	n	%	n	%
Less than $25,000	0	0%	1	6%	0	0%	0	0%	1	1%
$25,000 to $34,999	3	6%	0	0%	0	0%	1	4%	4	4%
$35,000 to $49,999	2	4%	3	17%	0	0%	1	4%	6	6%
$50,000 to $74,999	7	13%	3	17%	0	0%	4	15%	14	14%
$75,000 to $99,999	10	19%	2	11%	1	50%	5	19%	18	18%
$100,000 to $149,000	11	20%	3	17%	0	0%	4	15%	18	18%
$150,000 to $199,000	6	11%	2	11%	1	50%	4	15%	13	13%
$200,000 or more	11	20%	0	0%	0	0%	6	23%	17	17%
DK	0	0%	1	6%	0	0%	0	0%	1	1%
REF	4	7%	3	17%	0	0%	1	4%	8	8%
Total	**54**	**100%**	**18**	**100%**	**2**	**100%**	**26**	**100%**	**100**	**100%**

C.3 Nonparticipating Customer Survey Results

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency programs, the TRC evaluation team will conduct telephone surveys with nonparticipating customers. The evaluation team defined a nonparticipating customer as any electric or combination customer who received a furnace rebate but did not receive cooling equipment rebate since 2012, which was when Xcel Energy started tracking product participation through its data tracking tool, Salesforce. The research will be conducted to assess key process and impact evaluation objectives, including customer perceptions/awareness, customer decision-making and barriers, heating fuel type, and spillover

Section S: Spillover

S1a. On a scale of 1 to 5, with 1 being "not at all familiar" and 5 being "extremely familiar", how familiar would you say you are with Xcel Energy's energy efficiency rebate programs?

Response	Frequency	% Respondents
1-Not at all familiar	20	29%
2	13	19%
3	16	23%
4	18	26%
5-Extremely familiar	3	4%
DK	0	0%
REF	0	0%
Total	**70**	**100%**

[ASK IF S1a = 2-5 OR 88 OR 99; IF S1a = 1, SKIP TO B1]

S1b. And using the same scale, how aware are you of Xcel Energy's rebates for residential cooling equipment such as central air conditioners and heat pumps?

Response	Frequency	% Respondents
1-Not at all familiar	10	20%
2	11	22%
3	10	20%
4	14	28%
5-Extremely familiar	5	10%
DK	0	0%
REF	0	0%
Total	**50**	**100%**

[ASK if S1b= 2-5]

S2. How did you first become aware of the Xcel Energy rebates for residential cooling equipment? (DO NOT READ, Select one.)

Response	Frequency	% Respondents
Contractor	11	28%
Xcel Energy website	4	10%
On-bill messages from Xcel Energy	5	13%
Friends or family	4	10%
Social media	0	0%
Other [SPECIFY]	14	35%
DK	2	5%
REF	0	0%
Total	**40**	**100%**

S3. In the past year, have you or anyone in your household installed an energy efficient air conditioner or heat pump?

Response	Frequency	% Respondents
Yes	12	24%
No	38	76%
DK	0	0%
REF	0	0%
Total	**50**	**100%**

[NOTE: ALL NONPARTICIPATING CUSTOMERS THAT INSTALLED A CENTRAL AIR CONDITIONER OR HEAT PUMP EQUIPMENT WITHIN THE PAST YEAR WILL BE ASKED SPILLOVER QUESTIONS; ALL OTHERS SKIP TO NEXT SECTION]

[ASK IF S3=1, ELSE SKIP TO B1]

S4. What type of cooling equipment did you install? [DO NOT READ; ALLOW MULTIPLE]

[If type of heat pump is not mentioned, PROBE: Was it a ground source, air source, or mini-split heat pump? If not sure, code as simply "heat pump."]

Response	Frequency	% Responses
Central air conditioner	10	83%
Heat pump	1	8%
Air source heat pump	1	8%
Window air conditioner(s)	0	0%
Portable / room air conditioner(s)	0	0%
Ground source heat pump	0	0%
Mini-split heat pump	0	0%
Evaporative Cooler	0	0%
Other [SPECIFY]	0	0%
DK	0	0%
REF	0	0%
Total	**12**	**100%**

[IF S4= 1,4,5,6,7; ELSE SKIP TO B1]

[PROGRAMMING NOTE: S4B THROUGH S14 BELOW FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST TWO MENTIONS IN S4, WHEN S4=1,4,5,6,7 [CENTRAL AIR CONDITIONERS OR HEAT PUMPS]. (MOST RESPONDENTS WILL NOT HAVE MULOW-PARTICIPATING TRADE PARTNERSTIPLE.) PIPE IN RELEVANT RESPONSE FROM S4 AS <Like_Spillover_Measure> FOR EACH ROUND THROUGH THE LOOP.]

[ASK FOR EACH ITEM SELECTED IF S4=1,4,5,6,7]

S4b. Who installed your <Spillover_Measure>?? Was it… [READ 1 – 4]

Response	Frequency	% Respondents
A contractor	11	92%
Yourself	0	0%
A friend or family member	1	8%
Someone else [SPECIFY]	0	0%
DK	0	0%
REF	0	0%
Total	**12**	**100%**

[ASK IF S4b = 1]

S4c. Could you share the name of the company that completed the installation?

Verbatim comments redacted for participant privacy.

S5_1. Did you receive a rebate through Xcel Energy for installing <Spillover_Measure>?

Response	Frequency	% Respondents
Yes	0	0%
No	9	75%
DK	3	25%
REF	0	0%
Total	**12**	**100%**

[ASK IF S5_1 = 2; ELSE SKIP TO LOOP 2]

S6_1. When installing your heating equipment that received an Xcel Energy rebate, were you also aware that efficient cooling equipment may have also been eligible for a rebate?

Response	Frequency	% Respondents
Yes	6	67%
No	3	33%
DK	0	0%
REF	0	0%
Total	**9**	**100%**

[ASK IF S6_1=1]

NEW S6d_1. Are you planning to pursue a rebate for the <Spillover_Measure> in the next 12 months?

Response	Frequency	% Respondents
Yes	2	33%
No	3	50%
DK	1	17%
REF	0	0%
Total	**6**	**100%**

[IF S6_1 = 1]

S6a_1. Did the <Spillover_Measure> you installed qualify for the Xcel Energy cooling rebate?

Response	Frequency	% Respondents
Yes	3	50%
No	1	17%
DK	2	33%
REF	0	0%
Total	**6**	**100%**

[IF S6_a1 = 1]

S6b_1. Why did you not apply for the rebate for the <Spillover_Measure> you installed?

Verbatim comments redacted for participant privacy.

[IF S6_1 = 2/88]

S6c_1. Would you have considered different cooling equipment when you installed your <Spillover_Measure> if you knew that a rebate for higher efficiency equipment and optimized installation were available?

Response	Frequency	% Respondents
Yes	3	100%
No	0	0%
DK	0	0%
REF	0	0%
Total	**3**	**100%**

S7_1. In your own words, can you explain HOW your knowledge of the rebates or resources available through Xcel Energy influenced your decision to install the <Spillover_Measure>?

Verbatim comments redacted for participant privacy.

S8_1. How influential was any information or encouragement you received from Xcel Energy on your decision to install the <Spillover_Measure>? This could include promotional or educational materials, or talking to someone at Xcel Energy. Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If respondent does not understand the meaning of the “influential” scale, can use alternate scale where 0 = “It did not matter at all” and 10 = “It mattered a great deal”.]

Response	Frequency	% Respondents
0-Not at all influential	1	11%
1	1	11%
2	2	22%
3	0	0%
4	0	0%
5	5	56%
6	0	0%
7	0	0%
8	0	0%
9	0	0%
10-Extremely influential	0	0%
Not applicable	0	0%
DK	0	0%
REF	0	0%
Total	**9**	**100%**

S9_1. Did you receive any information from contractors or retailers about any Xcel Energy rebates prior to your decision to install the <Spillover_Measure>?

Response	Frequency	% Respondents
Yes	5	56%
No	4	44%
DK	0	0%
REF	0	0%
Total	**9**	**100%**

[ASK IF S9_1=1]

S9b_1. How influential was any information you received from contractors or retailers on your decision to install the <Spillover_Measure>? Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means ”extremely influential.” [INTERVIEWER NOTE: If

respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	Frequency	% Respondents
0-Not at all influential	1	20%
1	0	0%
2	0	0%
3	0	0%
4	0	0%
5	2	40%
6	0	0%
7	0	0%
8	2	40%
9	0	0%
10-Extremely influential	0	0%
DK	0	0%
REF	0	0%
Total	5	100%

S10_1. Prior to your decision to install the <Spillover_Measure>, did you hear about Xcel Energy programs or rebates through word-of-mouth? This could include talking to someone you know about Xcel Energy's programs or hearing from someone else who had received a rebate from Xcel Energy.

Response	Frequency	% Respondents
Yes	3	33%
No	6	67%
DK	0	0%
REF	0	0%
Total	**9**	**100%**

[ASK IF S10_1=YES]

S10b_1. How influential was this word-of-mouth from people about Xcel Energy's programs on your decision to install the <Spillover_Measure>? Please use a scale from 0 to 10 where 0 means "not at all influential" and 10 means "extremely influential." [INTERVIEWER NOTE: If

respondent does not understand the meaning of the "influential" scale, can use alternate scale where 0 = "It did not matter at all" and 10 = "It mattered a great deal".]

Response	Frequency	% Respondents
0-Not at all influential	2	67%
1	0	0%
2	0	0%
3	0	0%
4	0	0%
5	0	0%
6	0	0%
7	0	0%
8	0	0%
9	0	0%
10-Extremely influential	1	33%
DK	0	0%
REF	0	0%
Total	**3**	**100%**

S11_1. Just to make sure that we understand you correctly, please answer the following hypothetical question. If you had NOT known about rebates or resources available through Xcel Energy, would you still have installed the <Spillover_Measure>? Please use a scale of 0 to 10, where 0 means you definitely WOULD NOT have installed your energy efficient equipment and 10 means you definitely WOULD have done so.

Response	Frequency	% Respondents
0-Not at all influential	0	0%
1	0	0%
2	0	0%
3	0	0%
4	0	0%
5	0	0%
6	0	0%
7	0	0%
8	0	0%
9	0	0%
10-Extremely influential	8	89%
DK	1	11%
REF	0	0%
Total	**9**	**100%**

S12_1. How do you know that the <Spillover_Measure> you installed was energy efficient?

Verbatim comments redacted for participant privacy.

[ASK IF S4 = 1, 4, 6, 7]

S13_1.What was the SEER of the… <Spillover_Measure>? (Interviewer note: SEER ratings range from 13 to 30.)

Response	Frequency	% Respondents
DK	3	100%
REF	0	0%
Total	**3**	**100%**

[ASK IF S4 = 5]

S13_2.What was the EER of the… <Spillover_Measure>?

No Data

S14_1.How many <Spillover_Measure>s did you install? [INTERVIEWER NOTE: IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT OR ROUND UP TO NEAREST WHOLE NUMBER AS NEEDED]

Response	Frequency	% Respondents
DK	0	0%
REF	0	0%
Total	**0**	**0%**

[PROGRAMMING NOTE, THIS IS THE END OF LOOP]

Section B: Awareness & Perceptions

[ASK ALL]

B1. Next, I'd like to understand a little more about your awareness of different cooling technologies. First, I would like to understand how familiar you are with heat pumps. During warmer weather, the heat pump functions as an air conditioner but the same equipment can also provide warmth in cooler times of the year by absorbing the heat from the air or ground and then transferring heat to the home. Before today, how familiar would you say you were with heat pumps, on a scale of 1 to 5, with 1 being not at all familiar and 5 being extremely familiar?

Response	Frequency	% Respondents
1-Not all familiar	25	36%
2	10	14%
3	13	19%
4	15	21%
5-Extremely familiar	7	10%
DK	0	0%
REF	0	0%
Total	**70**	**100%**

[ASK IF B1 = 2-5]

B2. Using the same scale, how familiar are you with …

[RANDOMIZE ORDER]

B2_1a. Mini-split heat pumps?

Response	Frequency	% Respondents
1-Not all familiar	22	49%
2	5	11%
3	6	13%
4	8	18%
5-Extremely familiar	4	9%
DK	0	0%
REF	0	0%
Total	**45**	**100%**

B2_2b. Ground source heat pumps? [INTERVIEWER NOTE: THIS IS THE SAME AS GEO-THERMAL HEAT PUMP]

Response	Frequency	% Respondents
1-Not all familiar	11	24%
2	11	24%
3	9	20%
4	9	20%
5-Extremely familiar	5	11%
DK	0	0%
REF	0	0%
Total	**45**	**100%**

B2_3c. Air source heat pumps?

Response	Frequency	% Respondents
1-Not all familiar	21	47%
2	8	18%
3	5	11%
4	8	18%
5-Extremely familiar	3	7%
DK	0	0%
REF	0	0%
Total	**45**	**100%**

[ASK ALL]

B2A. Knowing that heat pumps can provide both cooling and heating using an electric source, what is the likelihood you would consider installing a heat pump at your home in the next five years, on a scale of 1 to 5, with 1 being not at all likely and 5 being extremely likely?

Response	Frequency	% Respondents
1-Not all familiar	36	51%
2	14	20%
3	7	10%
4	4	6%
5-Extremely familiar	3	4%
DK	6	9%
REF	0	0%
Total	**70**	**100%**

[IF B2A>3 and B2A != 88, 99, ELSE SKIP TO B3]

B2A_1. Would you plan to use the heat pump to cool or heat your whole house or a portion of your house?

Response	Frequency	% Respondents
Whole house	5	71%
Portion of home	2	29%
Other [SPECIFY]	0	0%
DK	0	0%
REF	0	0%
Total	**42**	**100%**

B3. For cooling equipment, there is an enhanced installation process, known as a “Quality Installation.” The Quality Installation process does not describe the equipment itself -- rather, it is a specific process for how the equipment is installed in your home. This process ensures that the equipment is properly sized. In addition, contractors are required to test the airflow, refrigerant charge and ductwork after the installation to ensure optimal efficiency. Before today, had you ever heard of this enhanced installation process for air conditioners and heat pumps?

Response	Frequency	% Respondents
Yes	18	26%
No	51	73%
DK	0	0%
REF	1	1%
Total	**70**	**100%**

[ASK IF B3 = 1 AND S4=1,4,5,6 AND S4b=1]

B3a. Did your contractor use the Quality Installation process to install your new cooling equipment?

Response	Frequency	% Respondents
Yes	4	67%
No	1	17%
DK	1	17%
REF	0	0%
Total	**6**	**100%**

B4. How did you first learn about Quality Installation? (Select one)

Response	Frequency	% Respondents
Contractor	12	67%
Xcel Energy website	1	6%
Xcel Energy bill	0	0%
ENERGY STAR website	0	0%
Friends or family	1	6%
ANY OTHER MENTION OF XCEL ENERGY [SPECIFY]	0	0%
Other [SPECIFY]	4	22%
DK	0	0%
REF	0	0%
Total	**18**	**100%**

B5. What would you say are the benefits of a Quality Installation? [PROBE: Anything else?] (DO NOT READ. ALLOW MULTIPLE RESPONSES) [INTERVIEW NOTE: IF YOU ARE UNSURE, PLEASE SELECT 10 AND ADD VERBATIM]

Response	Frequency	% Respondents
Other [SPECIFY]	9	29%
Works better / optimized performance	6	19%
More efficient/uses less energy	5	16%
Lower utility bills	3	10%
Smaller sized system / properly sized system	3	10%
Ductwork is sealed / reduced leakage of conditioned air	2	6%
Increased comfort	1	3%
Better air distribution	1	3%
Less dust distributed through ductwork	1	3%
Better dehumidification	0	0%
DK	0	0%
REF	0	0%
Total	**31**	**100%**

Section C. Decision-Making & Barriers to Participation

C1. Do you remember seeing or hearing about any rebates for energy efficient appliances or home upgrades in the past year or two?

Response	Frequency	% Respondents
Yes	50	71%
No	19	27%
DK	1	1%
REF	0	0%
Total	**70**	**100%**

[IF C1 = 1]

C1a. Were the rebates that you heard about related to energy efficient cooling equipment?

Response	Frequency	% Respondents
Yes	13	26%
No	30	60%
DK	7	14%
REF	0	0%
Total	**50**	**100%**

[IF C1 = 1]

C2. Please list/tell me what organizations or types of companies offer such rebates, as best as you know or can remember. These companies could include Xcel Energy and or somewhere else. [INTERVIEWER: RECORD VERBATIM]

Verbatim comments redacted for participant privacy.

[IF C2 != 88/99]

C2a (same page as C2). [INTEVIEWER: DO NOT READ] Was Xcel Energy mentioned in C2?

Response	Frequency	% Respondents
Yes	48	96%
No	2	4%
Total	**50**	**100%**

[ASK C3 IF C2a = 2 AND] B4 = 1, 4, 5, or 7; i.e. Xcel Energy not mentioned in C2 or B4]

C3. Prior to today, have you received any information from Xcel Energy on services they provide to customers to help them save energy?

Response	Frequency	% Respondents
Yes	1	50%
No	1	50%
DK	0	0%
REF	0	0%
Total	**2**	**100%**

C4. About how often would you say you receive tips or information from Xcel Energy on ways to save on energy or rebate offers the company provides? Is it generally...

Response	Frequency	% Respondents
Daily	0	0%
Weekly	3	4%
Monthly	35	51%
A few times a year	14	20%
Yearly	4	6%
Less than yearly	0	0%
Not at all	6	9%
DK	7	10%
REF	0	0%
Total	**69**	**100%**

[ASK If C4 < 7]

C5. Where do you see information from Xcel Energy about saving energy?

[DO NOT READ. Select all that apply. If interviewer is unsure how to code, select 12 and record verbatim.]

Response	Frequency	% Respondents
Bill insert	32	40%
Other [SPECIFY]	29	36%
Xcel Energy Website	6	8%
Home energy report	5	6%
Digital / web advertisement (not on the Xcel Energy Website)	3	4%
Television advertisement	3	4%
Billboard or other outdoor advertisement	1	1%
Social media	1	1%
Radio advertisement	0	0%
Contractor	0	0%
Colleague	0	0%
Xcel Energy representative	0	0%
DK	0	0%
REF	0	0%
Total	**80**	**100%**

[ASK IF C1a = 1]

C6. Where did you hear about the cooling equipment rebates offered by Xcel?

[DO NOT READ. Select all that apply]

Response	Frequency	% Respondents
Bill insert	5	31%
Other [SPECIFY]	3	19%
Xcel Energy Website	2	13%
Home energy report	1	6%
Digital / web advertisement (not on the Xcel Energy Website)	1	6%
Television advertisement	1	6%
Billboard or other outdoor advertisement	1	6%
Social media	1	6%
Radio advertisement	1	6%
Contractor	0	0%
Colleague	0	0%
Xcel Energy representative	0	0%
DK	0	0%
REF	0	0%
Total	**16**	**100%**

[ASK IF S3 = 1, ELSE SKIP TO C15]

C7. When the weather is hot, do you use air conditioning equipment in your home?

Response	Frequency	% Respondents
Yes	12	100%
No	0	0%
DK	0	0%
REF	0	0%
Total	**12**	**100%**

[ASK IF C7 = 1; ELSE SKIP TO C15]

C8. What is the primary type of air conditioning equipment used to cool your home? [SELECT ONE]

[If type of heat pump is not mentioned, PROBE: Is it a ground source, air source, or mini-split heat pump? If not sure, code as simply “heat pump.”]

Response	Frequency	% Respondents
Central air conditioner	11	92%
Window air conditioner(s)	0	0%
Portable / room air conditioner(s)	0	0%
Heat pump	0	0%
Ground source heat pump	0	0%
Air source heat pump	0	0%
Mini-split heat pump	0	0%
Evaporative cooler	1	8%
Other [SPECIFY]	0	0%
DK	0	0%
REF	0	0%
Total	**12**	**100%**

[ASK IF C8 = 1 or 4, 5, 6, OR 7; ELSE SKIP TO C12]

C9. Approximately when did you install this equipment? [READ 1-4]

Response	Frequency	% Respondents
Less than 5 years ago	11	100%
At least 5 years ago but less than 10	0	0%
At least 10 years ago but less than 15	0	0%
15 or more years ago	0	0%
DK	0	0%
REF	0	0%
Total	**11**	**100%**

[ASK IF C9 = 1-2]

C9b. Was this high efficiency equipment you installed?

Response	Frequency	% Respondents
Yes	9	82%
No	1	9%
DK	1	9%
REF	0	0%
Total	**11**	**100%**

C9b1. What does “high efficiency” mean to you?

Verbatim comments redacted for participant privacy.

[SKIP IF S4b_1=2 OR S4b_2=2]

C9b2. Did the contractor who installed your cooling equipment mention that Xcel Energy offers rebates for cooling equipment?

Response	Frequency	% Respondents
Yes	6	67%
No	3	33%
DK	0	0%
REF	0	0%
Total	**9**	**100%**

[IF C9b2 = 1]

C9b2_1. Did the contractor offer you an instant equipment rebate instead of asking you to fill out the paperwork from Xcel Energy?

Response	Frequency	% Respondents
Yes	2	33%
No	2	33%
DK	2	33%
REF	0	0%
Total	**6**	**100%**

C9b3. Why did you not apply for the rebate for the air conditioning equipment you installed?

Verbatim comments redacted for participant privacy.

[ASK IF (C9b = 2 or 88 or 99) OR (C9b = 1 AND S1b = 1 or 88)]

C9b4. Would you have considered different cooling equipment if you knew that a rebate for quality installed air conditioning equipment were available?

Response	Frequency	% Respondents
Yes	1	50%
No	0	0%
DK	1	50%
REF	0	0%
Total	**2**	**100%**

[ASK IF C9b = 2]

C9d. What are the main reasons you did not install high efficiency cooling equipment?

Verbatim comments redacted for participant privacy.

[ASK IF C9 = 3, 4, 88, or 99]

C10. Have you considered upgrading to more efficient cooling equipment?

No Data

[ASK IF C10 = 1 OR 2]

C11. What are the main reasons you upgraded your heating equipment but <IF C10 = 1: "have not upgraded"; IF C10 = 2: "have not considered upgrading"> your cooling equipment?

No Data

[ASK IF C10 = 88]

C11b. Is there a specific reason why you are unsure about upgrading to more efficient cooling equipment?

No Data

[ASK IF C10 = 2 OR 88 OR 99]

C11c. Would you consider upgrading your cooling equipment in the next two years if you knew that a rebate for higher efficiency equipment and optimized installation were available?

No Data

[ASK IF C8 = 2, 3 , OR 8]

C12. Have you ever considered upgrading to a central air conditioner?

No Data

[ASK IF C8= 1, 2, 3, 8]

C13. Prior to this conversation, have you ever considered upgrading to a heat pump?

Response	Frequency	% Respondents
Yes	2	17%
No	9	75%
DK	0	0%
REF	1	8%
Total	**12**	**100%**

[ASK IF C12 OR C13 = 2 OR 88 OR 99]

C14. Would you consider upgrading your cooling equipment in the next two years if you knew that a rebate for higher efficiency equipment with optimized installation were available?

Response	Frequency	% Respondents
Yes	0	0%
No	9	90%
DK	0	0%
REF	1	10%
Total	**10**	**100%**

[IF C14 = 2 OR 88]

C14a. How old is your cooling equipment?

Verbatim comments redacted for participant privacy.

[ASK IF C14 = 88]

C14b. Is there a specific reason why you are unsure about upgrading to more efficient cooling equipment if you knew that a rebate for higher efficiency equipment with quality installation were available?

Verbatim comments redacted for participant privacy.

[ASK IF S1b = 1 - 5]

C15. Next I'm going to read you a list of factors that may have been a challenge for you to participating in Xcel Energy's cooling equipment rebate program.

On a scale from 1 to 5, where 1 is “not at all a challenge” and 5 is “very much a challenge”, please indicate the extent to which you see the following as a challenge to participating in Xcel Energy’s cooling equipment rebate program.

You can also tell me if something was not applicable to your experience or if you DK

[RANDOMIZE ORDER, ANCHOR C14i LAST]

C15a. Lack of knowledge regarding efficient cooling equipment

Response	Frequency	% Respondents
1-Not at all a challenge	16	32%
2	11	22%
3	6	12%
4	5	10%
5-Very much a challenge	5	10%
Not applicable	6	12%
DK	1	2%
REF	0	0%
Total	**50**	**100%**

C15b. Lack of knowledge regarding rebate amounts

Response	Frequency	% Respondents
1-Not at all a challenge	23	46%
2	9	18%
3	5	10%
4	4	8%
5-Very much a challenge	3	6%
Not applicable	4	8%
DK	2	4%
REF	0	0%
Total	**50**	**100%**

C15c. Lack of knowledge regarding quality installation

Response	Frequency	% Respondents
1-Not at all a challenge	27	54%
2	5	10%
3	6	12%
4	3	6%
5-Very much a challenge	3	6%
Not applicable	3	6%
DK	2	4%
REF	1	2%
Total	**50**	**100%**

C15d. Amount of time it takes to install equipment

Response	Frequency	% Respondents
1-Not at all a challenge	26	52%
2	4	8%
3	9	18%
4	2	4%
5-Very much a challenge	2	4%
Not applicable	3	6%
DK	4	8%
REF	0	0%
Total	**50**	**100%**

C15e. Finding a qualified contractor to perform equipment installations

Response	Frequency	% Respondents
1-Not at all a challenge	22	44%
2	8	16%
3	4	8%
4	7	14%
5-Very much a challenge	4	8%
Not applicable	4	8%
DK	1	2%
REF	0	0%
Total	**50**	**100%**

C15f. Your preferred contractor does not offer the rebates

Response	Frequency	% Respondents
1-Not at all a challenge	24	48%
2	1	2%
3	5	10%
4	2	4%
5-Very much a challenge	4	8%
Not applicable	8	16%
DK	6	12%
REF	0	0%
Total	**50**	**100%**

C15g. Amount of paperwork

Response	Frequency	% Respondents
1-Not at all a challenge	25	50%
2	4	8%
3	9	18%
4	4	8%
5-Very much a challenge	1	2%
Not applicable	4	8%
DK	3	6%
REF	0	0%
Total	**50**	**100%**

C15h. Equipment cost

Response	Frequency	% Respondents
1-Not at all a challenge	25	50%
2	4	8%
3	9	18%
4	4	8%
5-Very much a challenge	1	2%
Not applicable	4	8%
DK	3	6%
REF	0	0%
Total	**50**	**100%**

C15i. Installation cost

Response	Frequency	% Respondents
1-Not at all a challenge	9	18%
2	5	10%
3	11	22%
4	13	26%
5-Very much a challenge	6	12%
Not applicable	3	6%
DK	3	6%
REF	0	0%
Total	**50**	**100%**

C15j. Is there any other factor that you see as a challenge to participating in Xcel Energy's cooling equipment rebate program?

Response	Frequency	% Respondents
Yes [SPECIFY]	8	16%
No	41	82%
DK	1	2%
REF	0	0%
Total	**50**	**100%**

[ASK IF C15j = 1]

C15j_1. On a scale from 1 to 5, where 1 is "not at all a challenge" and 5 is "very much a challenge", please indicate the extent to which you see <C15j_OTH> as a challenge to participating in Xcel Energy's cooling equipment rebate program.

Response	Frequency	% Respondents
1-Not at all a challenge	1	13%
2	0	0%
3	0	0%
4	1	13%
5-Very much a challenge	6	75%
Not applicable	0	0%
DK	0	0%
REF	8	100%
Total	**1**	**13%**

C.4 Participating Trade Partner Interview Results

This appendix presents results from the participating trade partner interviews. The trade partner research addressed the following process topics:

- **Rebate Experiences:** The evaluation team will explore trade partners' awareness of the equipment, product rebates, and the ACCA QI process. Trade partners feedback on the new comprehensive approach to providing residential HVAC services in one product and the potential value a comprehensive approach brings to trade partners.
- **Barriers to Participation:** The evaluation team will ask trade partners about what they view as the biggest barriers to engaging with the product and what may motivate them to install equipment outside of the product. We will determine the tools trade partners find most helpful in motivating customers to purchasing efficient air conditioning and heat pump equipment and performing QI, and any barriers they experience.
- **Heat Pump Growth:** The evaluation team will explore what types of heat pumps trade partners are installing, or if they specialize in a particular type. We will gauge the potential of going midstream with mini-split rebates and discuss trade partners' familiarity with heat pump installation processes. Overall, this will help to understand what trade partners think the future of the heat pump market looks like.

- **Retrospective and Prospective NTG Impacts:** Finally, the team will ask questions on product attribution, or the impact the product had on their decision to install and/or recommend efficient air conditioning or heat pump equipment.

The remainder of this appendix includes results from the trade partner interviews organized by process topic and research question.

Section A: Background and Program Familiarity

A1. How long have you been in your current role?

[IF < 5 YEARS] What was your previous role? [**PROBE TO MAKE SURE WE ARE TALKING TO:** Owner, Sales Manager, Sales Person].]

Time	Tier-1	Mid-Tier
0-5 years		5
5-10 years	2	2
10+ years	6	3

A2. Can you describe how much involvement you typically have with the rebate program? This would include interaction with Xcel Energy staff, filling out program paperwork, providing invoices, or fulfilling other requirements..

Amount of Involvement	Tier-1	Mid-Tier
High	7	5
Mid	1	4
Low	0	1

c. Generally, do rebates go directly to customers or are they sent to you?

Directly to Customers?	Tier-1	Mid-Tier
Yes	7	10
No	1	0

d. **[IF DIRECTLY TO CUSTOMERS]** What prevents you from offering an equipment discount to the customer and receiving the rebate payment from Xcel Energy later?

- More convenient for customer and trade partner i.e., less paperwork involved, customer receives rebate quicker, less complicated process.

i. **[If timing of rebate receipt is a barrier]** What would be a reasonable timeline to receive the rebate, from invoice verification of the final application to receiving the rebate?

F1. One last question to help me understand your perspectives, do you have experience installing heat pumps? If not, do others at your company have experience installing heat pumps?

Experience with Heat Pumps	Tier-1	Mid-Tier
Yes	5	9
N/A	1	1

Section D: Perceptions/Awareness: Quality Installation

D1. To qualify for Xcel Energy's cooling rebates for air conditioners and heat pumps, an enhanced installation process, known as a "Quality Installation" must occur. The Quality Installation process does not describe the equipment itself -- rather, Quality Installation improves the efficiency of the equipment and includes a load calculation to make sure the equipment is properly sized for a home and sealing of all exposed ductwork. Xcel Energy defines Quality Installation as installation that follows procedures documented in ACCA Standard 5. Are you familiar with the "Quality Installation ACCA Standard 5 protocols"?

Familiar with the Quality Installation ACCA Standard 5 protocols	Tier-1	Mid-Tier
Yes	8	10

[IF D1 = YES]

D1b. Do you have experience <u>following</u> the "Quality Installation ACCA Standard 5 protocols?

Experience following the Quality Installation ACCA Standard 5 protocols	Tier-1	Mid-Tier
Yes	8	10

[IF D1b = NO, IF D1b = YES SKIP D2]

D1bb. Do others at your company have experience performing Quality Installation, according to the ACCA Standard 5 protocols?

- Tier-1: Yes, we have our own standards that fall in line with QI. (n = 1).

[IF INTERVIEWEE UNDERSTANDS QI (D1 = YES), OTHERWISE SKIP TO D3]

D2. What are the steps you take when completing a Quality Installation for air conditioners that are different from a standard installation?

- Tier-1: No difference (n = 4). Sealing all exposed ductwork is the only difference between their "normal" practices and product requirements (n = 4).

- Mid-Tier: No difference (n = 8)

D2_1. What software do you use to perform the load calculations?

- Tier 1 Verbatims: Rheem Pro Partner, EDS Auditor, Nitek Software, Manual J Software, and Wrightsoft Mobile.
- Mid-tier Verbatims: Enterprise selling solutions, Rheems Design star, Comfort air software, Wrightsoft, AccuLoad, and EDS calculator.

D2_2. What tools do you use to measure air flow?

- Tier-1 Verbatims: Anemometer, pressure method, flow plates.
- Mid-Tier Verbatims: Thermos door one., Anemometer, Magnehelic gage for static pressure and manufacturers paperwork, CFM meter, Testo.

D2_3. What steps do you take to verify the refrigeration charge?

- Tier-1 Verbatims: Use regular gages, weigh the charge in and use factory recommendations on how to charge; in rare times when we are installing ACs in colder weather, we'll come back in spring when warmer and double check on cooler side, digital gages with clamp on temperature breaks, technicians measure the shockers, use the field piece probes.
- Mid-tier Verbatims: Manual called for sub-cooling target. Owner does the installs Checks the refrigerant. He has both meters to read it; not sure which one he's using. Field piece digital gages, check air flow and amperage on motor, make sure it's where it needs to be, check the return temperatures and get all those listed, takes him that long to get amperage and everything calculated, make sure super heat is in manufacturer specifications, adjust super heat where it's required to be, gage up, always do refrigerant, typically go back when the weather is decent, add refrigerant based on line set links, based on manufacturer standards, charge the way the manufacturer recommends them to be charged.

[ASK IF CONTRACTORS INSTALL HEAT PUMPS, F1=YES]

D2a. What additional steps do you take when completing a Quality Installation for air source heat pumps that are different from a standard installation?

- Tier 1: No difference (n = 8)
- Mid-tier: No difference (n = 7), don't know (n = 3)

D2ab. What have been your experiences setting up a heat pump to work properly with a back-up heating system?

- Tier-1: All of their systems out there will have back up heat (n = 1), don't do a lot of the dual fuel system anymore (n = 1)
- Mid-tier: Most customers get a new gas furnace (or use existing furnace, but not usual) (n = 1), normally same steps, want to make sure that the HP will work in the heat (n = 1)

[ASK ALL]

Section H: Program Influence on the Market

Now, I will ask some questions about the relative importance of the Xcel Energy offering in your recommendation to pursue high efficiency measures and installations. I understand that the market recently has been quite different due to the impacts of the supply chain issues. Try to think about your experiences in a "normal" year.

NEW H1. How would you describe the influence that the rebate program had on your decision to recommend 15 SEER central air conditioners (and above)?

- Tier 1: Use as price differential (n = 2). Rebates make sale of higher efficiency equipment easier (n = 6). Shows value to the homeowner (n = 1). No effect (n = 1).
- Mid-tier: Use as price differential (n = 3). No effect (n = 3). Significant impact (n = 3). Rebates make sale of higher efficiency equipment easier (n = 2). Shows value to the homeowner (n = 2). Use rebates to keep pace with market (n = 1)

H1a. How has that changed in 2021, if at all?

- Tier-1: 81 substitutions last year in installation process, sell customer 16 seer ac now have to sell a hp (n = 1),) they are getting a lot of people from co the past several years who are transplants and they are more energy conscious they are looking more for the he products regardless of the payback (n = 1), made a decision this year, we are not going to offer any utility ac rebate during the winter (n = 1), product selection has gotten a little better, new products have rolled out (n = 1),
- Mid-tier: Some people wait; some people don't care about brand. Wouldn't say its hurt our ability to sell (n = 1). No change (n = 1).

NEW H2. Lastly, How would you describe the influence that the Xcel Energy air conditioner and heat pump offering had on your decision to use procedures that meet the Quality Installation procedures for your customers?

- Tier-1: all exposed ductwork is the only difference between their "normal" practices and product requirements (n = 4), made trade partners better installers (n = 6).
- Mid-tier: program has influenced QI practices (n = 6), QI is a competitive advantage for their company, the rest said they compete against larger installers that also adhere to QI standards (n = 4), no difference (n = 1)

NEW H3. How would you describe the influence that the rebate program had on your decision to recommend heat pumps?

- Tier-1: No influence (n = 4), customers are motivated by electrification movement (n = 4)
- Mid-tier: little influence (n = 5), no influence (n = 3)

H3a. How has that changed in 2021, if at all?

- Tier-1: Yes, increasing interest in heat pumps (n = 2)
- Mid-tier: No (n = 1)

Now, we are going to talk through a number of different scenarios to understand how they impact the type of equipment you sell.

SCENARIO 1: STATUS QUO

H4. First, thinking about the current market,

i. About what percent of the central air conditioners you sell are at least 15 SEER?

% of ACs sold that are SEER 15+	Tier-1	Mid-Tier
75-100%	6	3
50-75%	1	5
25-50%	1	1
0-50%	0	1

j. About what percent of the heat pumps you sell are at least 15 SEER?

% of HPs sold that are SEER 15+	Tier-1	Mid-Tier
75-100%	6	9
0-50%	1	1

k. About what percent of the central air conditioners you sell use procedures that meet the Quality Installation ACCA 5 Standards?

% of ACs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
75-100%	5	10

a. What percentage of these installations do you complete a Manual J load calculation?

- Tier-1: 100% (n = 3).
- Mid-tier: 100% (n = 1).

b. What percentage of these installations do you seal all exposed ductwork?

- Tier-1: 100% (n = 3).

- Mid-tier: 100% (n = 1).

c. What percentage of these installations do you measure airflow and sub-cool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

- Tier-1: 100% (n = 3).
- Mid-tier: 100% (n = 1).

d. What percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

% of HPs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
75-100%	4	7
25-50%	0	1

SCENARIO 2: HISTORICAL PERSPECTIVE [IF APPLICABLE] –

H6. Now, I want you to think back to before you started participating in the program: thinking about when you first started the business, before you participated in the program

c. What percent of the central air conditioners you sold were installed using the procedures that meet the Quality Installation ACCA 5 Standards?

% of ACs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
0-25%	4	5

a. For what percentage of these installations would you complete a Manual J load calculation?

b. For what percentage of these installations would you seal all exposed ductwork?

c. For what percentage of these installations would you measure airflow and subcool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

d. What percent of the air source heat pumps you sold were installed using the procedures that meet the Quality Installation ACCA 5 Standards?

% of HPs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
0-25%	2	2

SCENARIO 3: NO REBATE PROGRAM

H7. Now imagine that the Xcel Energy rebate program were not available today, and you were not able to offer rebates for cooling equipment or have any program support.

f. About what percent of the central air conditioners you sell do you think would be at least 15 SEER?

% of ACs sold that are SEER 15+	Tier-1	Mid-Tier
75-100%	3	2
50-75%	1	0
25-50%	3	2
0-25%	1	4

g. About what percent of the heat pumps you sell do you think would be at least 15 SEER?

% of HPs sold that are SEER 15+	Tier-1	Mid-Tier
75-100%	2	6
50-75%	1	1
25-50%	0	3

h. If Quality Installation were not required, what percent of the central air conditioners you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

% of ACs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
75-100%	7	8
25-50%	0	1
0-25%	1	1

a. For what percentage of these installations would you complete a Manual J load calculation?

b. For what percentage of these installations would you seal all exposed ductwork?

c. For what percentage of these installations would you measure airflow and subcool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

i. If Quality Installation were not required, what percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards? a Quality Installation? What effect would that have on your business?

% of HPs sold using ACCA 5 Standards for installation	Tier-1	Mid-Tier
75-100%	2	1
50-75%	1	0
0-25%	1	1

j. What effects would this have on your business? **[PROBE:** employees, sales techniques, number of clients, time it takes to sell projects]

- Tier-1: No large effect (n = 2). Harder to justify higher-efficiency equipment to customers (n = 2). Less business (n= 1). Reduced revenue (n = 1).
- Mid-tier: No large effect (n = 5). Less customers (n = 4). Harder to justify higher-efficiency equipment to customers (n = 1). Change customer buying behavior (n = 1). Reduced revenue (n = 1).

[INTERVIEWER NOTE: CHECK FOR CONSISTENCY IN RESPONSES. SEEK CLARITY AS NEEDED.]

H8. Do you do any work for customers served by another utility? In what regions? About what percent of the cooling equipment you sell in this region is considered energy efficient? [PROBE: 15 SEER or higher]

H9. About what percent of the cooling equipment installations you perform in this other region use procedures that meet the Quality Installation ACCA 5 Standards?

Section S: Satisfaction and Program Experiences

Now, I'd like to talk more specifically about your experiences with the rebate program.

Using a scale from 1 to 5, where 1 is extremely dissatisfied and 5 is extremely satisfied, please rate your satisfaction with the following items:

S1. Your **overall satisfaction** with the rebate program?

Overall Satisfaction	Tier-1	Mid-Tier
5	4	3
4	2	5
3	1	1
2	0	1

[ASK ONLY IF S1 < 5]

S1a. What could Xcel Energy do to increase your satisfaction with the rebate program? [**PROBE:** as needed for specific factor]

- Tier-1: Increase rebate amounts (n = 1). Online application is cumbersome (n = 1). Not a fan of the program website (n = 1).
- Mid-tier: Get rid of EER requirement for heat pumps (n = 1). Quicker turnaround time for rebates (n = 5). Increase amount of equipment that qualifies for program (n = 1). Needs more information about heat pumps in program (n = 1). Nothing (n = 1).

[ASK ALL]

S2. What is the rebate program doing well that they should keep doing?

S3. What can Xcel Energy do to increase your participation in the rebate program? (Probe for efficient equipment and QI.)

- Tier-1: Different start-up requirements (n = 2). Increase rebates (n = 2). More equipment rebated through program (n = 1). More marketing from Xcel Energy (n = 1).
- Mid-tier: More equipment rebated through program (n = 3). Nothing (n = 2). Increase rebates (n = 1). More marketing from Xcel Energy (n = 1).

S4. In April, Xcel Energy combined its air conditioning and heating rebates under one rebate form. What do you like or dislike about having all the HVAC offerings under one rebate form?

- Tier-1: Love it (n = 2). Indifferent (n = 1).
- Mid-tier: Love it (n = 3). Like it (n = 3).

[PROBE: easier to find eligible equipment? more efficient rebate processing?]

S5. Are there any challenges you have experienced with participating in the rebate program? (Probe for details.)

- Rebates not high enough (n = 5), more equipment should be rebated (n = 5), administrative burden (n = 4), spring start-ups (n = 3), rebate turnaround time (n = 2).
  - 1 tier-1 trade partner no longer offers air conditioner rebates in the winter because the return start-up trip costs them the time they could use to pursue new opportunities.
  - 1 tier-1 trade partner doesn't offer the $200 AC rebate to customers because the start-up checks lose them potential profit.

S6. Do you have any other feedback to provide Xcel Energy about this change to offering one rebate program?

Section C: Motivations/Barriers for Trade Partners

C1. How did you initially learn about opportunities to participate in the rebate program?

C2. What is the main reason you pursue rebates through the Xcel Energy rebate program?

- Tier-1: Value for customers (n = 3), drives business (n = 2), high-efficiency equipment is better for the environment (n = 1).
- Mid-tier: Value for customers (n = 81), drives business (n = 5), credibility with customers (n = 2), keep up with competition (n = 2).

C3. What, if anything, about the rebate program keeps you from participating more?

[SKIP D4 IF INTERVIEWEE ISN'T FAMILIAR WITH QUALITY INSTALLATION AND COMPANY DOESN'T OFFER VARYING INSTALLATION SERVICES]

D4. What, if anything, would enable your company to complete more of the in-depth installation services defined by the ACCA Standard 5 protocols (Quality Installation)? [**PROBE:** e.g., certification requirements, customer understanding of QI, and cost barriers]

Section E: Trade Partner Marketing

Now, I have some questions about customer motivations and how you sell efficient equipment to customers.

E1a. What tools or resources from Xcel Energy have you found to be the most helpful in selling efficient air conditioning equipment? [**PROBE** for the role of Quality Installation]

E1aa. Do you face any challenges in using these tools or resources?

E1b. What tools or resources from Xcel Energy have you found to be the most helpful in selling heat pumps? [PROBE for the role of Quality Installation]

E1bb. Do you face any challenges in using these tools or resources? [IF YES] What are those challenges?

- Tier-1: Xcel Energy website (n = 1), nothing (n = 2).
- Mid-tier: Video on heat pumps from Xcel Energy (n = 1), nothing (n = 2).

E2. Do you explain the difference between standard installation and the more detailed installation services defined by the ACCA Standard 5 protocols to your customers? (If so: How do you explain it, and what do you tell them about the differences?)

E3. What tools or resources have you found to be the most helpful in selling the more detailed installation services defined by the ACCA Standard 5 protocols?

- Tier-1: Xcel Energy flyers on QI (n = 1), talk about general benefits of QI (n = 2).

E9a. Do you face any challenges in using these tools or resources?

E4. How influential are the equipment rebates as opposed to the requirement to perform Quality Installation in selling rebate-eligible projects to your customers? How do you use the rebate in your sales process? How important is the rebate to customers in their decision (in a normal year)?

E4a. Is Quality Installation a competitive advantage for your company? Do you expect that your competitors or conducting Quality Installation?

- Tier-1: Yes, but only bigger companies are conducting QI. (n = 4).
- Mid-tier: Yes, if they are in the program (n = 4). Yes, but only bigger companies are conducting QI. (n = 2). Unsure (n = 1). No (n = 2).

[IF YES]

How do you use quality installation to close sales with customers?

[ASK ALL]

E5. Do you promote the rebate program with your customers? If so: How?

E6. Have you ever sold any efficient cooling equipment to Xcel Energy residential customers without submitting an application for the rebate?

- Tier-1: No (n= 1). Yes, if equipment doesn't quality (n = 2)
- Mid-tier: No (n = 7)

e. How frequently does this happen?

f. What are the reasons why?

g. For how many of those projects do you perform a the more detailed installation services defined by the ACCA Standard 5 protocols?

h. What would need to change for you to submit applications for these projects? (Probe: Is there anything Xcel Energy could do to help ensure applications are submitted for all eligible projects?)

Section F: Perceptions/Awareness: Heat Pumps

[IF TRADE PARTNER INSTALLS HEAT PUMPS, F1=YES]

F1a. What types of heat pumps does your company have experience installing?

Tier 1: Air source heat pumps and mini-splits heat pumps (n = 1)

PROBE: Air source heat pumps, Ground source heat pumps, Minisplit heat pumps (ducted and ductless), Cold climate heat pumps

IF MULTIPLE: Does your company specialize in a certain type of heat pump?

IF COLD CLIMATE: What do you use to define as a cold climate heat pump?

F2. How experienced are you and your company in selling and installing heat pump technology on a scale from 1 – 5, with 1 being not at all experienced (i.e., no

experience with the technology) and 5 being very experienced (the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

Familiarly with Heat Pumps	Tier-1	Mid-Tier
5	2	0
4.5	1	1
4	1	1
3	0	2

- Tier-1: electricity prices make heat pumps less affordable, have installed less than previous years (n = 2).
- Mid-tier: Don't install a lot of heat pump installations (n = 3).

F3. What do you see as the primary benefits of heat pump technology in Colorado?

- Tier-1: utility savings and comfort (n =1), electrification (n = 1)
- Mid-Tier: More efficient, less of a carbon footprint in some scenarios (n = 1), something that all the vendors and Xcel Energy want to push.

F4. What do you see as the primary drawbacks of heat pump technology in Colorado?

F5. What do you tell customers about the perceived benefits of heat pumps?

F6. If your distributor offered an instant discount on mini-split heat pumps, how many more mini-split heat pumps would your company recommend to customers annually? What percentage of these savings would you pass on to the customer?

- Tier 1: Rebate would not have a large impact on their sales of mini-splits (n = 4).
- Mid-tier: Rebate would not have a large impact on their sales of mini-splits (n = 7).

F7. What percentage of your customers do you think will buy heat pumps instead of air conditioners five years from now?

- Tier 1: Roughly 30% more (n = 1). Breakdown will be 60/40, heat pumps/ACs (n = 1). 85% will buy heat pumps (n = 1).
- Mid-tier: Higher percentage (n = 1). 35% more heat pumps (n = 1). 80-90% more heat pumps (n = 1). Split will be 50/50, heat pumps/ACs (n = 2). 60-70% more heat pumps (n = 1).

F8. What needs to change, if anything, to make heat pumps more viable to residential customers? [IF NEEDED examples could include equipment costs, electricity costs, more viable cold climate technology, policies, carbon-free electricity]

- Tier 1: Increase rebates (n = 1)
- Mid-Tier: Increase rebates (n = 1). Education and training on heat pumps (n = 2).

F9. Thermostat: INFO Gathering, If supply chain is functioning next year/year after.

What % of new systems will you install w/ a communicating thermostat

- Tier 1: 65-70% of systems (n = 1).
- Mid-tier: 100% of heat pumps (n = 2). 80-90% (n = 2). ACs probably 60-70% (n = 1). 40-45% (n = 1). 20% (n = 1). 5% (n = 1).

Section J: Closing

J1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences working with the rebate program?

- Tier 1: Great program (n = 3). No (n = 2). Need more information about heat pumps (n = 1). Lower cost of electricity to increase heat pump sales (n = 1).
- Mid-tier: Great program (n = 4). Increase rebates (n = 2). Need more information about heat pumps (n = 2).

J2. Those are all the questions I have today. [THANK AND TERMINATE]

C.5 Nonparticipating Trade Partner Interview Results

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency products, members of the TRC evaluation team are conducting in-depth telephone interviews with nonparticipating Trade Partners. This guide presents the questions to be covered in the in-depth interviews of trade partners who have had little to no participation in the Colorado residential air conditioner and heat pump product.

Section A: Introduction/Background Information

Thank you for agreeing to talk with me today. I expect this conversation to take about half an hour. To help me capture your responses accurately, is it okay if I record this call? The recording will be used for my note-taking purposes only. It won't be shared with Xcel Energy.

Do you have any questions before I start?

First, I want to take a few minutes to better understand your role and set the stage for the rest of the questions.

A1. How long have you been in your current role? [IF < 5 YEARS] What was your previous role? [**PROBE:** Owner, Sales Manager, Engineer, Contractor, Field Technician, Project Manager, etc.]

Time	Low-participating Trade Partners	Nonparticipating Trade Partners
0-5 years	2	1
5-10 years	0	2
10+ years	2	3

A2. What are your primary responsibilities at COMPANY NAME?

Low-participating trade partners:

- Sales calls and marketing (n=5)
- Operations and accounting (n=3)
- Equipment installations (n=2)

Nonparticipating trade partners:

- Sales calls and marketing (n=4)
- Operations and accounting (n=4)
- Equipment installations (n=2)

A5. How many employees does your company have?

Number of Employees	Low-participating Trade Partners	Nonparticipating Trade Partners
1-10	4	5
11-20	1	0
20+	1	1

Section D: Perceptions/Awareness: Quality Installation

D1. Are you familiar with the "Quality Installation ACCA Standard 5 protocols, which is an installation process that is intended to improve the efficiency of cooling equipment and includes a load calculation to make sure the equipment is properly sized of a home and sealing of all exposed ductwork?

- All nonparticipating trade partner said they were familiar with the Quality Installation ACCA Standard 5 protocols.

[IF D1 = NO]

D1a. Do others at your company have experience performing Quality Installation according to the ACCA Standard 5 protocols?

[IF D1 = YES]

D1b. Do you have experience following the "Quality Installation ACCA Standard 5 protocols?

[IF D1b = NO]

D1bb. Do others at your company have experience performing Quality Installation, according to the ACCA Standard 5 protocols?

[IF D1bb = NO, IF D1bb = YES SKIP D2]

D1bbb. Why does your company not perform Quality Installation?

Nonparticipating trade partners:

- Rebates for QI are too low.
- Take a lot of time to conduct QI.
- Manual J calculations are not always reliable.

[IF D1a = YES or D1b = YES, OTHERWISE SKIP TO NEXT SECTION]

D2. What prompted your company to start offering Quality Installation?

Low-participating trade partners:

- Ability to offer Xcel Energy rebates
- Competitors offer QI.

Nonparticipating trade partners:

- Ability to offer Xcel Energy rebates
- Competitors offer QI.

D2a. What are the steps you take when completing a Quality Installation for air conditioners that are different from a standard installation?

Low-participating trade partners:

- Sealing ductwork
- Submitting paperwork for QI rebate

D2ai. What software do you use to perform the load calculations?

Low-participating trade partners:

- WrightSoft (n=2)

- EDS
- Carmel

Nonparticipating trade partners:

- Rheem
- Akiload
- Coolcalc

D2aii. What tools do you use to measure air flow?

Low-participating trade partners:

- Clocking
- Manometer
- CPS

Nonparticipating trade partners:

- Manometer (n=2)

D2aiii. What steps do you take to verify the refrigeration charge?

Low-participating trade partners:

- Digital gage (n=3)

Nonparticipating trade partners:

- Digital gage

D2aiv. When you install an air conditioner unit in the winter, what steps do you take to ensure the installation was performed according to ACCA Standard 5 protocols (since the outside temperature would be below 70 degrees at the time of the installation)?

Low-participating trade partners: Return in spring for start-up (n=6)

Nonparticipating trade partners: Return in spring for start-up (n=2)

Do you do anything differently if you were installing in the winter vs. summer?

Do you install heat pumps?

Low-participating trade partners: No (n=2)

D2b. What additional steps do you take when completing a Quality Installation for heat pumps that are different from a standard installation?

Low-participating trade partners: Adjusting the charge.

D2ab. What have been your experiences setting up the heat pump to work properly with the back-up heating system?

Nonparticipating trade partners: Experience with dual fuel systems.

D10. What, if anything, would enable your company to complete the more in-depth installation services defined by the ACCA Standard 5 protocols? (Probe for certification requirements, customer understanding of QI, and cost barriers.)

Low-participating trade partners: The house needs to facilitate the ability to follow full protocols

Nonparticipating trade partners: Would need to get rid of txv requirement and a higher incentive to justify time spent Manual J calculations.

D11. What do you perceive as the value to customers in offering the more in-depth installation services defined by the ACCA Standard 5 protocols? Is this a competitive advantage for your company and a part of your sales practice? Is this different from when you participated in the program?

Low-participating trade partners:

- Equipment will run more efficiently (n=3)
- Equipment longevity (n=2)
- Competitive advantage (n=1)

Section M: Program Influence on the Market

Next, I'm going to ask some question about the type of equipment you sell to customers.

[SCENARIO 1: STATUS QUO]

H4. Thinking about the current market,

l. About what percent of the central air conditioners you sell are at least 15 SEER?

Low-participating trade partners:

- 80%
- 70%
- 50%
- 60%
- 30%

Nonparticipating trade partners:

- Don't know

- 99%.
- 50%
- 30% (n=2)
- 10%.

m. About what percent of the heat pumps you sell are at least 15 SEER?

Low-participating trade partners:

- 100% (n=4)
- 75%

Nonparticipating trade partners:

- 100% (n=2)
- 50%
- 1% (excluding ductless heat pups)

n. About what percent of the central air conditioners you sell use procedures that meet the Quality Installation ACCA 5 Standards?

Low-participating trade partners:

- 100%
- 90%
- 80% (n=2)

Nonparticipating trade partners:

- 100%
- 50%
- 0%

d. What percentage of these installations do you complete a Manual J load calculation?

Nonparticipating trade partners:

- 100%
- 0%

a. What percentage of these installations do you seal all exposed ductwork?

Low-participating trade partners:

- 80%
- 0%

Nonparticipating trade partners:

- 95-100%
- 50%

b. What percentage of these installations do you measure airflow and sub-cool temperatures and adjust airflow and refrigerant charge to match manufacturer specifications, to the extent possible?

Low-participating trade partners:

- 100%
- 0%

Nonparticipating trade partners:

- 100%
- 0%

o. What percent of the air source heat pumps you sell would use procedures that meet the Quality Installation ACCA 5 Standards?

Low-participating trade partners:

- 100%

M4. Does the Xcel Energy rebate program impact your business practices in any way? (i.e. learning about new equipment, availability of equipment, market acceptance of equipment)

Low-participating trade partners:

- Starting to do more heat pumps
- More paperwork

Nonparticipating trade partners:

- No impact
- Important because it puts them on the list of Xcel Energy eligible trade partners

PROBE:

c. Impact on SEER levels?

Low-Participating Trade Partners: Customers are seeing the Xcel Energy information and requesting higher SEER levels.

d. Impact on heat pumps sales?

c. Impact on whether they follow procedures that meeting the Quality Installation ACCA 5 standards.

M5. Do you do any work for customers served by another utility? In what regions? About what percent of the cooling equipment you sell in this region is considered energy efficient? [PROBE: 15 SEER or higher]

Low-participating trade partners:

- Customers in mountains
- Other parts of Denver not served by Xcel Energy
- United Power and IREA service territories, 50-60% efficient
- IREA and Black Hills
- Case Rock with Black Forest

Nonparticipating trade partners:

- Black Forest
- Atlas Energy and Poudre Valley RDA
- IREA and Black Hills

[ASK IF M5=YES]

M5a. About what percent of the cooling equipment <u>installations</u> you perform in this other region are the in-depth installation (Quality Installation) service?

Low-participating trade partners:

- 100%
- 0%

Nonparticipating trade partners:

- No difference.

Section B: Barriers for Trade Partners

B0. Are you aware of the Xcel Energy rebates for air conditioners? What about for heat pumps?

Low-participating trade partners: Yes.

Nonparticipating trade partners: Yes.

[IF NOT AWARE, SKIP TO B4]

B1. What is the *main reason* you have not pursued [more] residential cooling rebates through the Xcel Energy rebate program? [PROBE for barriers: QI procedures, trade partner registration requirements, rebate application]

Rebate not high enough (n=11), QI process (n=11), too much paperwork (n=6), application process is confusing (n=4), work outside of Xcel Energy territory (n=4), NATE certification requirement (n=3), don't want M&V (n=2), Xcel Energy testing software (n=2).

Are there *other* reasons?

B1a. What are your thoughts about the rebate application process through the rebate program?

B2. [IF SELLING HIGH EFFICIENCY EQUIPMENT] What motivates you to sell and install high efficiency air conditioners and heat pumps without the rebate from Xcel Energy?

Low-participating trade partners:

- Just better equipment (n=2)
- Quieter and more comfortable (n=1)

Nonparticipating trade partners:

- More expensive
- If customers have solar (when selling heat pumps)

[ASK IF TRADE PARTNER WAS FORMERLY PART OF PROGRAM, IF NOT SKIP TO NEXT SECTION]

B3. We understand you have pursued cooling rebates in the past, but you haven't had any recent projects. Why did you choose to no longer pursue cooling rebates through the Xcel Energy rebate program?

Low-participating trade partners:

- Internal staffing issues
- Doesn't like the standard and equipment sizing requirements
- Doesn't do duct work sealing

Nonparticipating trade partners:

- Cheaper to give customer a rebate outside of program

- Not NATE certified anymore due to COVID training challenge

[Probe: Did the April 2021 decrease in the rebate amount for 13 and 14 SEER air conditioners impact your ability to perform QI for customers? Did the rebate decrease impact your decision not to apply for the rebate?]

Low-participating trade partners: No (n=3)

B4. What about the Xcel Energy rebate program would need to change for you to pursue rebates through Xcel Energy? What about the rebate offering for heat pumps?

Low-participating trade partners:

- Increase rebates (n=3)
- Don't require duct sealing (n=2)
- If Xcel Energy had a territory map that would be help trade partners to figure out if they are in the territory and qualify.
- Make the process simpler

Nonparticipating trade partners:

- Create a separate track for lower efficiency equipment.
- Provide a spreadsheet to use as a sales tool to show long-term ROI
- Drop Manual J calculations
- Drop TXV requirement
- Drop NATE certification

Section H: Perceptions/Awareness: Heat Pumps

H1. How experienced are you and your company in selling and installing heat pump technology on a scale from 1 – 5, with 1 being not at all experienced (i.e., no experience with the technology) and 5 being very experienced (the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

Low-participating trade partners:

- 3 (n=2)
- Love mini-splits but less experiences with split systems
- 2
- Knows the general gist and how to do it
- Not very much experience with traditional heat pumps

Nonparticipating trade partners: 5

[IF EXPERIENCED]

H1a. What types of heat pumps does your company have experience installing? [**PROBE:** Air source heat pumps, Ground source heat pumps, Minisplit heat pumps, Cold climate heat pumps]

Low-participating trade partners: Mini-split and air source heat pumps

Nonparticipating trade partners: Mini-split, air source heat pumps, and cold-climate heat pumps

IF MULTIPLE: Does your company specialize in a certain type of heat pump?

LOW-PARTICIPATING TRADE PARTNERS: Whatever suits the customer

IF COLD CLIMATE: What do you use to define as a cold climate heat pump?

Nonparticipating trade partners: Heat pumps rated down to single digit weather.

H3. What do you see as the primary benefits of heat pump technology in Colorado?

Low-participating trade partners:

- High-efficiency (n=2)
- Good for shoulder seasons

Nonparticipating trade partners:

- High-efficiency
- Great for homes with solar

H4. What do you see as the primary drawbacks of heat pump technology in Colorado?

Low-participating trade partners:

- Reliability (n=2)
- Grid overload potential

Nonparticipating trade partners:

- Difficulty in servicing and repairing them
- Energy costs

H5. In what situations would you recommend a customer install a heat pump?

Nonparticipating trade partners: Only recommend when they have solar.

H5a. What do you tell customers about the perceived benefits of heat pumps?

Low-participating trade partners:

- High-efficiency (n=2)
- Great for homes with solar (n=2)
- Single source for heating and cooling

Nonparticipating trade partners:

- Great for homes with solar (n=2)

H6. Are there situations where would you recommend against installing a heat pump? (Probe for details.)

Low-participating trade partners: No.

Nonparticipating trade partners:

- They would recommend against it if the lifecycle cost doesn't have any payback or if the heat pump is the sole source of heat.
- Only tell them it is not a good idea if he cannot get one.
- Gas heating

H7. If the same equipment discounts were offered instantly through a distributor, rather than the rebate application process, how many more *mini-split* heat pumps would your company recommend to customers annually? What percentage of these savings would you pass on to customers?

Low-participating trade partners:

- Instant rebate would make a positive difference (n=4)
- Sales would increase 50% (n=2)
- Sales would increase 2-3%
- No change in sales

Nonparticipating trade partners:

- Change in sales is hard to estimate
- Instant rebate would make a positive difference
- Sales would increase 80%
- Sales would increase 20%
- No change in sales

H8. What percentage of your customers do you think will buy heat pumps instead of air conditioners five years from now?

Low-participating trade partners:

- If technology keeps improving, 75%.
- 50%

Nonparticipating trade partners:

- If electric prices go up, then wouldn't expect a jump in heat pump sales.
- 5-10%

H8a. Do you expect a rapid growth in the next 1-3 years or will it take more time?

H9. What needs to change, if anything, to make heat pumps more viable to residential customers? [IF NEEDED examples could include equipment costs, electricity costs, more viable cold climate technology, policies, carbon-free electricity]

Low-participating trade partners:

- Education in the market
- Equipment cost
- Electric rates

Nonparticipating trade partners:

- Education in the market (n=2)
- Equipment access and availability (n=2)
- Equipment cost

Section I: Closing

I1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences installing high efficiency air conditioners and heat pumps?

I2. Those are all the questions I have today. [THANK AND TERMINATE]

C.6 Peer Utility Benchmarking Interview Results

Introduction

TRC conducted secondary research and in-depth interviews with key staff of residential energy-efficient HVAC rebate programs at peer utilities. The objective of the benchmarking was to identify opportunities to improve the Colorado Residential Heating and Cooling Product based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the product in

context with the performance of other utilities. The evaluation team's findings were informed by interviews with key informants (e.g., program managers) at six utilities (shown in this appendix as Utilities A-F). These utilities were selected because they have comparable territories and/or programs to the Xcel Energy Residential Air Conditioning and Heat Pump product. This enables the evaluation team to provide an "apples-to-apples" comparison and to evaluate the set of circumstances (such as regulation and demographics) that impact program plans at peer utilities.

Interviews focused on topics similar to those researched in participating and nonparticipating customer surveys and the trade ally interviews, while also emphasizing the research objectives specific to peer benchmarking interviews identified below. Evaluation objectives addressed by the peer benchmarking research are:

- Collect feedback on **peer utility experiences** with their residential air conditioning and heat pump rebate program processes. This will include a variety of topics including:
  - Level of rebates offered for residential air conditioning and heat pump measures.
  - Awareness of the ACCA QI process and interpretation of QI.
- **Explore ways to grow the heat pump market**. In doing so, we will explore the following topics:
  - Explore potential for midstream mini-split rebates for peer utilities.
  - Explore what heat pump market transformation looks like from the peer utilities' perspective.
  - Research interest in heat pumps among participating customers in other DSM programs.
  - Understand how peer utilities are defining and supporting cold climate heat pumps.
  - Understand if peer utilities have a rebate for Quality Installation and/or prioritize Quality Installation.

The remainder of this appendix provides a summary of key takeaways, background information relating to the structure of the residential cooling programs included in this analysis, and findings related to the objectives listed in the above bullets. The final section provides a summary of incentive levels from each peer utility.

Key Takeaways

Residential HVAC rebate programs are a way for customers to reduce their utility bills via energy efficient cooling products, such as central air conditioners or heat pumps. Key takeaways and details include:

- Four of the six peer utilities interviewed offer rebates for both air conditioning and heat pump measures. However, Utility C is planning to phase out their residential air conditioning rebates as they have found central air conditioners to be no longer cost-effective in their service territory. Utilities B and F do not offer rebate for central air conditioners.
- Only one peer utility interviewed, Utility A, requires Quality Installation following the ACCA 9 Standard. Utilities B, E, and F both require Quality Installation but do not use the ACCA 9 Standard as their Quality Installation benchmark[9]. Utility B outlines their

[9] Actual standard for measurement and verification (M&V) Quality Installation.

specific Quality Installation specification in their statewide program manual that includes specific installation training and licensing for contractors who participate in the program. Utility B also conducts a robust post-installation inspection for a specific number of jobs per contractor. Utility E requires that installation practices from their Technical Specification Manual (TSM) are followed, and on-site inspections are conducted. Similarly, Utility F requires that 5% of contractors' jobs are quality-controlled and that contractors send in pictures of the installations they complete. Utility F follows Title 24 standards, per their state's Energy Commission, and has a contractor handbook that outlines this standard, along with other Quality Installation specifications for contractors.

- No peer utility interviewed currently offers midstream rebates for mini-split heat pumps. Utilities A, B, C, and E have considered adding them to midstream, however, the implementer for Utility A finds that adding mini-split heat pumps to midstream is not cost-effective, but potentially could be in the future. Utility E noted that moving measures to midstream is something that they should eventually move forward with as the market evolves. Similarly, the program manager at Utility B recommends that they want to wait to offer a midstream rebate for mini-split heat pumps until customers are more aware of heat pumps in the market.
- Two of the six peer utilities interviewed offer cold climate heat pumps. Utility B offers incentives for cold climate heat pumps, $500 for cold-climate air source heat pumps for partial load heating and $2,000 for cold-climate air source heat pumps for full load heating. Utility B relies on the qualified product list (QPL) for cold-climate heat pumps defined by the Northeast Energy Efficiency Partnerships (NEEP). Utility B is going to require additional training for cold climate design and sizing for air source heat pump contractors starting January 1, 2022. Utility C considers their rebated fuel efficiency heat pump a cold-climate heat pump and offers a rebate of $1,250 per ton. These heat pump efficiency requirements are specific to the statewide program and are outlined in the program's Qualified Products List, not NEEP's, and are based on recommendations by the program engineers.
- Two peer utilities, Utilities B and F, track and claim savings for fuel-switching. Utility B heat pump projects in gas-constrained areas may allow for additional incentives to promote electrification, according to their 2020 Annual Report. Among the peer utilities interviewed, Utility C is the only peer utility that functions in a regulatory environment that does not allow for fuel-switching.
- Heat pump market transformation was not a focus of peer utilities interviewed in their residential HVAC rebate programs.

Background Information

This section provides background information on the structure of the peer utilities' residential HVAC rebate programs. Peer utilities interviewed were from across the nation and included both rural and urban territories. Five utilities span many areas of the state they serve, while one is confined to targeted area of a state. Four of the peer utilities interviewed have a version of Quality Installation (QI) as part of their residential HVAC rebate program, with Utility A being the only peer to adopt the ACCA 9 Standard Quality Installation practices. The programs are generally staffed by a handful of people, with a large range of trade partners. Table 20 outlines background information for each peer utility interviewed and their respective residential HVAC rebate programs.

Table 20. Background Information by Utility

Utility	Energy Type	Location	Fuel Switching
Xcel Energy	Electric & Gas	West	x
Utility A	Electric	Southwest	
Utility B	Electric & Gas	Northeast	x
Utility C	Electric & Gas	Northeast	
Utility D	Electric & Gas	Southwest	
Utility E	Electric	West	
Utility F	Electric	West	x

Error! Reference source not found. outlines the equipment offerings of the residential HVAC rebate programs at each of the peer utilities interviewed. All peer utilities interviewed offer heat pump rebates while two peer utilities do not offer any rebates for central air conditioners.

Table 21. Program Equipment Offerings by Utility

Utility	Heat Pumps	Cold-Climate Heat Pumps	AC SEER 13-14	AC SEER 15+	QI*
Xcel Energy	x	Not specified	x	x	Required: ACCA 5 Standard
Utility A	x	Not specified	Not offered	Not offered	Required: ACCA 5 Standard
Utility B	x	X	Not offered	Not offered	Specification in statewide program manual
Utility C	x	x	Not offered	x (SEER 16+)	Not required
Utility D	x	Not specified	Not specified	Not specified	Not required
Utility E	x	Not specified	Not offered	Not offered	Required: Technical Specification Manual on program website
Utility F	x	Not specified	Not offered	Not offered	Specification in statewide program manual

*Peer utility programs who require Quality Installation do not necessarily have the same definition of Quality Installation as Xcel Energy (ACCA 5 Standard).

Recent changes for all the programs tend to be tied to program offerings and program operating costs.

- Utility A experienced portfolio budget cuts a couple of years ago and therefore, raised their program's minimum SEER requirement from 14 to 15 to better control program participation. In 2017, SEER 15+ air conditioner rebates were reduced from $250 to $200 per system.
- Utility E added dual-fuel heat pumps to their residential HVAC rebate program offerings in 2020.
- Utility F no longer offers rebates for gas equipment due to the COVID-19 pandemic and the associated revenue losses. The utility is now focusing on electrification efforts through the residential HVAC rebate program.

Multiple utilities continuously look to improve their program delivery, and some have changes planned for the future:

- As of July 1, 2021, Utility B no longer offers midstream incentives and now only offers incentives directly to either the contractor or the customer.

- Utility C is looking to address the barrier of upfront installation costs for air conditioners and heat pumps in their downstream offering. Potential solutions being explored include direct payments to trade partners, distributors, or manufacturers. The shift from fossil fuel systems, and their associated central air conditioners, is also being taken into consideration by Utility C when updating their program offerings.
- Utility D began to accept Department of Energy (DOE) certification for air conditioning unit efficiency, instead of only AHRI certification, on July 1, 2021.
- Utility E is open to the idea of moving their HVAC measures to their midstream offering, however is not sure when this would occur.
- Utility F explained they were looking at ways to bring back a tiered rebate system while always considering what rebate structure works best for their customers.

Program Rebate Structures

Error! Reference source not found. and Table 23 below outline the specific measure rebates offered by each peer utility interviewed through their residential HVAC rebate program.

- Utility A focuses their program on air conditioner rebates however, rebates are offered for heat pumps, except mini-split heat pumps. A $200 rebate is available for air conditioners that are at least SEER 15, with a limit of up to five systems per home. The heat pumps eligible for this rebate were not specified.
- Utility B only offers rebates for heat pumps. They also offer incentives for cold climate heat pumps, $500 for cold-climate air source heat pumps for partial load heating and $2,000 for cold-climate air source heat pumps for full load heating.
- Utility C focuses on heat pump rebates in their downstream program. Heat pumps that qualify for rebates include central heat pumps, ductless mini-splits, geothermal heat pumps, and air source heat pumps. Rebates are sent directly to the customer, with the option to send the check to the trade partner, however many trade partners do not take advantage of this opportunity. Utility C also offers fuel optimization rebates for oil, propane, and electric resistance heating.
- Utility D offers both air conditioner and heat pump rebates based on HERS ratings.
- Utility E offers rebates for central air conditioners (distributor-only), ground source heat pumps, air source heat pumps, and ductless mini-splits.
- Utility F offers rebates only for multi-stage electric heat pump systems. A $3,000 rebate is available for those who convert to a heat pump from a gas system.

Trade Partner Engagement

All of the peer utilities interviewed work with trade partners to complete the installation and application for the installation of the measures offered through their residential HVAC rebate programs.

- Utility A has over 100 in-network trade partners. The territory they serve has a highly competitive trade partner market, therefore Utility A does not feel they need to offer high rebates to encourage trade partner participation in its residential HVAC rebate program.
- Utility C had roughly 1,200 trade partners participate through the program in the last twelve months. Utility C mentioned how challenging the upfront cost of stocking energy efficiency heat pumps is for trade partners.

- Utility D has 36 participating trade partners in their program.
- Utility E has over 50 trade partners active in their residential HVAC rebate program[10].
- Utility F has between 60-75 in-network contractors. Several contractors were dropped from the network once a new electrification requirement for network participation was introduced. Utility F requires contractors to complete at least three electrification projects every 90 days to stay in-network.

Several utilities promote trade partner engagement with their program through trainings, routine communications, and data management systems.

- Utility A uses a cloud-based software portal to interact with participating trade partners. Utility A also offers trade partners subsidized memberships and trainings with a local heat pump council. The focus of these trainings is to keep trade partners on their qualified list, keep them up to date on their NATE certifications, provide refrigeration classes, and other fundamentals for HVAC installations. They will also work with another utility in the area to hold sales trainings, and they allow the top-five trade partners with highest Quality of work to use the utility logo in their marketing materials. Once a year, Utility A meets with trade partners to update them on program rules and has an HVAC expert on the implementation team that also works to train trade partners in the program.
- Utility B offers updates and checks-in when possible either through themselves or their implementation partner. They have also set up a reoccurring open forum for trade partners and industry partners to gather and make improvement suggestions for their residential HVAC program. Utility B focuses on receiving as much external feedback as possible because the residential HVAC program is imperative to sustaining positive relationships with their stakeholders.
- Utility C has a channel team that focuses on trade partner engagement and that interacts directly with contractors. Utility C organizes counter days at distributor locations, lets trade partners know that the channel team is available to answer questions via phone and email, sends newsletters with program updates, and offers online trainings, including heat pump installation training, for trade partners.
- Utility D does not list trade partners who are not active in their program on their program's trade partner list to encourage trade partners to be more active in the program.
- Utility E offers a trade partner portal and a sales pocket guide that tracks the incentives offered by their residential HVAC program. They also provide technical information sheets to contractors with new measure offerings.
- Utility F offers a robust learning management system (LMS) that includes tools and marketing trainings focused on selling heat pumps. These are great opportunities for new contractor hires to become more familiar with heat pump technology and installation. However, it is challenging to get contractors to attend the free training they offer. They also release monthly newsletters and give quarterly presentations to their trade partners. Participating contractors have the opportunity use the logo of Utility F in their marketing material and they also can call Utility F when they need additional support.

[10] From the 2019 Utility E Annual Report, 2020 numbers were not available.

Marketing and Outreach Methods

The peer utilities interviewed market their programs through a variety of channels including in-house, trade partners, and distributors.

Utility C identified that the lack of customer awareness surrounding the heat pump market is a major hurdle in growing their residential heat pump rebate program. They are focusing on collaborating with other stakeholders to align program priorities and improve marketing messaging.

Utilities A, B, D, E, and F perform in-house marketing. In-house marketing techniques include TV commercials, radio ads, emails, and social media campaigns.

- Most effective in-house marketing techniques described by the peer utilities interviewed include:
  - Utility A conducts basic in-house marketing and had a total marketing budget of $72,000 in 2020.
  - Utility D utilizes their salespeople to educate customers about all their programs. For example, if working with a business customer, residential HVAC rebates will also be mentioned to build program awareness. Overall, Utility D found that emails have very low conversion rates due to customers' wariness towards email scams.
  - Utility E surveys have shown that bill inserts work best for informing customers about residential HVAC measure rebates.
  - Utility F relies heavily on the aggressive residential HVAC measure rebates they offer and the positive relationships the utility has with its customers.

Utility B developed their marketing strategy based on customers' fuel source. It was also noted that electric rates in their territory are relatively high, compared to the rest of the country, and so they take a lot of care crafting their message about heat pumps to customers. Utility C is focusing on market segmentation too, particularly exploring how marketing messages differ for customers building new homes versus those who are updating old HVAC equipment. Utility C is also aiming to "meet customers where they are" with simplified heat pump-related terminology in marketing materials to grow program participation. Meanwhile, Utility F performs customer segmentation in-house, targeting customers who are believed to specifically have the resources to take on electrification in their home as an investment, along with targeting customers who live in older homes and who would be eligible for retrofit projects.

Some utilities rely on their implementer to conduct targeted marketing campaigns. Utility D noted how custom segmentation depends on both program design and the program implementer. Utility E mentioned the program implementer uses a tool to help with customer segmentation. Using metrics like past participation, income, and territory, customers who are more likely to participate in the program are targeted for marketing.

Four of the six peer utilities interviewed, Utilities A, B, C, and E, stressed the important role trade partners play in driving customer participation in their residential HVAC rebate programs. Utility E explained on trade partners are on-the-ground speaking to customers daily about their needs and if a trade partner is not part of their trade partner network, Utility E will reach out to them to get their customer their program's equipment rebate.

Utilities vary in their levels of engagement with distributors through their residential HVAC rebate programs.

- Utility A does not engage with distributors.
- Utility B offers a $75 incentive to distributors for stocking heat pumps. As of July 1, 2021, Utility B no longer offers midstream, distributor-focused air source heat pump incentives.
- Utility C uses their engagement with distributors as a direct channel to also engage with trade partners because trade partners spend a lot of time at distributor locations.
- Utility D relies on distributors to do most of their outreach and offers $10 to distributors for each energy efficient measure they stock. It was noted how material costs have gone up 30-40% and high-efficiency units have gone up 200%.
- Utility E has a separate team that reaches out to distributors to discuss product availability. They offer stocking rebates for three tiers of upstream central air conditioners, midstream room air conditioners and evaporative coolers, and downstream heat pumps.
- Utility F has limited engagement with their distributors but would like to increase engagement to ensure that energy efficient technology, like heat pumps, gets stocked at the distributor level.

Quality Installation

Four of the six peer utilities interviewed have a Quality Installation specification for trade partners to follow who participate in their residential HVAC rebate program.

- Like Xcel Energy, Utility A requires ACCA 9 standards Quality Installation and requires qualified trade partners to have specific training and levels of expertise. Program savings are based solely on Quality Installation however, Utility A does not offer QI incentives for trade partners.
- Utility B has a statewide QA/QC process for the purpose of ensuring Quality Installation that adhere to the manufacturers' installation requirements and applicable laws, regulations, and codes that is explained in the statewide program manual. Also, a specific number of jobs per trade partner are inspected for installation requirements each year.
- Quality Installation will be a focus for Utility C over the next three years as improper installation is a major issue in the current residential HVAC rebate program. For now, Utility C requires trade partners to install heat pumps per the manufacturers' specifications but there are no additional installation requirements beyond that.
- Utility D no longer requires Quality Installation as they found only 3% of their claimed savings came from Quality Installation. However, Utility D is working with trade partner groups to continue to improve the quality and workmanship of trade partners in their program.
- Utility E bases their installation practices on their state's Technical Specifications Manual (TSM). Where federal, national, regional, state, or local code exceed that in the TSM, the code is applied. Utility E used to offer rebates for Quality Installation but no longer does.
- Utility F has a contractor handbook that outlines the Quality Installation requirements for their program's trade partners along with their state's Energy Commission's Title 24

Quality Installation standard. A minimum of 5% of a trade partner's projects received Quality-control checks, with contractors sending in pictures of the work they've completed.

Measures

Four of the peer utilities, Utilities A, C, E, and D, interviewed offer both heat pump and air conditioning rebates through their residential HVAC rebate programs, while Utilities B and F only offer heat pump rebates. The equipment rebates offered by the peer utilities interviewed are outlined in **Error! Reference source not found.** and Table 23.

Utility A is the only peer utility interviewed that requires Quality Installation of air conditioners with the same specifications as Xcel Energy. Utilities A and C are the only peer utilities that have air conditioning rebate amounts on their residential program websites. **Error! Reference source not found.Error! Reference source not found.** outlines peer utility air conditioning measure rebates and the programs' Quality Installation requirements. Four of the six peer utilities interviewed have Quality Installation requirements for trade partners participating in their residential HVAC rebate programs. Utility E is the only peer utility interviewed that offers different rebates depending on the central air conditioners SEER level, however, these rebates are only available to distributors.

Table 22. Central Air Conditioner Measure Rebates by Utility

Central Air Conditioning	Xcel Energy	A	B	C	D[A]	E[B]	F
15+ SEER	$500	$200	Not offered	$50 per ton (min SEER 16)	Not specified	$125 per unit $200 per unit (min SEER 17) $315 per unit (min SEER 20)	Not offered
Quality Installation	$300	Required, no separate rebate	Required, no separate rebate	Not required	Not required	Required, no separate rebate	Required, no separate rebate

[A] *Utility D does not have their air conditioner rebate amounts publicly available.*

[B] *Utility E air conditioner rebates are only for distributors.*

Table 23 outlines the heat pump measure rebates offered by each peer utility. Utility E appears to have the largest variety of heat pump rebates available to their residential customers, while Utility C is the only peer utility that determines the heat pump rebate amount using the equipment tonnage.

Table 23. Heat Pump Measure Rebates by Utility

Heat Pumps	Xcel Energy	A	B	C	E	F
Mini-split heat pump	$500					
Central air source heat pump	$800		Up to $5,000			
Cold-Climate: Partial Load Heating	$1,000		$500			
Cold-Climate: Full Load Heating			$2,000	$250 per ton		
Single-head ductless heat pump (9.5 HSPF, 16 SEER)		$200[A]	$250[B]		$1,300	
Multi-head ductless heat pump (9.5 HSPF, 16 SEER)		$200[A]	$250[B]		$1,700	
Supplemental ductless heat pump	$600[C]	$200[A]	$250[B]		$600	
Dual fuel heat pump conversion (electric heat)					$2,600	
Dual fuel heat pump conversion (gas heat) **Climate zone 3**					$1,000	
Dual fuel heat pump conversion (gas heat) **Climate zones 5 & 6**					$2,000	
Ground source heat pump	$1,500-$2,000 per ton		$2,850		$2,500	
Geothermal heat pump			$5,000 per 10,000 Btu/h			
Multi-stage electric heat pump upgrade – gas to electric (16+ SEER, 8.2 + HSPF)						$3,000

Heat Pumps	Xcel Energy	A	B	C	E	F
Multi-stage electric heat pump upgrade – electric to electric (16+ SEER, 8.2 + HSPF)						$750

Note: Utility D does offer heat pump measure rebates but does not rebate information available on their program site

[A] Utility A offers the same rebate for heat pumps but did not specify the type of heat pumps in the interview.

[B] Utility B did not differentiate between types of mini-split heat pumps when describing rebate offerings.

[C] Xcel Energy offers rebates for cold-climate mini-split heat pumps SEER 18+ only.

Performance Metrics

When it comes to program savings and goals, Utility F is the only peer utility that focuses on avoided carbon emissions, while the other peer utilities focus on program energy savings. Utility A is the only peer utility interviewed that claims program savings based solely on the Quality Installation of the equipment. Utility B is the only peer utility interviewed who reported savings in MMBtus in their 2020 Annual Report. Peer utility 2020 program savings goals, actual 2020 savings, and budgets are reported in Table 24.

Table 24. 2020 Program Savings and Budgets by Utility

Utility	Savings Goals (MWh)	Program Savings (MWh)	Gross Savings	Budget
Xcel Energy	2,566.12	3,651.6		$3,133,689
Utility A		6,825	6,245.2 MWh	$5,399,000
Utility B		282,000 MMBtu[A]		$15,205,165
Utility D	6,666.67	4,999.8		$4,000,000
Utility E		11,126.9		$14,827,395[B]
Utility F		Res. HVAC – Cooling: 453 Res. HVAC – Heating: 4,310.3	Res. HVAC – Cooling: 567 Res. HVAC – Heating: 7,183.9	

Note: Program savings and budget information was not available for Utility C.

[A] Total savings of statewide residential heat pump rebate program. Savings only reported in MMBtu.

[B] Total reported 2020 expenditure for the residential program.

Most peer utilities interviewed did not report their participation goals for the 2020 program year. However, it appears that despite the COVID-19 pandemic, peer utilities all had respectable participation in their residential HVAC rebate programs, reported in Table 25.

Table 25. Participation Goals and Actual by Utility

Utility	Participation Goals (Units)	Actual Participation (Units)
Xcel Energy	The product exceeded expectations related to participation and energy savings by approximately 20 percent	7,247
Utility A		5,681
Utility B		~103,000[A]
Utility C		
Utility D	4,100	3,522
Utility E		21,080[B]
Utility F		

[A] *Estimate for statewide program that includes the residential heat pump rebate program at Utility B.*

[B] *Total HVAC units rebated in the residential program that include heat pumps and air conditioners.*

Table 26. Peer Utility Net-To-Gross Ratios & Program Offerings

	Xcel Energy	Utility A	Utility D	Utility E	Utility G	Utility H	Utility I	Utility J
Program Overall	0.71	1.00	0.82	0.98	Central ACs 0.81 ASHP 0.98 DMSHP 0.61	0.76	0.92	0.64
Year	PY 2021 Evaluation	Stipulated	2021	PY 2020	PY 2020	2020-2029 Program Plan	PY 2020	PY 2020
Measures Included	Heat pumps; SEER 13/14; SEER 15+	Heat pumps; SEER 15+	Cooling measures (not specified)	All Res HVAC measures (no air conditioners)	Heat pumps; ACs SEER 15+	Heat pumps; ACs SEER 15+	Heat pumps; ACs SEER 15+	Heat pumps; ACs SEER 16+
QI	Required	Required	Not Required	Required	Not Required	Not Required	Required	Not Required

Note: Peer utilities G, H, I, and J were not interviewed for this evaluation but were included in Table 26 as additional references.

Three of the peer utilities interviewed report their residential HVAC rebate program's cost effectiveness in their Annual Reports. However, different tests were used to calculate program cost effectiveness across the peer utilities as seen in Table 27.

Table 27. Cost Effectiveness Test per Peer Program

Test	Xcel Energy	A	E[B]	F
SCT		1.19		
UTC			1.79	
TRC	3.61[A]		1.22	HVAC Cooling – 0.21 HVAC Heating – 0.08

Note: Utilities B, C, and D did not publicly report their residential heat pump rebate programs' cost effectiveness

[A] Modified TRC ratio for electric offerings in the Residential Program.

[B] Cost effectiveness of residential program that does not only include air conditioners and heat pumps.

High Efficiency Air Conditioning Evaluation

2021 Program Evaluation: Recommendations and Responses

The Residential Heating & Cooling product provides incentives to the Company's customers who purchase a variety of qualifying heating and cooling equipment for residential use, including air conditioners, evaporative coolers, heat pumps, natural gas furnaces, natural gas boilers, natural gas water heaters, electric heat pump water heaters, smart thermostats, and the Western Cooling Control device. This evaluation focused on air conditioners and heat pumps. A Net-to-Gross Ratio ("NTGR") analysis was only conducted for air conditioners and mini-split heat pumps, due to the small number of participants in other heat pump measures.

Xcel Energy (The Company) engaged a team of researchers led by TRC companies to conduct a process and impact evaluation of the air conditioner and heat pump measures in the Residential Heating & Cooling product. The evaluation conducted research to address the following research objectives:

- Estimate product influence on customers decisions (NTGR).
- Collect feedback on trade partner and participating customer experiences with the rebate and QI processes to understand motivations for participation, perceptions of the most successful or valuable aspects of the product, and perceptions of the most challenging aspects of the product.
- Identify barriers to participation in the product, particularly by investigating why trade partners and participating and nonparticipating customers may install equipment outside of the product.
- Explore ways to grow the heat pump market. In doing so, TRC explored a variety of related topics, including how trade partners talk to their customers about the perceived benefits of heat pumps, whether trade partners specialized in the types of heat pumps they install, and the potential for midstream mini-split rebates.

Based on the results of this research, the evaluation team developed key findings and recommendations for Xcel Energy.

Recommendation	Response
1) The evaluation team recommends using a prospective NTGR of 0.73 for air conditioning equipment (both SEER 13-14 and SEER 15+).	The Company agrees to apply the recommended NTGR values for air conditioners.
2) The evaluation team recommends using a prospective NTGR of 0.57 NTGR for mini-split heat pumps.	The Company agrees to apply the recommended NTGR for mini-split heat pumps. The Company will continue to monitor changes in the program and determine when it is appropriate to conduct additional NTGR research.
3) Assess incremental cost data to determine feasibility of adjusting the rebate structure for air conditioners and heat pumps.	The Company agrees with this recommendation. The Company will review available data and propose new rebate levels for air conditioners and heat pumps in the 2023 Extension Plan.
4) Conduct NTGR research when rebate levels change to better understand its impact on customers decision-making and to better understand what rebate adjustments are needed	The Company will continue to monitor changes in the program and will determine when to conduct additional NTGR research.

to increase product participation and claimed product savings.	
5) Conduct NTGR research on heat pump measures if and when the heat pump participant population expands.	The Company will continue to monitor changes in the program and will conduct additional NTGR research when annual participation in heat pump measures is sufficiently large to support quantitative evaluation methods consistent with EM&V best practices.
6) Support trade partner efforts to market heat pump measures to customers who have installed solar at their homes.	The Company will support trade partners that currently market heat pumps to customers with distributed solar while working to improve the customer economics for a larger customer population.
7) Align heat pump offering with utility-wide discussions around carbon-free goals to make the operating cost of electric heating more feasible to customers.	The Company expects to pursue this recommendation in upcoming filings; implementation depends on the outcome of those proceedings.
8) Consider rate changes for customers using electric heat and/or applying a bill credit to customers who install a heat pump to encourage additional heat pump adoption	The Company acknowledges that rates are a potential barrier for heat pump adoption but notes this is a complex topic. The Company will continue to review the feasibility of this recommendation.
9) Continue supporting efficient air conditioner installation rebates until product objectives change and/or barriers of heat pumps are addressed, including customer operating costs and trade partner ability to communicate the benefits of heat pumps to their customers.	The Company agrees with this recommendation.
10) Continue providing heat pump education to trade partners.	The Company agrees with this recommendation.
11) Clearly differentiate in the application which measures require QI, and which do not, for various HVAC measures and send periodic messages to trade partners about application updates and FAQs.	The Company agrees with this recommendation.
12) Allow for alternate methods to assess refrigerant charge during the QI process as these technologies continue to evolve. Reach out to trade partners after this change is implemented to better understand trade partner experiences with new methods.	The Company agrees with this recommendation.

13) Once Xcel Energy confirms that an alternative method is successful, from an energy savings perspective and trade partner usability perspective, reach out to nonparticipating trade partners to inform them of this change to support their re-engagement in the product.	The Company agrees with this recommendation.
14) Engage trade partners who are not interested in following QI procedures to encourage them to sell mini-split heat pumps, since they do not require QI.	The Company agrees with this recommendation.
15) Drop the NATE certification for air conditioners and air source heat pumps.	The Company agrees with this recommendation. This is included in a previously filed 60-day notice.
16) Hold off developing a midstream mini-split heat pump offering.	The Company agrees with this recommendation.