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Xcel Energy

Colorado Energy Management Systems (EMS) Product Impact & Process Evaluation

Prepared for:

Xcel Energy
Nick Minderman
414 Nicollet Mall
Minneapolis, MN 55401
Nicholas.Minderman@xcelenergy.com

Prepared by:

TRC
Jeremy Kraft & Team
807 E. Roy St., Suite 301
Seattle, WA 98102
jkraft@trccompanies.com

Acknowledgments

This report was prepared on behalf of Xcel Energy by the following members of the TRC Team:

Account Management:

Jeremy Kraft

Portfolio Oversight/Strategy:

Nicole Thomas

Hannah Justus

Evaluation Manager:

Emily Morton

Analysts:

Evan Gutierrez

Alfredo Jahn

Table of Contents

Appendices

Figures

Tables

EXECUTIVE SUMMARY

2022 Colorado C&I Energy Management Systems Product

Introduction

The Colorado Energy Management Systems Product (EMS) provides custom calculated rebates for a variety of new and upgraded EMS measures for commercial and industrial (C&I) customers. The product was designed to support C&I customers looking to install new energy management systems or upgrade existing systems but who would not do so on their own; ultimately the product helps these customers save on operational costs and energy usage.

As part of the process evaluation, TRC collected feedback on trade partner and customer experiences with the EMS product's processes, looked for opportunities to improve customer and trade partner understanding of the interaction between the EMS product and peak coincident demand management (PCDM), explored ways to grow the market for the EMS product, and assessed peer utility program practices. For the impact evaluation, TRC assessed the impact of the product on customer decision making. This summary includes the key findings and recommendations from our evaluation.

Methods

Participating customer interviews (n=3)

Near-participating customer interviews (n=6)

Participating trade partner interviews (n=5)

Nonparticipating trade partner interviews (n=4)

Peer utility interviews (n=4)

Fielding:
July – October 2022

Summary of Findings

The evaluation team estimated a retrospective **NTGR of 0.75** based on participating customer and trade partner responses. The team recommends Xcel Energy could apply a prospective **NTGR of 0.84** if product design updates are implemented. When participation increases, the product should conduct research to confirm validity.

Customers expressed satisfaction with the product, reporting **highest satisfaction with the performance of their EMS technology**.

EMS is familiar technology, but trade partners are unclear of the **path to implementing PCDM**. Nonparticipating trade partners are not well-informed around PCDM and are not successfully communicating it to their customers. Participating trade partners are not frequently incorporating PCDM into the projects they submit to EMS.

Customers and trade partners whose applications were rejected often did not understand the reasons for their rejections, but some would have been interested in adjusting if they had more information earlier.

High incremental costs associated with non-energy EMS components can contribute to projects failing cost effectiveness requirements. A peer utility adjusted proposed project costs down by 50% to account for incremental costs not related to energy savings.

Customers and trade partners are interested in a more predictable or straightforward rebate. Participants also expressed some desire for the rebate to be larger and thus more influential.

Product Influence

Retrospective Net-to-Gross Ratio: = (1 - **Free Ridership**) + (**Spillover Ratio**) + (**Market Effects**)

0.75 = (1- **0.25**) + (**0.00**) + (**0.00**)

Participating & Non-Participating Trade Partners **design projects with the product** in mind.

The evaluation team **found no evidence** of participating or near-participating spillover.

The evaluation team found **no evidence** of market effects.

EXECUTIVE SUMMARY

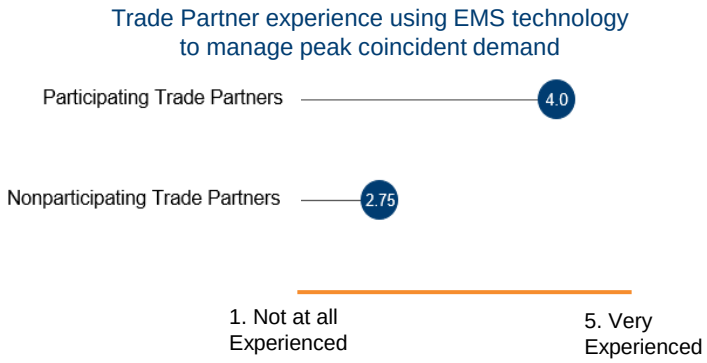
2022 Colorado C&I Energy Management Systems Product

Interaction between EMS and Peak Coincident Demand Management (PCDM)

Awareness of EMS Technology & PCDM

Both participating and nonparticipating customers considered themselves **somewhat familiar with PCDM, but none reported implementing it in their EMS projects.**

Participating trade partners are **more aware of PCDM than** nonparticipating trade partners and report feeling **more experienced selling and installing EMS technologies to implement PCDM.**



Support Needed to Increase Participation through PCDM Strategies

Participating and nonparticipating customers were interested and open to PCDM but needed **support identifying opportunities to manage peak load without impacting their primary business functions** (n=4).

Both participating and nonparticipating trade partners felt they would be more likely to suggest PCDM strategies to their customers if there were more **financial support** to make the incorporation of PCDM more appealing to customers.

Trade partners were interested in receiving more training on the connection between incorporating PCDM strategies into their projects and developing projects that successfully meet the cost effectiveness requirements of the EMS product.

Peer Experience with PCDM Strategies

None of the interviewed peers said that they currently incorporate or require PCDM strategies in their EMS programs. But most (n=3) said they were interested in or actively working to adapt their program design to incorporate PCDM.

Three peers provided ideas for strategies to increase PCDM through EMS program design that peers may incorporate in the future:

- **Workforce Development**: Paying for trainings in PCDM to create a pool of specialized trade partners.
- **Automated Demand Response:** Identifying equipment that can be curtailed during peak periods and easily triggered for curtailment.
- **Real-Time Energy Markets:** Offering a way for businesses to generate revenue by changing their consumption.

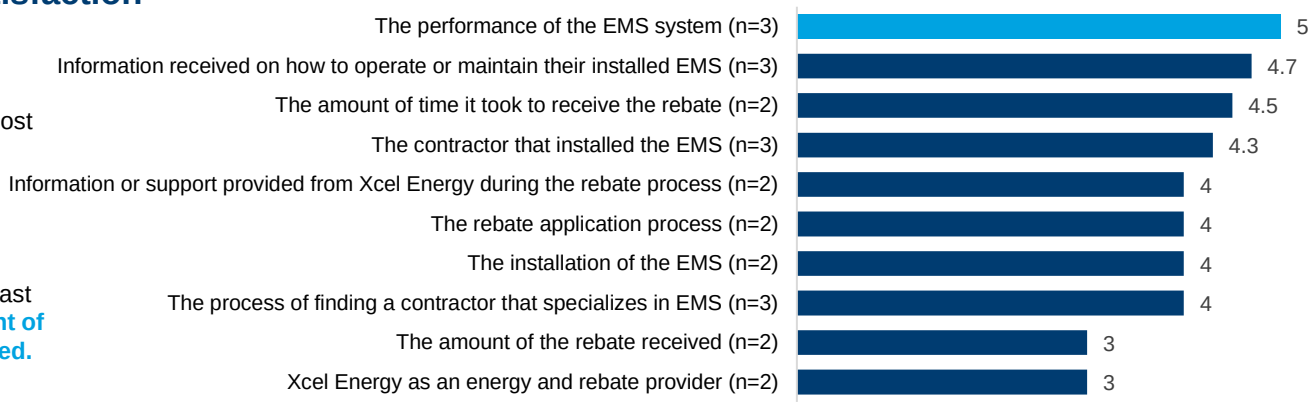
EXECUTIVE SUMMARY

2022 Colorado C&I Energy Management Systems Product

Product Satisfaction

Participating customers were most **satisfied** with the performance of the EMS System.

Participating customers were least satisfied the **amount of rebate they received.**



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."

When asked what **participating customers** liked most about the product, they said the **updated equipment, having better control over the building** and getting **assistance with project costs.**

Trade partners rated their overall product satisfaction moderately high, rating it a **3.8 out of 5** on average

Trade Partners were **very satisfied with the product staff**, rating them a 5 out of 5. They were least satisfied with the **time it took to complete the application**, rating it a 3.2 out of 5.

Product Experience

Nonparticipating trade partners and near-participating customers reported that the **application process was more of a challenge than participating customer and trade partners.** Both groups were unclear on **why their projects were rejected** and what equipment would have made them more likely to successful. Nonparticipating trade partners also felt the **application was too long.**

"It was just very cumbersome to be able to go through. And then … it just seemed like when they put it through their analysis, we [got] very little feedback as far as why we didn't get the rebates."

Participating trade partners reported **discussing plans for meeting the product's cost-effectiveness requirements and elements that would improve the likelihood that the product is eligible for a rebate with their customers**. While they did not employ PCDM strategies to meet these requirements, they did report using strategies like **commissioning and assessing sequence adjustments and targeting larger buildings.**

Growing the EMS Market

Nonparticipating trade partners felt that the product could increase participation by providing more information on **how to create a cost-effective project**; giving trade partners upfront information on what elements were likely to make the project successful. They were also interested in receiving quicker feedback on **why their projects were rejected**.

"It would be awesome if they told us, hey, if you do XYZ, if you include this type of sequence…If our [acceptance] rate was higher and the speed to analyze [our application] was quick and the effort to submit [the application] was less, I think our usage [of the EMS product] would go up."

Opportunities identified by peer utilities for growing their programs most frequently related to **workforce development, providing a reliable rebate and using a closed trade ally/project expeditor network**.

Three of the interviewed peers predicted that there would be an **increased reliance on PCDM** to meet demand reduction goals as coal-fired generation plans retire in the future. None currently require PCDM strategies through their program.

Conclusions & Recommendations

Product participation is currently low, but upcoming product development updates are likely to capture more product influence. The evaluation team estimated a retrospective **NTGR of 0.75** for the EMS product based on participating customer and trade partner responses. The team recommends Xcel Energy could apply a prospective **NTGR of 0.84** if recommendations and planned product development changes are implemented.

Apply prospective NTGR of 0.84 when product design updates are implemented. Once participation increases, conduct research to assess whether product changes increased the product's influence in the market compared to the product's level of influence presented in this report.

- **Spotlight and market project components that incorporate PCDM** and make projects more likely to be cost effective, so that trade partners and customers are more likely to submit successful applications.
- **Provide training to trade partners (e.g., webinars) on implementing and marketing PCDM components** (i.e., why it is important to include in projects).
- **Apply a reduction to project costs submitted in applications** by a flat amount to adjust incremental costs and account for incremental costs not related to energy savings.

While application submissions have declined in previous years, trade partners continue to submit applications despite the product's high rejection rates.

- This provides evidence that trade partners are being influenced by the EMS product, but this influence is not currently captured because of cost-effectiveness challenges and low project approvals. The proposed product development changes are likely to increase the acceptance rate, thereby capturing more of the product's influence.

Non-participating trade partners were not well-informed around PCDM and were not successfully communicating it to their customers. Peer utilities highlighted the importance of training to increase adoption of PCDM.

Increase training for trade partners to improve understanding of how to explain the importance of PCDM and sell PCDM elements to customers.

- Conduct webinars and other in-person trainings, and provide training materials on the product webpage to help trade partners understand PCDM and prepare them to support their customers in using their EMS to implement PCDM.
- Highlight and market project elements that incorporate PCDM and make projects more likely to succeed pass.
- Consider creating a list of priority or spotlighted trade partners who have completed the previously-mentioned trainings so that customers are more likely to select trade partners who are equipped to develop product-eligible projects.
- The product team already has begun engaging trade partners in discussions about the future of the EMS product and can leverage this engagement and momentum by implementing the new trainings as soon as possible.

Customers and trade partners whose applications were rejected often did not understand the reasons for their rejections but would have been interested in adjusting if they had more information earlier.

Increase communication around reasons for rejections, providing trade partners time to adjust projects and make them cost effective. Consider working with account managers to identify and connect with customers beginning an EMS project.

- Communicate with trade partners early in the project planning when it seems that projects are likely to be rejected so that customers and trade partners can work to make adjustments.
- Ask trade partners to connect with product staff before the project is fully vetted to determine whether the project looks cost-effective and discuss options for adjustments that could be made to help the project pass.

Conclusions & Recommendations

Non-energy elements of submitted projects contribute to high incremental costs – which in turn contribute to low project cost effectiveness and rejections. A peer utility cut proposed project costs in half to account for costs not related to energy savings.

To more accurately portray the costs related directly to energy savings when assessing project cost effectiveness, consider applying a flat reduction of 50% of EMS project costs to account for incremental costs like comfort and security not related to energy savings.

- This avoids putting additional burden on trade partners and product staff to split out the incremental costs and identify costs not related to energy efficiency. It also mitigates the high/increasing costs of EMS projects caused by non-energy elements.
- This recommendation reflects research conducted by a peer utility to determine the percent of project costs that are not directly related to energy savings.

Customers and trade partners are interested in a more predictable or straightforward rebate. Participants also expressed some desire for the rebate to be bigger and thus more influential.

Move forward with plans to make some elements of the EMS product more prescriptive.

- The product development team is currently considering updates that would make some measure components of EMS projects prescriptive. Evaluation findings showed that making rebates more predictable or prescriptive would drive participation and increase influence.
- Other considerations could include: increasing the rebate amount for the product, which would also likely drive participation and increase influence; take an approach like one peer, where they applied a rebate of 30% of projects costs for all qualifying projects.

It can be difficult to collect enough data directly from customers to track customers and understand customer experience, particularly for products with low participation.

Ensure best practice documentation policies are widely disseminated and become standard practice. Build in additional practices for confirming appropriate data is saved after client engagement (like in a project close checklist) as needed.

- Make sure Xcel Energy staff save or share any documentation – emails, application forms, contact information that contain any information on the customer journey to provide supplemental details and improve Xcel Energy's ability to help track customers. This information can also help increase confidence in NTG estimations during evaluations.
- Ask account managers to update and share contact information pre-emptively to make recruiting more efficient.
- Conduct periodic accountability checks to ensure important information is saved – for example, as part of a QA/QC process when a customer engagement is wrapped up.

1 Introduction

Xcel Energy offers a comprehensive array of energy services and products to its customers, including demand side management (DSM). For its 2022 product evaluations, Xcel Energy sought to understand the role each evaluated 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 nine products offered in Colorado and Minnesota in 2022.[1] This included the Energy Management Systems Product in Colorado, 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 Energy Management Systems Product (EMS) provides custom calculated rebates for a variety of new and upgraded EMS measures for commercial and industrial (C&I) customers. The product was designed to support C&I customers looking to install new energy management systems or upgrade existing systems but who would not do so on their own; ultimately the product helps these customers save on operational costs and energy usage. To achieve these objectives, product staff work with customers and trade partners to identify cost-effective measures and submit rebate applications. Product staff also help customers and trade partners iterate project designs to meet the eligibility requirements of the product.

To participate in EMS, customers or trade partners must install new or upgraded control system measures, additional control points for an existing system, or microprocessor-based controls in existing C&I buildings. Customers or trade partners first submit an application for project preapproval and receive confirmation of preapproval before completing the application workbook. The application workbook collects the project details required for the product engineers to conduct a project cost-effectiveness assessment.

Project preapproval can be granted at the time of the application, which allows customers and trade partners to begin invoicing expenses to the project with confidence that it will qualify for an incentive without delaying the process. Conversely, if preapproval is not granted, the intention is to facilitate quick iteration of project design specifications to meet product cost-effectiveness requirements. However, in the past, this quick turnaround has been difficult to achieve. Project cost effectiveness is measured by the Colorado-specific modified Total Resource Costs test (TRC) and must result in a ratio greater than 1.0. After product staff determine projects will be cost effective, they calculate rebate amounts on a custom basis at the rate of $700 per kW saved for system peak savings, plus up to $0.035 per annual kWh saved for customers with electric service and/or $4 per annual Dth saved for customers with an eligible natural gas rate. Custom rebate calculations for EMS are based on modeled savings.

In 2020, Xcel Energy made a change to all custom products' cost-effectiveness calculation method and, consequently, the application process. The new calculation required an "8760"[2] hour-by-hour building energy analysis, which increased the amount of information that trade partners are required to supply. To

[1] The products selected for evaluation include: Lighting Efficiency (Colorado and Minnesota), Home Energy Insights (Minnesota and Colorado), Whole Home Efficiency (Colorado), Energy Management Systems (Colorado), Energy Savings Kits (Colorado), Low Income Segment (Minnesota), Home Energy Squad (Minnesota)

[2] An 8760 energy model is an hour-by-hour analysis that simulates a building's performance for all 8,760 hours in a given 12-month period. This method uses the actual sequence of days and weather data, instead of averages.

address the added burden on trade partners, product staff revised the workbook used to collect project data. They attempted to streamline the application process for customers and trade partners and reduce the amount of project data required to complete the workbook. Product staff felt this change made the application process easier for customers and trade partners, compared to the previous version, and it decreased application processing time for product staff.

The EMS Product faces additional challenges to project cost effectiveness because benefits from Avoided Revenue Requirements (ARRs)[3] have rapidly declined for kWh savings in the past several years. The declining ARRs reduce the available savings from off-peak benefits. Projects that could pass cost-effectiveness tests in the past by relying on turning off equipment during off-peak hours can no longer meet cost-effectiveness requirements. The product focuses on system peak savings during the hours of 2PM to 6PM but, in the future, it may become more difficult to capture these peak savings for many C&I customers, because the system peak could either shift as an increasing share of renewable energy coming onto the grid or the Company may shift to valuing reduction at a time of greatest peak demand net of renewable generation.

The combination of decreasing ARR benefits and increasing costs of EMS measures has made it significantly more difficult for EMS projects to pass TRC tests and, as a result, project acceptance rates have steadily decreased to their current rate of about 30% passing. In 2022, EMS product staff also worked with the Xcel Energy product development team to identify product design changes intended to increase the likelihood of project cost effectiveness, help the product meet its savings goals, and provide a better experience for trade partners and customers. In combination with the findings and recommendations identified through this evaluation, these changes will continue to inform the direction of support and incentives for load shifting in conjunction with EMS installation and narrow the list of already-modeled savings aspects to those that are most likely to help a project pass the cost-effectiveness test.

As shown in Table 1-1 below, EMS achieved most of its savings through rebates for new EMS installation, versus rebates for EMS upgrades, representing 73% of projects in 2021. The kWh savings goal for the EMS Product in 2021 was 7,235,485 kWh and the product achieved approximately 48% of that goal.

Table 1-1. Colorado Energy Management Systems, January – December 2021

Measure	kWh		kW		Therms		Units	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total
New EMS	2,046,851	59%	371.3	67%	12,754	53%	8	73%
EMS Upgrade	1,436,967	41%	181.2	33%	11,220	47%	3	27%
Total	3,483,818	100%	552.5	100%	23,974	100%	11	100%

Source: These numbers are based on aggregated data provided to TRC in March 2022.

To better understand this report's findings in future contexts, it is important to recognize possible modifications to the product design that Xcel Energy is considering implementing. These changes are intended to increase participation in the program by helping trade partners and customers submit projects that are most likely to pass the cost effectiveness test:

[3] ARRs for energy may variously be known as avoided energy costs, marginal energy costs, or costs of saved energy. This observed trend is distinct from any observations related to avoided capacity costs, which are typically expressed in peak coincident kilowatts (kW).

- More prescriptive offerings (Advanced Rooftop Unit Controllers, Demand Control Ventilation).
- Adjusting incremental costs to exclude costs not associated with energy efficiency.

1.2 Evaluation Overview

The evaluation team designed a comprehensive evaluation of the EMS Product to provide information on four key research objectives:

1. Estimate product influence on customer decisions (net-to-gross ratio).
2. Understand opportunities to improve customer and trade partner understanding of the interaction of EMS technology and peak coincident demand management (PCDM).
3. Collect feedback on customer and trade partner experiences with EMS, including satisfaction with product elements.
4. Explore ways to grow the EMS market.

1.3 Report Organization

The following chapters organize the evaluation findings into two components: impact and process evaluation results.

- Chapter 2 presents an overview of the impact and process evaluations, as well as characteristics of respondents from our data collection efforts.
- Chapter 3 discusses the results of the net impact evaluation and the attribution of product impacts using a standard net-to-gross ratio (NTGR) analysis.
- Chapter 4 discusses the process evaluation results, including interaction of EMS technology and PCDM, product experience, and EMS market growth.
- Chapter 5 presents conclusions and recommendations.
- The report's appendices provide supporting documents, such as the evaluation plan, data collection instruments, and task-specific findings.

2 Evaluation Overview & Respondent Characteristics

To accomplish the objectives of the Energy Management Systems Product evaluation, TRC completed a suite of intersecting and complementary research activities in 2022. Detailed information on the sampling approach used for the research can be found in the Evaluation Plan within Appendix A. The following discussion highlights the research objectives addressed by each of the following research activities: staff interviews, trade partner interviews, participating customer interviews, near-participating customer interviews, peer utility interviews, and supplemental customer journey analysis. Within each research activity description, we have also included a description of respondent characteristics to help frame the results presented in Chapters 3 and 4. Table 2-1 presents an overview of how each of these research activities relate to each research objective of the EMS evaluation.

Table 2-1. Energy Management Systems Research Summary

Task Ref.	Research	Sample Size	Research Objectives
1	Staff Interviews	7	Inform Evaluation Plan
2a	Participating Trade Partner Interviews	5	Understanding of PCDM, Product experiences, Growing the EMS market, NTGR
2b	Nonparticipating Trade Partner Interviews	4	Understanding of PCDM, Product experiences, Growing the EMS market, NTGR
3a	Participating Customer Interviews	3[a]	Understanding of PCDM, Product experiences, NTGR
3b	Supplemental Customer Journey Analysis	3[b]	NTGR
4	Non- and near-participating Customer Interviews	6	Product experiences, Growing the EMS market, NTGR
5	Peer Utility Interviews	4	Growing the EMS market

[a] *The census of all 2020 / 2021 participating customers, and estimated 2022 participating customers was 14. The evaluation team attempted to recruit all participating customers from 2020, 2021, and through Q2 of 2022.*

[b] *The evaluation team reviewed materials tracked through Salesforce, email, spreadsheet trackers or other correspondence (as available) as part of supplemental customer analysis, but the available information did not provide necessary information to make it useful in informing results on product influence.*

2.1 Staff Interviews

Between March and April of 2022, the evaluation team conducted seven interviews with Xcel Energy staff to inform the evaluation plan, discuss product goals, and review product processes, challenges, and successes. Those interviewed included current and former product managers, a product team lead, a member of the engineering team, a trade relations manager, and two account managers. These interviews were conducted over the telephone and took approximately 30 to 60 minutes to complete. These meetings, combined with the kickoff meeting, allowed the evaluation team to create a focused evaluation plan with defined data collection activities.

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

2.2 Participating Customer Interviews

The evaluation team utilized participating customer interviews to meet both process and impact evaluation objectives. These interviews focused on the following topics:

- **Product Experiences & Satisfaction:** The evaluation team assessed how customers became aware of the EMS Product and eligible measures to better understand how participating customers learned about the rebates. We also asked customers about their motivations to apply for rebates to better understand why they want to participate and if any particular product elements drive participation. Our conversations with respondents covered participating customers' experiences, understanding, and satisfaction with various aspects of the rebate process.
    - The evaluation team identified product strengths and opportunities for the product to better engage potential customers.
    - The evaluation team assessed customer satisfaction with various aspects of the product application workbook, cost-effectiveness test, staff communications, and rebate opportunities. We also asked customers if there were other resources or tools customers wanted or needed to make it easier for them to participate and/or to improve their satisfaction.
    - The evaluation team assessed customers' experience throughout the product, including what was working well, what they found were the most important or valuable aspects of the product, and what aspects of the product they felt could be improved. We also identified potential support that might improve customer experience or that customers mentioned they would like to see included in the product.
- **Understanding of EMS Technology & PCDM:** The evaluation team explored customers' understanding of peak demand and the effects of load shifting on the product's rebate structure. The team also sought to determine if customers were interested in understanding and maximizing their savings through peak demand management.
- **Retrospective Net Impacts:** The team asked participating customers questions on product attribution, or the impact the product had on their decision to install energy-efficient measures, because of the product. We also asked about potential efficient measures installed without an Xcel Energy rebate due to the influence of the product (spillover).

For the participating customer interviews, the evaluation team spoke with three customers who participated in EMS between 2020 and 2022. We attempted to conduct two waves of participant interview efforts. The first occurred shortly after evaluation planning, to minimize recall bias for participants from 2020 and 2021. We attempted to conduct a second set of interviews later in 2022 to capture as many 2022 participant responses as feasible, but there were no new EMS applicants. Additionally, product staff worked with the product development team on proposed changes to the product's design and were interested in collecting feedback from the product's participating customers. The evaluation team coordinated with the product development team to incorporate their questions when appropriate and as the length of the interview guide allowed.

Table 2-2. Sample for Participating Customer Interviews, January 2020 – July 2022

Year of Participation	Population Size[a]	Sample Size
2020 Participants	10	2
2021 Participants	3	1
2022 Participants (Through June 22)	1	0
Total	**14**	**3**

[a] *The census of all 2020 / 2021participating customers, and estimated 2022 participating customers was 14. The evaluation team attempted to recruit all participating customers from 2020, 2021, and through Q2 of 2022, but was not able to reach every participant.*

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

2.3 Near-Participating Customer Interviews

The evaluation team conducted six near-participating customer telephone interviews to meet process evaluation objectives. For the purposes of this research, we defined near-participating customers as customers who applied to install EMS equipment with support from the product, but ultimately did not install equipment through EMS (either because their application was rejected or because they chose not to move forward). These interviews were conducted over the phone and focused on the following topics:

- **Product Experiences:** The evaluation team assessed near-participating customer perceptions and awareness of the product, including barriers to product participation. For customers whose applications were rejected, the evaluation team asked questions to understand customers' understanding of why they were rejected and how that impacted their perception of the product. We also asked near-participating customers if they continued to install EMS equipment without the support of the product.
- **Retrospective & Prospective Net Impacts:** The team asked near-participating customers how their behavior would differ in response to program design changes, which helped inform prospective net-to-gross ratio insights.

Table 2-3. Sample for Near-Participating Customer Interviews, January 2020 – December 2021

Strata	Population Size	Sample Size
2020	24	2
2021	9	4
2022	3	0
Total	**25**	**6**

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.

2.4 Participating Trade Partner Interviews

The evaluation team used trade partner interviews to meet both process and impact evaluation objectives. These interviews were integral for exploring the following topics.

- **Product Experience:** The evaluation team asked trade partners about their product experiences and satisfaction with EMS, including their interactions with product staff. We assessed their awareness and understanding of the product. We also explored their broader experience and satisfaction with Xcel Energy and account managers and identified opportunities, if any, to improve product delivery.
    - The evaluation team assessed trade partner feedback on customer awareness, motivations, and barriers to product participation. We also explored what types of projects trade partners implement for participating customers without the support from Xcel Energy products and reasons why they do or do not complete additional projects. This provided insight into broader market experiences to help supplement findings from the participating and nonparticipating customer interviews.
- **Opportunities for Growing the EMS Market:** The evaluation team asked trade partners about new equipment or technology that they expect to drive the EMS market in the future, including wireless EMS and integrated controls.

- **Retrospective & Prospective Net Impacts:** The evaluation team asked questions on product attribution, or the impact the product had on their decision to install and/or recommend efficient equipment. In particular, we explored what energy management measures, if any, non- or near-participating customers had included in their projects, and we explored the motivation for those choices. This was important in assessing "standard practice" within the market, and it provides evidence for determining market effects and estimating the prospective NTGR.

The evaluation team interviewed five participating trade partners as part of this effort, from a total census of eight trade partners who completed EMS projects through the product in 2021. We used the responses from these interviews to inform peer utility interviews, particularly related to interest in new technologies or potential program design changes. The evaluation team also attended an EMS Advisory Board meeting prior to the interviews, where the product team discussed EMS with participating and previously participating trade partners. The meeting covered topics including upcoming or proposed product changes, ideas for project elements that could make a project more likely to pass, and a discussion of barriers and challenges. The evaluation team used the discussion during this meeting to inform and hone the trade partner interview guide.

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.

2.5 Nonparticipating Trade Partner Interviews

The evaluation team utilized nonparticipating trade partner interviews to meet both process and impact evaluation objectives. For the purposes of this research, a nonparticipating trade partner was defined as a trade partner who had previously participated in the product or as a trade partner who submitted an application for EMS that did not successfully pass. These interviews were used to explore the following topics.

- **Product Experience:** The team spoke with previously participating trade partners to better understand why they no longer complete projects through EMS, and what barriers to participation they experience.
    - The evaluation team assessed nonparticipating trade partner feedback on customer awareness, motivations, and barriers to product participation. We also explored what types of projects these trade partners implement for their customers without the support from Xcel Energy products and reasons why they do or do not complete additional projects. This provided insight into broader market experiences to help supplement findings from the participating and nonparticipating customer interviews.
- **Opportunities for Growing the EMS Market:** The evaluation team asked trade partners about new equipment or technology that they expect to drive the EMS market in the future, including wireless EMS and integrated controls. We also asked about project preferences in terms of completing new construction projects versus projects in existing buildings.
- **Retrospective & Prospective Net Impacts:** The evaluation team asked questions on the influence, if any, the product has had on the trade partner's business strategy or model. The team also asked nonparticipating trade partners to provide their perspectives on potential product design changes, which contributed to the estimation of the prospective NTGR.

The evaluation team interviewed four nonparticipating trade partners as part of this effort. This response captured roughly 10% of the total census of the trade partners who have stopped participating in EMS since 2018.

Appendix B.5 presents the interview guide used for the participating trade partner research, and Appendix C.5 provides results specific to this research activity.

2.6 Peer Utility Benchmarking Interviews

The objective of the peer utility and stakeholder benchmarking task was to understand how peer utilities were approaching key issues related to implementing energy management system products. The evaluation team first interviewed an industry stakeholder to understand their perceptions of the EMS market, opportunities for growth, and also to solicit ideas for relevant peer utility programs to recruit for further interviews. We used this information, as well as input from the Xcel Energy product manager to identify four to six peer utilities to interview. We considered the following criteria when selecting peer utilities: similar program designs, programs that utilize the Total Resource Cost test of cost effectiveness to assess projects, programs known to have best practices or tools Xcel Energy is interested in pursuing, and utilities that operate in similar territories (including geography, use of PCDM/time-of-use with EMS projects, number of customers, and/or number of small businesses in its territory).

The evaluation team interviewed four staff in key management roles for EMS programs at peer utilities. These interviews generally focused on the same discussion topics explored in our interviews with Xcel Energy customers and trade partners, but emphasized the following research objectives specific to peer benchmarking interviews:

- **Program Design:** The interviews focused on whether PCDM is occurring and, if so, how peer utilities have successfully increased participation in their programs, specifically what technical support related to PCDM for the product would be necessary for increasing controls installations. Interviews also assessed the challenges faced by peer programs and what steps peers are taking to overcome these barriers. We also followed-up on questions posed to trade partners about emerging or new technologies to determine how peers are incorporating these technologies into their programs.
- **Cost Effectiveness:** The evaluation team also asked how peer utilities who employ the TRC test to assess EMS project cost effectiveness have successfully approved enough projects to add meaningful incentives to meet their savings and participation goals.

The evaluation team worked with the product manager to identify a list of peer utilities to include in the peer utility sample. We reviewed these utilities and identified additional peer utilities for consideration prior to conducting the interviews.

TRC interviewed peer utility staff from across the nation, including a peer from the Southwest. Three utilities offer a custom-only program, while one offered both prescriptive and customer incentives. All but one program was standalone. Utility B's program was embedded within a broader commercial offerings program. No peer utility currently incorporates PCDM strategies into their program design or eligibility requirements although each program expressed interest in PCDM for the future. Table 2-4 outlines background information for each peer utility interviewed and their respective EMS programs.

Table 2-4. Peer Utility Program Design Overview

Utility	Custom/ Prescriptive	Rebate Structure	Standalone Program or Embedded	Incorporates PCDM	Region
Xcel Energy	Custom	$700 per kW saved for system peak savings, plus up to $0.035 per annual kWh saved $4 per Dth saved	Standalone	Yes	Southwest
Utility A	Custom	$0.02/kWh	Embedded	No	Southwest
Utility B	Custom & Prescriptive	Prescriptive rebate: $300/pt based on conditioned space-controlled criteria, $75/sensor installed	Standalone	No	East
Utility C	Custom	20 to 33 percent cost-share incentive paid after installation	Standalone	No	East
Utility D	Custom	$0.40 per kilowatt-hour (kWh) saved (+ $6 per therm saved) + Performance Incentive paid after year of operation	Standalone	No	West

Appendix B.6 presents the interview guide used for the peer utility research, and Appendix C.6 provides results related specifically to this research activity.

2.7 Supplemental Customer Journey Analysis

The evaluation team planned to supplement findings from participating customer interviews with an analysis of customer interactions with product staff, trade partners, and account managers to further understand the product's influence on customer decision-making. We requested materials tracked through Salesforce, email, spreadsheet trackers or other correspondence (as available) that may help to map the history of interactions between staff and the customer for all participating customers to determine a storyline of participation. We attempted to compare this information to responses from participating customer interviews to understand whether there is a consistent story that describes Xcel Energy's influence on customer motivation to participate in the product, but the amount of customer data available did not provide enough insight into customer and product relationships to draw additional conclusions.

3 Impact Findings

A central component of this evaluation was the estimation of the net-to-gross ratio (NTGR) for the Xcel Energy Energy Management Systems (EMS) Product in Colorado. For demand side management products, the NTGR is a metric that estimates the influence of a product on its target market. A NTGR of 0 indicates that the product has no influence on customer participation, indicating that customers are full free-ridership. A NTGR of 1 means that there is no free-ridership among participating customers and they are fully influenced by the product's activities. It is used both as a benchmarking indicator of effectiveness and to adjust reported gross energy savings to account for energy efficiency that would have occurred 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 a NTGR of 1.00 (gross) and net savings, such as free-ridership and spillover. In prior years, Xcel Energy Colorado relied on a stipulated NTG value of 0.86 for EMS projects.

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 –** presents the recommended NTGR based on the evaluation team's synthesis of findings from market actors.
- **Retrospective Net-to-Gross Ratio Inputs –** presents qualitative and quantitative data that support the NTGR estimations.
- **Prospective Net-to-Gross Considerations –** presents findings the evaluation team considered when recommending its prospective NTGR.
- **Peer Utility Net-to-Gross Comparisons –** presents NTGR ratios across peer utilities whose representatives we interviewed for this evaluation.

The approach to estimate the NTGR can be found in Appendix A.

3.1 Key Impact Findings

This section presents a summary of the key findings from the impact evaluation of EMS, including retrospective and prospective NTGR recommendations. The evaluation team estimated the retrospective NTGR 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 estimated the recommended prospective NTGR based on potential changes to product design and the commercial energy management system and building controls market.

3.1.1 Retrospective Net-to-Gross Ratio

TRC weighted our estimated NTGR by product savings to estimate an overall retrospective NTGR of 0.75. To arrive at this ratio, the evaluation team took the following steps:

- The evaluation team first estimated unweighted free-ridership ratios to be 0.40 for the product. We based these values on participating customer interviews. We found trade partners to be highly influential, as all participating customer respondents rated their trade partners as an influential product factor. Additionally, trade partners described the product as being influential in helping their customer complete projects on-time and on-budget.
- The evaluation team weighted these results to be representative of the population by kWh and included any adjustments based on qualitative information from participating customer and trade partner interviews, which adjusted the free-ridership score to 0.25.
- The evaluation team also analyzed spillover to determine if any survey respondents installed additional energy-efficient equipment as a result of participating in EMS but without participating in another Xcel Energy rebate offering. We found no evidence of quantifiable spillover associated with the product.
- The evaluation team did not find any evidence to include an adder for market effects due to the product that are not addressed through the free-ridership and spillover results. We found that trade partners still rely on the product to complete qualifying projects but are often not adjusting their processes to optimize their business for EMS, including a lack of implementing PCDM strategies.
- Since the evaluation team didn't find evidence of spillover or market effects, we calculated the overall NTGR by subtracting the free-ridership ratio from 1.00. This brings the overall product NTGR to 0.75. Section 4 provides detailed methodology for NTGR estimation.

3.1.2 Prospective Net-to-Gross Ratio

Based on evaluation results, TRC recommends Xcel Energy applying a prospective 0.75 NTGR to EMS projects if no product changes are made.

If Xcel Energy were to implement the following changes, the evaluation team recommends a higher NTGR of 0.84.

1. Increase efforts to market and educate customers and trade partners on project elements that incorporate PCDM strategies; making them more likely to pass cost-effectiveness tests.
2. Cut project costs submitted in applications to account by removing non-energy incremental costs associated with projects.
3. Implement product changes to increase the number of prescriptive offerings.

This value is supported by a review of peer utility NTGRs.

3.2 Retrospective Net-to-Gross Inputs

As described in the approach section, the recommended retrospective NTGR for EMS is based on three primary data inputs: the Free-Ridership Ratio, the Spillover Ratio, and the Market Effects Adder. This section explores each of these results in more detail, including qualitative data that support the results.

3.2.1 Free-Ridership Results

Free-ridership is a measure of the proportion of the product's claimed energy efficiency savings that would have occurred in the absence of the product. This section presents results related to the two metrics used to estimate the final free-ridership ratio of 0.25: the Product Influence Score and the No-Product Score.

Product Influence Score

To study product influence, the evaluation team collected feedback from both participating customers and trade partners. The population size is small for EMS, with a total participating population of 14 customers between 2020 and Quarter 2 of 2022. The evaluation team was able to interview three respondents from this population. Due to the limited data sources, qualitative feedback, in addition to quantitative indicators, played an important role in our analysis. Following the Illinois TRM Study-Based Protocol, the evaluation team built many open-ended questions into the interview to capture all key details regarding each participating customer's experience. We also reviewed Salesforce documentation and the custom rebate application to supplement interview findings, but we found limited supplemental information on product influence from Xcel Energy documentation.

The evaluation team estimated the unweighted Product Influence Score for EMS to be 6. On a scale of 0 to 10, where 0 is not at all influential and 10 is very influential, participating customer rated the product as moderately influential on their decision to go forward with their EMS project, rating it a 4, 7, and 7, respectively. We analyzed these scores alongside qualitative data from participating customer interviews and compared to responses from their corresponding trade partners' perceptions of the influence of the product on their project. We found that participating customers are likely to underestimate the influence of the product when using a quantitative rating scale. In all cases, the influence scores increased after comparing quantitative results to qualitative responses from participating customers and trade partners. In qualitative responses, trade partners described how the product helped move up the timeline and "get the project over the finish line." Trade partners indicated that rebates help participating customers complete their projects earlier than they would have otherwise:

> *"I think they may still have done it, but it would have been delayed."*

Trade partners also felt that EMS rebates helped shore up project financials and motivate customers to move forward:

> *"[The rebate] gets them over the finish line. It makes financials look better."*

The participating customer who rated the product's influence as a 4 said that they designed the project before going out to look for rebates:

> *"We got the upgrade information from our contractor, then worked with the corporate office to see if there were any rebates."*

For participating customers who rated product influence a 7, they felt the rebate dollars allowed them to spend more upfront and get the project approved:

> *"We knew we had to do some things to the building but knowing there was a way to recoup the cost [through rebates] meant we could spend more upfront and save over the long haul."*

> *"The main goal was to upgrade the central plant to save money. The rebate made it easier to get it across the line."*

To have matching scales with the Non-Product Score, the evaluation team took the Product Influence Score (6), reversed the scale (making a "10" now a "0"), and divided by 10, so scores would fall between "0" and "1." A Product Influence Score closer to 0 indicates a high level of product influence.

Since the Product Influence 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. The evaluation team averaged the Product Influence Score and the No-Product Score together to estimate an initial Free-Ridership Score for each participating customer respondent. The next section describes the No-Product Score.

No-Product Score

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 Influence 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. The evaluation team estimated the unweighted No-Product Score for EMS to be 4.

When asked the likelihood they would have installed exactly the same equipment had the Xcel Energy EMS offering not existed, 2 out of 3 customers reported they were highly likely to have installed the same project without the product, indicating high free-ridership:

> *"We would still have done the same controls upgrade. It was planned for a couple of years due to the age of the existing controls… It was preventative maintenance to do the replacement now."*

The third participating customer said they would have maintained their old system if the product did not exist, indicating no free-ridership:

> *"We would just have been able to maintain our system rather than redesign it."*

The evaluation team averaged the Product Influence Score and the No-Product Score together to estimate an initial free-ridership score for each participating customer respondent.

Timing Adjustments

The evaluation team developed a timing adjustment to overall free-ridership using survey responses. Unlike the Product Influence Score and No-Product Scores, which measure product influence on equipment installation overall, the timing adjustment measures whether the product influenced the timing of equipment installation. To determine whether a timing adjustment should be attributed to a participating customer, the evaluation team asked respondents whether they installed their equipment earlier than they otherwise would have due to the product's influence.

One participating customer said that the product allowed them to complete their project sooner. Without the product, they would have completed in the next two years. This customer's free-ridership score was adjusted down, from .15 to .07 to account for the product's influence on their decision to complete the project sooner.

Two customers said they would have completed their projects on the same timeline, so no timing adjustment was applied to their free ridership score.

Final Free-Ridership

Finally, the evaluation team weighted each score by the total savings for that measure, so that the score is representative of population-level savings (i.e., measures with a larger share of total kWh are weighted more heavily, as they have more influence on the total product savings). With the sampling weights applied, the free-ridership ratio was 0.25.

3.2.2 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 EMS. One participating customer installed additional VAVs but did not go through the rebate program because it was a minimal, ongoing upgrade. As a result, it cannot be counted as spillover. Nonparticipating customer projects do not qualify as spillover because their projects were rejected by the program, so they are not eligible for rebates.

3.2.3 Market Effects

In addition to free-ridership and spillover, the evaluation team also analyzed market effects for EMS. We did not find evidence of the product's influence on the market, and so we did not apply an adder for market effects to the free-ridership score.

We found that trade partners still rely on the product to complete qualifying projects, and they are not completing qualifying projects on their own. While there is some evidence that trade partners are adapting their business practices to align with the product, many product applications are rejected. This indicates that the product will not be able to achieve higher savings until the application approval rate increases.

3.2.4 Retrospective Net-to-Gross Ratio

Overall, the evaluation team found that the product impacted participating customer decisions to purchase and install EMS technology. Using the NTGR formula, shown in Equation 3-1Equation 3-1 below, the evaluation team estimated the retrospective NTGR to be 0.75. This is based on the free-ridership ratio of 0.25, which was driven by customers who were influenced by their trade partners who, in turn, reported they were influenced by the product. Free-ridership most often occurred when participating customer respondents reported that they planned their projects before looking for rebates or said they would do the exact same thing in the absence of the product. The evaluation team did not find any evidence of spillover or market effects.

Equation 3-1. C&I Energy Management Systems Retrospective Net-to-Gross Ratio

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

$$0.75 = 1 - (0.25) + (0) + (0)$$

3.3 Prospective Net-to-Gross Ratio Considerations

The evaluation team examined market conditions and possible product changes to recommend a prospective NTGR. Our findings indicate that current product practices support a prospective NTGR of 0.75 if no changes are made to the product design. If Xcel Energy were to implement the evaluation recommendations listed below and make product changes currently under discussion by the product

development team, we would expect EMS to have greater influence and, therefore, would recommend a prospective NTGR of 0.84.

The evaluation team expects the following changes would increase the product's influence on the market. These changes are based on findings from the process evaluation, presented in detail in Chapter 4:

- Spotlight and market project components that incorporate PCDM and make projects more likely to pass, so that trade partners and customers are more likely to submit successful applications.
- Provide training to trade partners (e.g., webinars) on implementing and marketing PCDM components (i.e., why it is important to include in projects).
- Create a list of "top" trade partners who have completed trainings, so that customers are more likely to work with trade partners who are knowledgeable of the strategies to design a project that can pass EMS cost effectiveness tests.
- Engage with trade partners early in the project planning stage to help develop projects that are likely to pass.

Product changes under discussion by the product development team that would impact the prospective NTG include the following:

- Develop more prescriptive offerings (Advanced Rooftop Unit Controllers, Demand Control Ventilation).
- Adjust incremental costs submitted with project applications to exclude costs not associated with energy efficiency. This reduces the costs associated with the project and makes them more likely to pass the cost effectiveness test.

The evaluation team feels the biggest increases in influence would result from making it more likely for customers and trade partners to develop projects that will pass cost-effectiveness tests and, as a result, will be approved by the product. EMS is influencing trade partners, but the product needs more projects to move beyond the application stage. While the product does influence trade partners, our findings suggest they might not understand how to successfully develop a passing project. If more projects pass, free-ridership should also decrease as the pool of participating customers increases and the impact of free-ridership dilutes.

3.4 Peer Utility Net-to-Gross Comparisons

The retrospective NTGR is lower than those reported for most of the peer programs that the evaluation team examined through this research, as shown in Table 3-1. This is likely due to the fact that we did not find evidence of other utilities facing barriers to passing eligible projects, as Xcel Energy faces due to the cost effectiveness criteria. The NTGR for Utility D is a stipulated value that is applied to their entire business management portfolio, rather than an evaluated value.

Table 3-1. Peer Utility Net-to-Gross Ratios

	Xcel Energy	Utility A	Utility B	Utility C	Utility D
Program Overall	**0.75**	**.98**	**0.94**	**N/A**	1.0
Evaluated or Stipulated	PY 2021 Evaluation	Evaluated	Evaluated	N/A	Stipulated (Portfolio-wide)

4 Process Evaluation

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

- Understand opportunities to improve customer and trade partner understanding of the interaction of EMS and PCDM.
- Collect feedback on customer and trade partner experiences with the EMS Product, including satisfaction with product elements.
- Explore ways to grow the EMS 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, as well as peer utilities. This section presents key findings from the process evaluation and detailed findings relating to each evaluation objective. Sub-sections for each objective include data from all relevant data collection efforts. Our findings will help Xcel Energy interpret research results 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.

4.1 Key Findings

The evaluation team found that participating customers were generally satisfied with current product operations, but nonparticipating trade partners and nonparticipating customers felt there could be more communication and support explaining the reasons why a project does not pass. Customers and trade partners also expressed interest in receiving support on strategies for incorporating PCDM into their projects. We provide additional key findings from the process evaluation research below, broken out by research objective:

- **Interaction of EMS and PCDM:** EMS was considered familiar technology, but the path to implementing peak coincident demand management was unclear for both customers and trade partners. Customers were generally unfamiliar with PCDM and felt it would impact their business operations and comfort. Nonparticipating trade partners were not well-informed about PCDM and were not successfully communicating it to their customers. Peer utilities highlighted the importance of training in their plans to increase incorporation of PCDM.
- **Product experience and satisfaction:** The application itself is not a barrier, but lack of understanding around eligibility and reasons for rejection were challenging. Customers and trade partners whose applications were rejected often did not understand the reasons for their rejections, but they would have been interested in making adjustments if they had more information earlier. Customers and trade partners were interested in a more predictable or straightforward rebate. Participants also expressed some desire for the rebate to be bigger, and thus, more influential.
- **EMS Market Growth:** Increasing clarity around cost effectiveness and increasing communication speed are critical to rebuilding public perceptions of the EMS Product. Customers and trade partners expressed a desire for more information to understand the capabilities of emerging technologies, as well as workforce development, to maintain energy savings persistence. Product

participation is currently low, but upcoming product development updates are likely to capture more product influence, streamline the process, and clarify PCDM and cost effectiveness.

The remainder of this chapter presents detailed findings related to each objective.

4.2 Interaction of EMS and PCDM

The following section explores the interaction of EMS technology and PCDM. Overall, PCDM is a more complex concept than more straightforward EMS technology. Despite a lack of implementation of PCDM strategies in the current market, market actors are aware of and interested in incorporating these practices in the future. Conceptually, PCDM has support from trade partners and some customers, but strategies for putting the concept into practice are not as obvious for most businesses. This section presents results relating to awareness of EMS and PCDM, opportunities to increase participation in PCDM, and support needed increase participation in PCDM.

4.2.1 Awareness

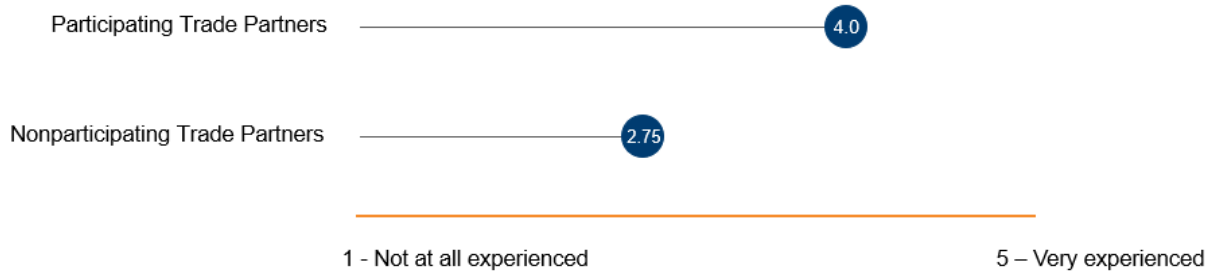
Overall, customer awareness of EMS technology broadly was higher than awareness of PCDM. Both participating customers and nonparticipating customers reported moderate familiarity with EMS, but they were less familiar with PCDM. Participating customers and nonparticipating customers became aware of EMS technology through a variety of sources, including prior hands-on experience (n = 3), a supplier (n = 3), or through Xcel Energy (n = 2). Participating customers and nonparticipating customers considered themselves somewhat familiar with the concept of PCDM, but none implemented it into their projects. One participating customer said, “We do energy management control through the new system, but it doesn't necessarily do any load shedding during those time periods.” While EMS technology has become industry standard, there is a general lack of awareness of PCDM or how to implement it in practice.

Despite low awareness levels among customers, some trade partners reported having spoken with their customers about PCDM. The EMS program has influenced participating trade partners to start talking about PCDM with their customers, but this was not the case for nonparticipating trade partners. Of the participating trade partners who recommended PCDM elements to customers (n = 3), most (n = 2) had not previously discussed PCDM with their customers before participating in the program. One participating trade partner said, “Now I talk about it with all my customers. When they use energy is just as important as how much energy they are using.” Nonparticipating trade partners emphasize components including building management (n = 2) and comfort benefits (n = 2) when selling EMS rather than PCDM.

Similarly, as shown in

Figure 4-1 below, participating trade partners (n = 4) rated their company's experience in selling and installing EMS technologies to implement PCDM higher than nonparticipating trade partners. These findings support the logic that trade partners who are knowledgeable about PCDM implementation and its benefits are more likely to discuss PCDM with a prospective customer, and in turn, submit a successful application.

Figure 4-1. Trade Partner Experience Using EMS Technology for PCDM



To put these findings into a broader context, the evaluation team also explored the landscape of peer utility EMS programs and how they consider PCDM. Our research found that peer utilities did not directly incorporate PCDM into their program design. Instead, programs were designed along a continuum of prescriptive (n = 2), to custom performance-based (n = 1), to carbon-based market development (n = 1). While demand savings were not explicitly factored into any program, the carbon-based market development program mentioned demand management strategies are commonly implemented. One peer utility mentioned, “We don't have any actual demand saving requirements or goals. Our objectives really are around growing the technology, growing the market for vendors, growing the market for customers and actual participants.” These findings demonstrate that Xcel Energy’s EMS Product is positioned to be the forefront of program design; while no other peer we spoke with directly incorporates PCDM savings into their cost-effectiveness calculations, some were working towards that goal. Naturally, as an innovator in program design, there will be many obstacles to overcome and lessons to be learned, but others have recognized the importance of solving the PCDM puzzle.

4.2.2 Support Needed to Increase Participation

While awareness of PCDM among customers and potential customers is currently low, this gap in awareness presents a significant opportunity to increase adoption of the practice in a way that aligns with EMS priorities. Participating customers and nonparticipating customers were open to the concept of PCDM, but they needed help identifying opportunities to manage peak load without impacting primary business functions. Impacts to business operations and occupant comfort were top concerns for both customer groups. Both groups showed interest in engineering support to identify solutions that do not impact customer or business functions. One participating customer said, “Yes, those things were discussed for sure. Just trying to gain all the benefits we could from [the EMS technology], not necessarily the peak stuff though. I just don't have the ability to gain much from peak demand [management].” One nonparticipating customer said that for hotels, “The guest experience is so critical. The guests still don't understand that they might need to sacrifice comfort for the good of the planet or some other ulterior motive. So right now, the focus is on guest comfort, and that's been the biggest challenge.” These findings underscore a need for engineering support services to help customers take the next step from concept to practice. The primary function of most businesses is not to manage real-time energy demand, and they require training and support to successfully implement PCDM.

Participating customers and nonparticipating customers also reported more information and higher rebates could help increase PCDM participation. Both groups indicated that providing clear examples of PCDM strategies (n = 4) and higher rebate amounts (n = 2) could increase participation. One participating customer said, “We gotta know what we can cut back on. We just can't go and change set points and think we're gonna solve the problem,” suggesting that they would benefit from specific examples of how to implement PCDM in their particular business. A nonparticipating customer felt they needed clear

examples of the benefits they would receive from taking on the extra expense of adding PCDM to their EMS technology, stating, “Well, anything, when it costs a lot of money, becomes challenging.” These findings support one of avenues peer utilities mentioned to use workforce development as a tool to build PCDM.

Relative to customers, trade partners saw PCDM as an even greater opportunity to help customers save energy and money, as well as sell EMS technology, but they also described needing further support to do so. Both groups of trade partners suggested changes focused on the financial incentives of installing EMS to support future viability of PCDM. To make PCDM viable for more C&I customers, trade partners (n=3) and nonparticipating trade partners (n = 2) cited needing more financing and reduced equipment costs. One trade partner recommended a case study demonstrating an appropriate set-up that does not sacrifice tenant comfort. One trade partner said, “The challenge is always just the cost… That's where obviously any incentive dollars from the utility to help the utility [meet] their goals obviously help reduce costs and increase [return on investment]”

The evaluation team also found that providing trade partners with more information, formal trainings, decision support tools, and engineering support help trade partners better support customers in managing peak demand. Trade partners specifically focused on clarifying the connection between EMS and cost effectiveness. Trade partners provided a variety of recommendations to explain the connection between EMS cost effectiveness and PCDM listed below. Overall, suggestions mainly focused on increase opportunities for education. Participating trade partner recommendations included:

1. Launch a webinar explaining the background of the application as the application "feels like a black box" (n=1)
2. Engage more with trade groups as contractors are often the ones selling to customers (n=1)
3. Increase customer education, e.g., showing peak demand on the utility bill (n=1)

Nonparticipating trade partner had the following suggestions for supporting customers in managing peak demand:

1. Adopt a pay for performance model (n = 2)
2. Increase clarity around requirements for cost effectiveness (n = 2)
3. Proactively educate trade partners about EMS technology and opportunities (n = 1)
4. Improve speed of response and project approval rate (n = 1)

Leveraging the strong influence trade partners often have during a critical juncture of the customer decision-making process will be an important strategy to increase the rate of adoption of efficient technologies and practices like PCDM, and the recommendations outlined in Chapter 4 suggest several approaches the product should consider implementing to do so – particularly related to nonparticipating trade partner suggestions 2-4 above. Adopting a pay for performance model would require deeper understanding of PCDM, as it is directly linked to avoided cost of energy. If trade partners are struggling to understand and implement PCDM, it is unlikely they will be able to adequately project incentives through a Pay for Performance model at this time. The product team could consider implementing this model in the future, when PCDM is better understood by trade partners and customers

Peer utilities with whom the evaluation team spoke offered interesting opportunities to increase adoption of PCDM beyond increasing incentive amounts. Most peer utilities (n = 3) recognized opportunities to

increase PCDM and are in the process of adapting their program design. Strategies to increase PCDM mentioned by peer utilities are listed below.

1. **Workforce Development:** “There were some conversations about whether or how we could help pay for training.” Workforce development is the lowest cost to entry idea suggested by peers.
2. **Automated Demand Response:** “There is a hope maybe for the future that we could help set up almost like a demand response button, where there's identification of the equipment that could be curtailed and then an easy way to trigger that curtailment.” Automated demand response is often intriguing to both customers and utilities due to the limited strain on human capital, but it is associated with higher upfront costs.
3. **Real-Time Energy Markets:** “The hypothesis that we're looking to prove through the pilot would be that buildings with EMS…can do demand management in such a way that they can be as cost-effective a resource as battery storage would be. We are going to fund pilot projects that can reduce the load for long durations up to 8-hour periods based on 15-minute response times.” Real-time energy markets offer a way for businesses to generate revenue by changing their consumption, but it requires tracking of energy markets and more sophisticated automated equipment[4].

Xcel Energy could explore one or more of these strategies to increase adoption of PCDM by customers and trade partners without necessarily increasing incentive amounts.

4.3 Product Experience

Respondent groups reported mixed experiences with the product. Their responses were primarily driven by the application process and understanding of project cost effectiveness, the latter of which directly impacts their rejection risk and even their satisfaction. Nonparticipating customers expressed more confusion with the application than participating customers. Confusion stemmed from a lack of understanding of cost effectiveness and equipment eligibility. Despite facing rejection, the evaluation team found that nonparticipating customers continued forward with the installation of their proposed EMS projects, but they still were interested in learning more about how they could have changed the project to be cost effective. PCDM strongly influences cost effectiveness and the likelihood of a passing project, which in turn drives product experience. This provides an opportunity for providing education on the link between PCDM and cost effectiveness to drive positive product experiences. The following section presents results relating to the product’s application process, cost effectiveness, rejections, and satisfaction.

4.3.1 Application Process

Despite confusion for some nonparticipating customers, in general, customers felt the application process was relatively straightforward and easy to complete overall. Both participating customers and nonparticipating customers said that the trade partner completed most or all of the application on their behalf. No participating customer reported experiencing any issues with the application process, and only one described needing to work with Xcel Energy directly to complete the application forms. This customer

[4] Xcel Energy currently does not have a real-time rate but could pay customers a rebate based on real-time performance. Competitive, real-time, wholesale energy markets are directed in Colorado through the Southwest Power Pool.

completed the form with help from their trade partner, but then their account representative changed, and they had to re-complete the application form.

Nonparticipating customers expressed more confusion about the application than participating customers, but generally did not feel the application was difficult. Three nonparticipating customers reported that they found the application process either confusing or cumbersome, but this was primarily driven by confusion related to the reasons they were rejected and understanding eligibility, rather than the application process itself. Two out of six nonparticipating customers said they were confused about what project elements were eligible for the program and what equipment was likely to be approved. Four nonparticipating customers said that their trade partner did not help them understand why their projects might not be cost effective and might not be approved. Like the knowledge gap in customer understanding of cost effectiveness, customer responses uncovered a gap in understanding of equipment eligibility that was not remedied by trade partners or product support. These findings demonstrate that customers rely heavily on the knowledge of trade partners to inform their decisions, as well as trade partner business practices, to support them throughout the project design and application process.

From the trade partner perspective, the application seemed to be more of barrier for nonparticipating trade partners than for participating trade partners, which provides some indication for why they no longer participate. When asked about their satisfaction with the application process, participating trade partners were least satisfied with the time it took to complete an application. While it was the factor rated lowest in terms of satisfaction, it was still rated moderately high, at 3.2 out of 5. Nonparticipating trade partners also felt the length of time it took to complete an application was a challenge but seemed to consider it a more significant barrier than participating trade partners. When a trade partner spent time completing an application, but then was ultimately rejected, they reported feeling like they had wasted their time. Additionally, nonparticipating trade partners identified the application process as a driver of their lapse in participation in the program. One nonparticipating trade partner said,

> *"It was just very cumbersome to be able to go through. And then … it just seemed like when they put it through their analysis, we [got] very little feedback as far as why we didn't get the rebates."*

Another nonparticipating trade partner said, "It got too difficult and too much time spent and too much invested, and things just weren't happening." Helping rejected applicants quickly understand the reasoning behind the decision is crucial to prevent them from becoming too discouraged to reengage with an application or the product. These findings show that the application stage can set the tone for the product experience—if customers and trade partners have the support to submit an accepted application, they are less likely to report problems.

4.3.2 Cost Effectiveness

Product experience hinged, in a large part, on customer and trade partner understanding of cost effectiveness, as well as the success of strategies to improve cost effectiveness. A common thread through responses from trade partners and customers who had successfully submitted a rebate application was that they talked about how to plan their project to meet cost-effectiveness requirements and include elements that will improve the likelihood that the product is eligible for a rebate. Participating customers and trade partners discussed strategies to make their project more cost effective with customers. Two out of three participating customers stated that their trade partner discussed how to make their project more cost effective and improve its likelihood of being eligible for a rebate. One participating customer described working closely with their trade partner to make sure they qualified for a rebate. The trade partner gave them several options of projects to choose from. One participating trade partner said, "[rebate eligibility] was a big part of the discussion before we decided on equipment." Trade

partners take on risk when promoting the product during their sales process or designing a project to align with EMS, because they have the potential to lose business if their rebate application for EMS is not successful. Trade partners equipped with knowledge of EMS cost effectiveness strategies, working closely with customers to tailor a project to EMS produces the best-case scenario: increased participation by customers who are influenced by the product and their trade partner.

Interestingly, participating trade partners did not include PCDM strategies in adjustments they made to increase the cost effectiveness of their projects. Instead, participating trade partners described the following strategies.

- Three participating trade partners described commissioning and assessing sequence adjustments.
    - For example, one of these trade partners stated, "I look at sequences that allow you to reduce use and achieve max savings."
- Three participating trade partners specifically targeted specific building or project types that were most appropriate for the product, such as large office buildings,
    - One said, "I feel like it is geared towards large, $200k+ projects."

These findings highlight a limitation of the current product: no trade partner is currently implementing PCDM, but only the largest buildings can meet cost-effectiveness requirements without incorporating any PCDM elements. Learning how to leverage PCDM could make it possible for more diverse building types and smaller projects to meet cost-effectiveness requirements, given high equipment cost relative to their size. The challenge, and major question, then becomes how to break down the barriers preventing trade partners and customers from adopting PCDM strategies. Currently, the projects that pass cost-effectiveness tests only do so due to the size of the project, without any contribution from PCDM. The structure of the product highly incentivizes PCDM savings, which prevents smaller projects from passing the test without incorporating PCDM. However, the trade partners we spoke to did not incorporate any PCDM strategies. Without trade partners altering their approach to incorporate PCDM, smaller projects will have no chance of passing cost-effectiveness tests, and only large buildings that do not incorporate any PCDM strategies will continue to dominate the product.

Nonparticipating trade partners expressed confusion and frustration surrounding cost-effectiveness calculations. Nonparticipating trade partners described receiving feedback (by talking to and emailing with engineers and product staff) on why their projects were not cost effective, but they wish they had the information earlier in the project development process. One nonparticipating trade partner stated,

> *"There were a couple times where there were…heated debates about it and you'd talk to the Xcel [Energy] engineer and be like 'I hear the words you're saying. But the system I use can't take that into account' but you know you can't ask Xcel [Energy] to analyze everything and those were unique and complicated problems for sure."*

Another nonparticipating trade partner said,

> *"We did actually get the opportunity after the fact on one of the projects to say, 'Hey, can we at least get with your engineering team, understand what things we can do better and need to do better to make sure to get these things approved as well.' So that was a positive, but just kind of felt like we were left on an island. During the process …it'd be really nice to have Xcel [Energy] there really trying to help you develop the project."*

Often, it is difficult to coordinate the timing of when a trade partner submits an application along the timeline of their project—sometimes the project is fully scoped, and other projects are earlier in the process. The product could increase influence over projects by engaging early in their process, avoiding projects that are fully designed and simply hunting for incentive dollars. A difficult part of engaging a project in the initial stages is that timing is critical. If product engineers cannot or are unable to respond on the business' timeline, they not only risk losing participation but also damaging the credibility of the trade partner.

The desire for earlier engagement in the project development process discussed by nonparticipating trade partners was echoed by nonparticipating customers. Nonparticipating customers often did not understand why their projects were not cost effective. One nonparticipating customer said they would have been interested in adjusting their project, if they knew earlier that it was likely to be rejected. Two nonparticipating customers said that it was too late for them to make updates to their project to make it more cost effective, because they had completed the project by the time their received the information back from Xcel Energy. Only one nonparticipating customer reported that their trade partner helped them understand why the project may or may not be approved before submitting the application. While some customers understood that their applications did not pass the cost-effectiveness test, they did not understand the reasons why the projects were not cost effective. By engaging customers earlier in a project's development cycle, customers can gain a deeper understanding of cost effectiveness before dumping money into development costs.

Beyond earlier engagement with customers and trade partners, one peer utility offered a creative solution to improve cost effectiveness. This peer utility reduced project costs by 50% for every submitted project application. The reduction in project costs represented the incremental costs not related to energy savings (e.g., security, comfort) and helped accurately represent the costs of the EMS equipment that should be considered in the cost effectiveness equation. The peer conducted their own research with EMS contractors to determine the ratio of incremental costs unrelated to energy savings in a typical project, and results found that they averaged approximately 50%. The peer utility stated,

> *"We did some asking around to contractors early on, to parse out some of the costs not associated with the building controls…and the answer was about half of the cost of a controls project is associated with things that don't directly bring in energy savings, so in our initial cost calculation we get the full project cost from the contractor and we cut that cost in half."*

The tactic of removing incremental costs not directly related to energy savings from the total project costs is theoretically logical and has relatively low additional administrative burden. This strategy could be employed for EMS Xcel Energy territory to calculate cost effectiveness and is likely to help trade partners understand a key driver of rejected projects (i.e., high costs relative to the energy savings benefits).

4.3.3 Rejections

Confusion among trade partner and customers about cost effectiveness and a lack of PCDM strategies in project design led to rejections, particularly for smaller projects. Nonparticipating customers felt that Xcel Energy could make changes to the application process to limit the number of rejections, including shortening the application approval timeline, providing more detailed information on what qualifies, and explaining why a project doesn't meet cost-effectiveness requirements earlier in the project development process. These three suggestions aim to shorten the project iteration cycle and increase communication, so applicants can react in time to address necessary changes and meet cost-effectiveness requirements. Despite not qualifying for the product, all nonparticipating customers installed the proposed projects in their applications. Nonparticipating customers said they would still be likely to apply for rebates through

Xcel Energy in the future but said they will adjust their expectations for receiving those rebates. One nonparticipating customer said, “It just felt like we tried, and we lost. So, it was very much disappointing given the time and energy involved.” Three nonparticipating customers felt that the application approval timeline was too long, and two nonparticipating customers said that they completed their projects before they received the rejection notice, at which point it was too late to adjust, because they assumed they would have passed. Providing feedback quickly and early in the development process can increase the product’s influence and likelihood of measure adoption.

In addition to increasing approval and feedback timelines, nonparticipating also requested additional education around qualifying projects. Three nonparticipating customers said that they would like more information on what project elements were likely to help a project pass as they were planning the project, to ensure it passed. One nonparticipating customer said, “If I understood what [Xcel Energy’s] standard requirement was, then I would have said, 'hey, do we qualify for this or do we not do? Should we waste our time, or no?'” Another said, “With Xcel, it's taking way too long to do anything in this space. It's time. Time is money in our business, and it just stinks that Xcel [Energy] just doesn't have the infrastructure and the ability to really move at our speed.” Customers with such experiences expect less reliability in regard to both financial and technical support from Xcel Energy, which could negatively impact the product’s public image and can be mitigated by clear and timely communication.

In addition to strategies targeted at responding to customers who have been rejected, nonparticipating trade partners provided feedback on ways to promote the connection between EMS cost effectiveness and PCDM strategies to reduce the rejection rates proactively. Nonparticipating trade partners felt that education of trade partners and customers by better explaining the connection between EMS cost effectiveness and PCDM would be the most supportive. These suggestions included:

- Conducting a webinar that explains the cost-effectiveness calculation and the application. One trade partner mentioned:

  “Feels a bit like a black box…. For the rebate application itself - go through and fill it out with someone [from Xcel Energy] who is very familiar with the program and can maximize savings…. Also understanding of how they're calculating it (a webinar, something that's more specific to this).”

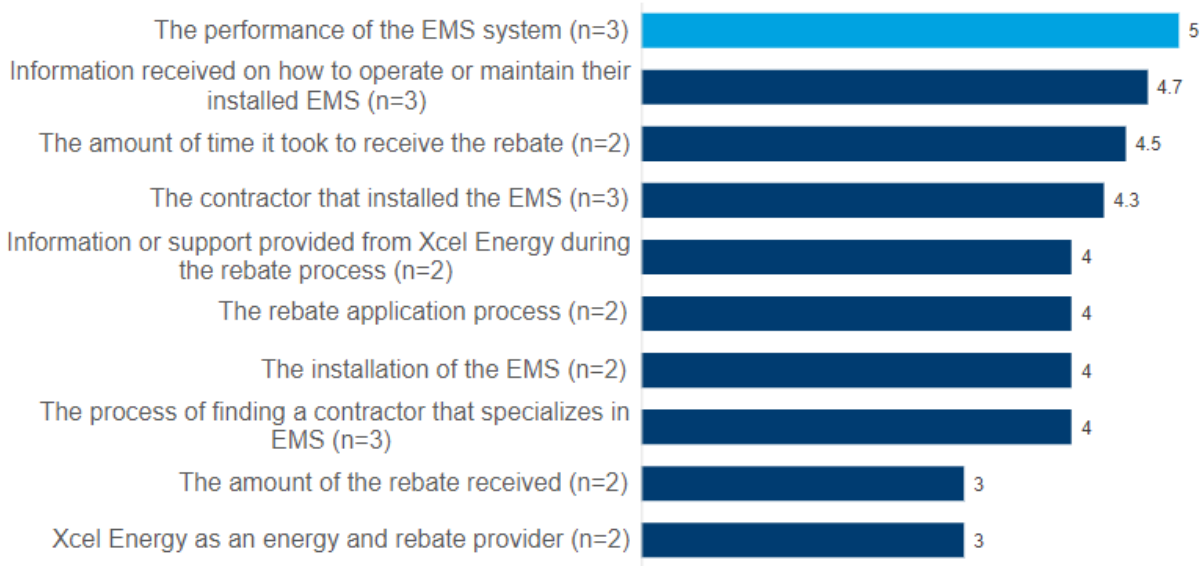
- Engaging trade groups (n=1)
- Showing peak demand performance on a customer’s utility bill (n=1)

A combination of proactive and reactive strategies can be deployed to combat cost-effectiveness issues and rejections from both ends of a project’s development cycle.

4.3.4 Satisfaction

Overall, satisfaction among participating customers was high, as seen in Figure 4-2 below. Participating customers were most satisfied with the performance of the EMS system they had installed. The lowest satisfaction related to the product was the amount of the rebate received. According to both customers and trade partners, the increasing costs of EMS equipment as well as labor has made it difficult for the program's incentive levels to keep pace with rising costs.

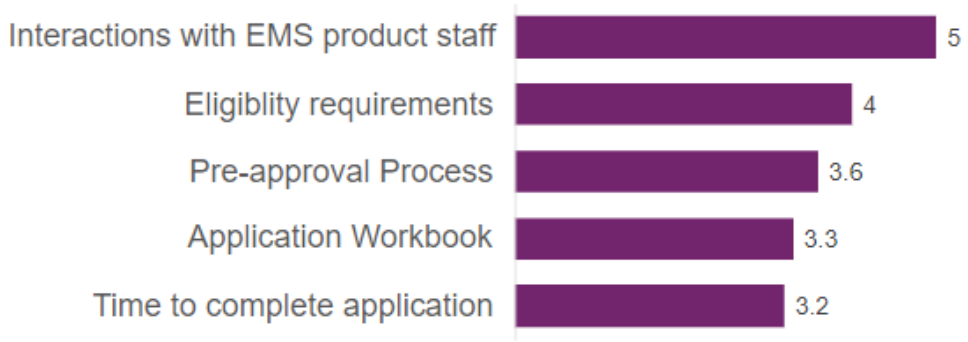
Figure 4-2. Participating Customer Product Satisfaction



Similarly, trade partners also reported moderately high levels of satisfaction with the product, rating it an average of 3.8 out of 5 (n = 5). Suggestions to increase satisfaction among trade partners focused on customer education (n = 2), program marketing (n = 1), and simplifying the pre-approval process (n = 1). One trade partner said, "If Xcel [Energy] can reach out and educate my potential customers so I don't have to go find them but rather the customers go to me." These findings echo the sentiments of nonparticipating customers and trade partners who were not able to put together a cost-effective project.

Regarding the participating trade partner experiences with various components of the EMS process, the evaluation team saw a general trend of high satisfaction. Figure 4-3 shows that trade partners were most satisfied with the EMS Product staff, rating it very highly: 5 out of 5. As noted previously, while Figure 4-3 shows trade partners were least satisfied with the time it took to complete the application, it was still rated relatively high—with an average of 3.2 out of 5. The application workbook itself was also rated somewhat moderately, but lower satisfaction scores with this component still tied back to length—trade partners felt it took a long time to complete and hear a response back. One participating trade partner said, "You submit something, and it takes 4-5 weeks to a couple of months to get responses." Additionally, one participating trade partner felt the preapproval process could be clarified, stating, "If there is a way, they can make it easier with the preapproval, pre-req thing…like I'm going from this to that with this set point and get a fixed rebate of x dollars." These comments highlight two difficult aspects, that the streamlined workbook is still considered cumbersome compared to a prescriptive structure, and long response times do not work with the timeframe realities businesses face.

Figure 4-3 Participating Trade Partner Satisfaction



4.4 EMS Market Growth

EMS product staff were interested in understanding how to rebuild public perceptions and how much interest exists in emerging technologies. Overall, customers and trade partners reported that perceptions of the EMS product have declined in recent years, driven by high rejection rates and application barriers. However, they offered a variety of suggestions to rebuild those damaged perceptions, focusing on education, communication, and some creative product design ideas. Similarly, peer utilities have taken steps to strengthen public perceptions of their EMS programs while reducing savings uncertainties through workforce development and streamlining the product design. In addition to rebuilding public image, incorporating emerging technologies to the EMS product was broadly supported by customers and trade partners. However, peer utilities were more interested in exploring the capabilities of EMS-enabled demand response. The next section describes perspectives rebuilding public perceptions, followed by an overview of emerging technologies.

4.4.1 Rebuilding Public Perceptions

Both trade partners and peer utilities provided valuable insight into strategies for rebuilding public perceptions of the EMS product. To address declining trade partner perceptions of the EMS product in recent years, participating trade partners (n=3) specifically called out the difficulty of the application process and the lack of transparency in cost-effectiveness calculations. One trade partner said, “Xcel [Energy] has made it more difficult to apply for these. Some of my guys I have to beg them to fill out the paperwork because it is so painful.” While nonparticipating trade partners were happy that the EMS product exists because it shows the utility is taking this technology seriously, they also expressed concerns that the current product is not user-friendly (n = 3) or is too focused on peak demand (n = 1). One nonparticipating trade partner noted that in previous years the application was simpler and almost prescriptive. One said, “We’re just trying to understand like…what's the incentive amount? How does the program function? And I think the more we learned about it, it seems like we have potential to use it.” The suggestions provided by nonparticipating trade partners aligned with suggestions heard from other market actors – indicating that making product changes suggested earlier and in the following recommendations section would improve public relations.

One nonparticipating trade partner’s comments captured the depth of multipronged approach needed to rebuild perception and participation, “I get that Xcel [Energy] can't share secret sauce, but it would be awesome if they told us, hey, if you do XYZ, if you include this type of sequence…If our [acceptance] rate was higher and the speed to analyze [our application] was quick and the effort to submit [the application] was less, I think our usage [of the EMS product] would go up.” These findings illustrate there is no single,

quick fix; rather, several small adjustments can combine to form a larger impact. Additionally, though there is a perception that Xcel Energy cannot share information because it is proprietary, in reality Xcel Energy is likely able to share substantial amounts of the information underlying the project cost effectiveness calculations. There is opportunity for Xcel Energy to share more of this underlying information that goes into project assessment and provide education around what elements will make a project cost effective, so it can successfully qualify for a rebate.

In addition to trade partners, peer utilities provided interesting perspective on program design. One peer utility had an innovative strategy to strengthen public perception of their EMS program while reducing savings uncertainties; they provided a flat 30% incentive of project cost regardless of savings achieved. They were able to justify this by running the product through a highly vetted trade ally network that drives customer engagement beyond submitting the paperwork to provide a year of analysis and workforce development. This peer's approach attacks two market problems:

> *"The issue is controls don't yield savings unless they're actually being used. Then, there's also a lot of uncertainty around vendor capabilities. Every vendor claims to have artificial intelligence, right?"*

Beyond developing an exclusive trade ally network, other peer utilities demonstrated a strong commitment to workforce development to support participation. Peer utilities delivered a range of workforce development services, including paid energy manager salary/services (n = 2) and employee trainings paired with assessments (n = 2). One peer went so far as to offer ongoing management services, "The customer also receives one year to a maximum of five years of ongoing energy management services from the vendor directly that minimally consists of performance analytics and a report every 6 months." Customers and trade partners want to know the utility is as invested in the success of the project as they are.

4.4.2 Emerging Technologies

Customers and trade partners expressed general interest in a variety of emerging EMS technologies, but peer utilities were more focused on exploring the capabilities of EMS-enabled demand response than adding another measure to their product. Participating and nonparticipating customers had minimal detailed knowledge of emerging EMS technologies. One participating customer mentioned being interested in rooftop units for controlling outside air dampers based on CO2 levels. Two nonparticipating customers expressed cautious optimism regarding emerging EMS technologies like wireless and machine learning; one said, "There's the possibility of wireless. I try to keep an open mind. Once a building gets some stuff in it, you just can't go experimenting too much. But I am open to growing the system we have." Again, customers are open to the idea conceptually, but they need help operationalizing those goals in practice.

Like customers, trade partners showed broad support for a variety of emerging technologies. In addition to the support of emerging technologies targeted by the interview, wireless EMS (n = 3), machine learning (n = 2), fault detection and diagnostics (n = 3), and integrated lighting controls (n = 3), trade partners also identified interest in autonomous commissioning (n = 3). One said, "Autonomous commissioning is what I'm trying to get into my projects. Operators are retiring and there are not people to fill their shoes. Autonomous commissioning is intended to fill that gap." Results provided a variety of approaches, but none stand out as being industry best practice at this time.

Peer utilities echoed these concerns. Peer utilities expressed cautious optimism in emerging EMS technologies and were primarily interested in exploring the capabilities of demand response. Instead of driving emerging technology expertise among EMS programs teams, peer utilities addressed concerns

about trade partner performance by vetting them through a program qualified trade ally or project expeditor network (n = 2). While no peer utility we spoke with currently incorporates PCDM savings into their cost-effectiveness calculations, peers predicted an increased reliance on PCDM to meet demand reduction goals as coal-fired generation plants retire (n = 3) and identified a need for automated DR capabilities (n = 2). One peer also expressed interest in adding incentives for battery storage to their program. Peer utilities recognized there may be more promise in removing the barriers to PCDM, rather than to trying to find the next technology that will overcome cost-effectiveness challenges.

5 Conclusions and Recommendations

This chapter presents the evaluation team's key findings and associated recommendations regarding the Xcel Energy Energy Management System Product in Colorado. All recommendations are based on key findings from the evaluation research, and they 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 EMS is considered familiar technology, but the path to implementing PCDM strategies is unclear. Additionally, the evaluation team found that, while low sample sizes made it difficult to draw broad conclusions, evidence supports some larger program design changes that should increase participation and program influence. The remainder of this chapter presents key findings and recommendations.

- **Key Finding 1: Nonparticipating trade partners are not well-informed around PCDM and are not successfully communicating it to their customers. Peer utilities highlighted the importance of training in their plans to increase incorporation of PCDM.**
  - **Recommendation 1: Increase training for trade partners to help them explain the importance of PCDM and sell PCDM elements to customers.** Ensuring trade partners are knowledgeable and confident in (1) their understanding of PCDM, (2) how it benefits a customer and (3) how it increases the success rate of project applications, will be crucial to ensuring that trade partners are talking to their customers about PCDM and developing successful projects. By providing this information before they develop a project, it is possible to avoid the time and administrative burden of going back and forth with Xcel Energy engineers and product staff to revise non-cost effective projects and is likely to improve satisfaction with the product by shortening approval timelines.
    - Conduct webinars and other in-person trainings, and provide training materials on the product webpage to help trade partners understand what they can expect in the future in terms of the role of PCDM and prepare them to support their customers in using their EMS to implement PCDM.
    - Highlight and market project elements that incorporate PCDM and make projects more likely to succeed.
    - Consider creating a list of priority or spotlighted trade partners who go through the aforementioned trainings so that customers are more likely to select trade partners who are equipped to develop product-eligible projects.
    - The product team already has begun engaging trade partners in discussions about the future of the EMS product and can leverage this engagement and momentum by implementing the new trainings and disseminating information on product changes as soon as possible.
- **Key Finding 2: Customers and trade partners whose applications were rejected often did not understand the reasons for their rejections, but they would have been interested in adjusting if they had more information earlier.**
  - **Recommendation 2: Increase communication around reasons for rejections, providing trade partners time to adjust projects and make them cost effective. Consider working with account managers to identify and connect with customers beginning an EMS project.** It is evident that trade partners are motivated and influenced by the product because

they continue to submit applications. By supporting trade partners whose applications are rejected to adjust and make the project cost effective, the product will capture more of that influence through product savings and potential increases in NTGR.

  - Communicate with trade partners early in the project planning when it seems that projects are likely to be rejected, so customers and trade partners can work to make adjustments.
  - Ask trade partner to connect with product staff before the project is fully vetted to determine whether the project looks cost effective and discuss options for adjustments that could be made to help the project pass.

- **Key Finding 3: High incremental costs contribute to low project cost effectiveness and rejections. A peer utility cut proposed project costs in half to account for costs not related to energy savings.**
  - **Recommendation 3: To more accurately portray the costs related directly to energy savings when assessing project cost effectiveness, consider applying a flat reduction of 50% of EMS project costs to account for incremental costs not related to energy savings like comfort and security.** This avoids putting additional burden on trade partners and product staff to split out the incremental costs and identify costs not related to energy efficiency. It also mitigates the high/increasing costs of EMS projects and their impact on poor cost effectiveness outcomes. Improving the passing rate by making it more likely for project to be considered cost effective should increase program participation and product influence by motivating customers to submit eligible projects for reliable incentives.
    - This recommendation reflects research conducted by a peer utility to determine the percent of project costs that are not directly related to energy savings.
- **Key Finding 4: Customers and trade partners are interested in a more predictable or straightforward rebate. Participants also expressed some desire for the rebate to be bigger and thus more influential.**
  - **Recommendation 4: Move forward with plans to make some elements of the EMS product more prescriptive.** The product development team is currently considering updates that would make some measure components of EMS projects prescriptive. Evaluation findings showed that making rebates more predictable or prescriptive would drive participation and increase influence.
    - Other considerations could include increasing the rebate amount for the product, which would also likely drive participation and increase influence, or take an approach similar to one peer—where they applied a rebate representing 30% of project costs for all qualifying projects.
- **Key Finding 5: Product participation is currently low, but upcoming product development updates are likely to capture more product influence.**
  - **Recommendation 5: Apply prospective of .84 when product design updates are implemented. Once participation increases, conduct research to assess whether product changes increased the product's influence in the market compared to the product's level of influence presented in this report.** While application submissions have declined in previous years, trade partners continue to submit applications despite the product's high rejection rates. This provides evidence that trade partners are being influenced by the EMS

product, but this influence is not currently captured because of cost-effectiveness challenges and low project approval rates. The proposed product development changes are likely to increase the acceptance rate, thereby capturing more of the product's influence.

- **Key Finding 6: It can be difficult to collect enough data directly from customers to track customers and understand customer experience, particularly for products with low participation.**
  - **Recommendation 6: Ensure best practice documentation policies are widely disseminated and become standard practice.** Build in additional practices for confirming appropriate data is saved after client engagement (like in a project close checklist) as needed. Make sure Xcel Energy staff save or share additional documentation – emails, application forms, contact information – that contains any information on product influence or the customer journey to provide supplemental details and improve Xcel Energy's ability to track customers. This information can also help increase confidence in NTG estimations during evaluation.
    - Ask account managers to update and share contact information pre-emptively to make recruiting more efficient.
    - Conduct periodic accountability checks to ensure important information is saved – for example, as part of a QA/QC process when a customer engagement is wrapped up.

Appendices

Appendix A: Evaluation Plan

A.1 Evaluation Plan

Introduction

To support the 2022 process and impact evaluation of Xcel Energy efficiency products, the TRC evaluation team conducted a process and impact evaluation of the Xcel Energy Colorado product. This memo provides a plan for the 2022 Energy Management Systems (EMS) product evaluation based on staff feedback during the evaluation kick-off meeting, staff interview findings, and review of product 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 EMS product provides custom calculated rebates for a variety of new and upgraded EMS measures for commercial and industrial (C&I) customers. The product is designed to support C&I customers looking to install a new energy management system or upgrade their existing system who would not do so on their own – and ultimately help them save on operational costs and energy. To achieve this objective, product staff work with customers and trade partners to identify cost-effective measures and submit rebate applications. Product staff also help customers and trade partners iterate project designs to meet cost-effectiveness requirements.

To participate in the EMS product, customers or trade partners must install new or upgraded control system measures, additional control points for an existing system, or microprocessor-based controls in existing C&I buildings. Customers or trade partners first submit an application for project preapproval and receive confirmation of preapproval before completing the application workbook. The application workbook collects the project details required for the product engineers to conduct a project cost-effectiveness assessment.

Project preapproval can be granted at the time of the application, which allows customers and trade partners to begin invoicing expenses to the project with confidence that it could qualify for an incentive without delaying the process. Conversely, if preapproval is not granted, it facilitates quick iteration of project design specifications to meet product cost-effectiveness requirements. Project cost-effectiveness is measured by the Total Resource Costs test (TRC) and must result in a ratio greater than 1.0. After projects are determined to be cost effective, rebates are provided on a custom basis at the rate of $700 per kW saved for system peak savings, plus up to $0.035 per annual kWh saved for electric customers and $4 per annual Dth saved for gas customers. Custom rebate calculations for the EMS product are based on modeled savings.

Xcel Energy made a change to the product's cost effectiveness calculation and consequently, the application process, in 2020. The new calculation required an "8760" hour-by-hour building energy analysis, which increased the amount of information that trade partners needed to

supply. To address the added burden on trade partners, product staff worked to revise the workbook used to collect project data to streamline the application process for customers and trade partners and reduce the amount of project data they needed to provide. Product staff felt this change made the application process easier for customers and trade partners, and effectively decreased application processing time for product staff.

The product faces additional challenge to project cost effectiveness because benefits from Avoided Revenue Requirements (ARRs) have rapidly declined for kWh savings in the past several years. The declining ARRs reduce the available savings from off-peak benefits – and projects that could pass cost-effectiveness tests in the past by relying on turning off equipment during off-peak hours can no longer meet cost-effectiveness requirements. The product focuses on system peak savings during the hours of 2-6pm, but in the future it will become more difficult to capture these peak savings for many C&I customers because the system peak will shift as an increasing share of renewable energy comes onto the grid.

The combination of decreasing ARR benefits and increasing costs of EMS measures has made it significantly more difficult for EMS projects to pass TRC tests, and as a result, project rejection rates have steadily increased to their current rate of about 30% passing[1]. In 2022, the EMS product staff have been working with the product development team to implement program design changes intended to increase the likelihood of project cost effectiveness, help the product meet its savings goals, and provide a better experience for trade partners and customers. In combination with the findings and recommendations identified through this evaluation, these changes, will continue to inform the direction of support and incentives for load shifting in conjunction with EMS installation and narrow the list of already-modeled savings aspects to those that are most likely to help a project pass the cost-effectiveness test.

As shown in Table 1 below, the EMS product achieved most of its savings through rebates for new EMS system upgrades, versus rebates for EMS upgrades, representing 73% of projects in 2021. The kWh savings goal for the EMS product in 2021 was 7,235,485 kWh and the product achieved approximately 48% of that goal.

Table 1. Colorado Energy Management Systems, January – December 2021

Measure	kWh		kW		Therms		Units	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total
New EMS System	2,046,851	59%	371.3	67%	12,754	53%	8	73%
EMS Upgrade	1,436,967	41%	181.2	33%	11,220	47%	3	27%
Total	3,483,818	100%	552.5	100%	23,974	100%	11	100%

[1] Product staff note that rejection rates are increasing and the number of submissions is also decreasing.

Evaluation Overview

The 2022 evaluation consisted of a process evaluation and an impact evaluation. The process evaluation focused on customer and market actor experiences with the product, while the impact evaluation focused on estimating a net-to-gross ratio (NTGR). This section presents the objectives of these two components of the evaluation. We have provided a more detailed description of the evaluation activities in the next section.

Process Evaluation

The evaluation team discussed process evaluation priorities during the kickoff meeting and staff interviews. During those conversations, the following process-related themes emerged:

- The product experienced decreasing customer and trade partner participation in recent years and did not reach its savings goals in 2021. Once changes to the program design have been implemented, the product team is interested in re-establishing and strengthening existing relationships with trade partners to promote the product and increase participation.
- Understanding and awareness of the product and EMS generally is low among customers. Application approval rate is low (<33%) because most submitted projects are not cost effective, which negatively impacts customer and trade partner experiences with the product. Furthermore, most customers and trade partners do not understand the product's cost effectiveness calculation, and the interplay between peak savings, reductions in ARR benefits and increases in project costs is complicated. As a result, when projects are rejected, it is often difficult for product staff to explain why, which can further impact relationships with customers and trade partners. Further complicating this issue is the high levels of turnover at trade partner companies. It is difficult to maintain awareness of the product and relationships because of the frequency of trade partners leaving the company.
- Customers have difficulty operating their EMS in a way that can reduce load during peak hours. Often, customers use their EMS to reduce their load by turning off equipment later in the day – not during peak hours of 2-6pm. Targeting peak hours will also become more difficult in the future as more renewables come onto the grid, pushing peak demand times to different times of the day based on varying weather conditions. Often these peaks will be pushed to later in the day when many businesses are already ramping down, making it more difficult to capture these savings. Xcel Energy is interested in identifying strategies and best practices to help customers reduce their energy use during current system peak hours and also set them up for more active demand management. More active management (like utility-controlled demand management) in the future will likely be accompanied by additional rebates.

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

- Understand opportunities to improve customer and trade partner understanding of **the interaction of EMS and peak load shifting**.

  Explore customer and trade partner awareness of the EMS product and EMS, particularly related to whether participants understand how to use their systems to optimize demand savings during peak periods. The evaluation team will also ask customers about their existing knowledge of non-energy benefits (like comfort) prior to completing their EMS project, and whether this pre-existing knowledge motivated them to participate in the product.

Identify opportunities to increase customer peak demand management and what technical support will be needed for customers to implement peak demand management and demand response.

Research what information, training, and tools product staff can provide to help trade partners better support customers in managing peak load shifting.

- Collect feedback on **customer and trade partner experiences** with the EMS product, including satisfaction with product elements.

  Solicit feedback on the new workbook process and determine whether trade partner continue to find the application process burdensome – and if so, what specifically about the process is challenging.

  Understand how product staff can best communicate cost-effectiveness to customers and prevent customers from becoming too discouraged if their projects do not pass the TRC test and are rejected.

  Understand how trade partners support the optimization of operation for their customers' EMS systems, and whether they follow up with customers after installation.

  Determine whether customers whose applications are rejected due to lack of cost effectiveness go on to install controls or participate in other products. Understand at what point in the application process customers decide not to participate.

  Understand customer and trade partner satisfaction with elements of the EMS product.

- **Explore ways to grow the EMS market.** In doing so, we will explore the following topics:

  Understand how peer utilities manage similar demand response-based EMS products.

  Understand how to rebuild public perception of and trust in the EMS product.

  Research trade partner awareness and perspectives of new or upcoming EMS technologies. In particular, determine trade partners interested in new or emerging technologies, like integrated lighting/controls systems, machine learning, fault detection, diagnostics and wireless controls systems.

  Understand whether trade partners feel there is opportunity for controls in smaller buildings and whether a predictable rebate would make the program more attractive. The evaluation team will follow up with peers on these questions to understand what peer programs are experiencing around these opportunities.

  Support product staff as they identify which projects/modeled savings aspects would be good candidates to remove from product materials that are known to be commonly rejected.

Impact Evaluation

The objective of the impact evaluation of the EMS product was to develop a net-to-gross ratio (NTGR) documenting the extent to which product activities influenced customer purchasing decisions. The evaluation team used participating and non-participating customer interviews as well as trade partner interviews to estimate the EMS product's NTGR (both retrospective and prospective). Accordingly, the objectives of the impact evaluation include:

- Determine NTGR for EMS rebates.
- Identify major drivers of free-ridership.
- Assess participating customer spillover.
- Assess market effects of the EMS product.

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

Data Collection Activities and Sampling Plans

To meet the above objectives, the evaluation team 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 the specific needs for this evaluation.

For customer research, the evaluation team planned to conduct interviews with up to 24 participating customers (representing a census of participating customers in 2020 and 2021, as well as an estimate of participating customers by Q2 of 2022 (Table 2, Task Reference 2). These interviews informed prospective and retrospective NTGR estimates and also included customer-related process questions. The evaluation team also planned to conduct interviews with up to 38 non- and near-participating customers, defined as customers who have applied for a rebate but ultimately did not receive one. (Table 2, Task Reference 3).

For trade partner research, the evaluation team planned to conduct phone interviews with up to 8 participating trade partners and 8 non-participating trade partners (Table 2, Task Reference 4) to understand their experiences with projects completed through the EMS product and barriers to participation. Non-participating trade partners were defined as trade partners that previously participated in the product but did not participate in 2021.[2]

Finally, peer utility and stakeholder interviews (Table 2, Task Reference 5) help Xcel Energy understand how other utilities support the installation of EMS measures in their C&I markets, with particular attention to programs that measure cost-effectiveness using the Total Resource Cost test at the project level, as well as programs that incorporate peak demand management in their design. These interviews were intended to further inform best practices related to EMS programs and provided insights into market-related opportunities for the EMS product.

[2] The targeted number of interviews for each data collection activity were based on achieving 90/10 confidence but were ultimately unfeasible due to low response rates and lower provided sample numbers than initially anticipated. The evaluation team attempted to contact all participating customers and trade partners. Actual completions were:

Participating customer interviews (n=3)
Near-participating customer interviews (n=6)
Participating trade partner interviews (n=5)
Nonparticipating trade partner interviews (n=4)
Peer utility interviews
(n=4)

Table 2. Energy Management Systems Research Summary

Task Ref.	Research	Included in Original Scope	Population Size	Research Objectives
1	Staff Interviews	✓	6	Inform Evaluation Plan
2a	Participating Trade Partner Interviews	Adjusted	8	Understanding of Peak Load, Product experiences, Growing the EMS market, NTGR
2b	Non-participating Trade Partner Interviews	No	34	Understanding of Peak Load, Product experiences, Growing the EMS market, NTGR
3a	Participating Customer Interviews	Adjusted	24[a]	Understanding of Peak Load, Product experiences, NTGR
3b	Supplemental Customer Journey Analysis	Adjusted	24	NTGR
4	Non- and near-participating Customer Interviews	Adjusted	43	Product experiences, Growing the EMS market, NTGR
5	Peer Utility & Stakeholder Interviews	Adjusted	4-6 utilities, 1 stakeholder	Growing the EMS market

[a] This represents a census of all 2020 and 2021 customers, and an estimate of 2022 participating customers. The evaluation team will attempt to recruit all participating customers from 2020, 2021 and through Q2 of 2022.

[b] This represents a census of all trade partners who participated in 2021. The evaluation team will attempt to recruit all participating trade partners.

1. Staff Interviews

In March and April 2022, the evaluation team conducted six interviews with Xcel Energy staff to inform this evaluation plan, discuss product goals, and review product processes, challenges, and successes. Those interviewed included the current and former product managers, a product team lead, a member of the engineering team, a trade relations manager, and two account managers. These interviews were conducted over the telephone and took approximately 30 to 60 minutes to complete. These meetings, combined with the kickoff meeting, allowed the evaluation team to create a focused evaluation plan with defined data collection activities.

2a. Participating Trade Partner Interviews

The evaluation team utilized trade partner interviews to meet both process and impact evaluation objectives. These interviews are integral for exploring the following topics.

- **Product Experience:** The evaluation team discussed trade partners' product experience and satisfaction with the EMS product, including their interactions with product staff. We assessed their awareness and understanding of the EMS product. We also explored their broader experience and satisfaction with Xcel Energy and account managers, as well identified opportunities, if any, to improve the products' delivery.

  The evaluation team also assessed trade partner feedback on customer awareness, motivations, and barriers to product participation. We also explored what types of projects trade partners implement for participating customers without the support from Xcel Energy products and reasons why they do or do not complete additional projects. This provided insight into broader market experiences to help supplement findings from the participant and non-participant customer interviews.

- **Opportunities for Growing the EMS market:** The evaluation team asked trade partners about new equipment or technology that they expected to drive the EMS market in the future, including wireless EMS and integrated controls.

- **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 equipment. In particular, we explored what energy management measures, if any, near or non-participating customers included in their projects and explored the motivation for those actions. This was important in assessing "standard practice" within the market and provided evidence for determining market effects and prospective NTG.

The evaluation team planned to interview up to 8 participating trade partners as part of this effort, which represented a census of the trade partners who completed EMS projects through the product in 2021. The responses from these interviews were also used to inform peer utility interviews, particularly related to interest in new technologies or potential program design changes. The evaluation team also attended an EMS Advisory Board meeting prior to the interviews, where the product team discussed the EMS product with participating and previously participating trade partners. Topics covered included upcoming or proposed changes to the program, ideas for project elements that could make a project more likely to pass, and a discussion of barriers and challenges. The evaluation team used the discussion during this meeting to inform and hone the trade partner interview guide.

2b. Non-Participating Trade Partner Interviews

The evaluation team utilized non-participating trade partner interviews to meet both process and impact evaluation objectives. These interviews were used to explore the following topics:

- **Product Experience:** The team spoke with non-participating trade partners to better understand why they no longer complete projects through the EMS product, and what barriers to participation they experience.

  The evaluation team assessed non-participating trade partner feedback on customer awareness, motivations, and barriers to product participation. We also explored what types of projects these trade partners implement for their customers without the support from Xcel Energy products and reasons why they do or do not complete additional projects. This provided insight into broader market experiences to help supplement findings from the participant and non-participant customer interviews.

- **Opportunities for Growing the EMS Market:** The evaluation team asked trade partners about new equipment or technology that they expected to drive the EMS market in the future, including wireless EMS and integrated controls. We also asked about project preferences in terms of completing new construction projects vs projects in existing buildings.
- **Retrospective and Prospective NTG Impacts:** Finally, the team asked questions on the influence, if any, the product had on the trade partner's business strategy or model. The team also asked non-participating trade partners to provide their perspective on potential product design changes, which contributed to estimation of prospective NTG impacts.

The evaluation team planned to interview up to 34 non-participating trade partners as part of this effort. This represented a census of the trade partners who have stopped participating in the EMS product since 2018. The evaluation team completed four interviews with non-participating trade partners, representing roughly 10% of the population.

3a. Participating Customer Interviews

The evaluation team utilized participating customer interviews to meet both process and impact evaluation objectives. These interviews focused on the following topics:

- **Product Experiences & Satisfaction:** The evaluation team assessed how customers became aware of the EMS product and eligible measures to better understand how participating customers learned about the rebates. We also asked customers about customer motivations to apply for rebates to better understand why they want to participate and if any particular product elements drive participation. The evaluation team discussed participating customers' experiences, understanding, and satisfaction with various aspects of the rebate process.

  The evaluation team identified product strengths and opportunities for the product to better engage potential customers.

  The evaluation team assessed customer satisfaction with various aspects of the product application workbook, cost-effectiveness test, staff communications, and rebate opportunities. We also asked customers if there are other resources or tools customers wanted or needed to make it easier for them to participate and/or to improve their satisfaction.

  The evaluation team assessed customers' experience throughout the product, including what was working well, what they found were the most important or valuable aspects of the product, and identified aspects of the products that could be improved. We also identified potential support that might improve their experience, or they would like to see included in the product.
- **Understanding of EMS & Peak Load Shifting:** The evaluation team explored customers' understanding of peak demand and the effects of load shifting on their rates and product rebate structure. The team also determined if customers were interested in understanding and maximizing their savings through peak demand management.
- **Retrospective NTG Impacts**: The team asked participating customers questions on product attribution, or the impact the product had on their decision to implement energy efficiency measures because of the EMS product. We also asked about potential

efficient measures installed without an Xcel Energy rebate due to the influence of the EMS product (spillover).

For the participating customer interviews, the evaluation team spoke with customers who participated in the EMS product between 2020 and 2022[3]. The population and sample are shown below in Table 3. Additionally, product staff were working with the product development team on proposed changes to the product's design and were interested in collecting some feedback from the product's participating customers. The evaluation team coordinated with the product development team to incorporate questions from the product development team as appropriate and as the length of the interview guide allowed.

Table 3. Sample for Participating Customer Interviews, January 2020 – July 2022

Year of Participation	Population Size[a]	Sample Size
2020 Participants	10	2
2021 Participants	3	1
2022 Participants (Through June 22)	1 (8 estimated)	0
Total	**14**	**3**

[a] This represented a census of all 2020 and 2021 customers, and an estimate of 2022 participating customers. The evaluation team attempted to recruit all participating customers from 2020, 2021 and up until Q2 in 2022, but was not able to reach every participant. There was only one 2022 participants by Q2 when the interviews were conducted, but the evaluation team was not able to reach that participating customer.

3b. Supplemental Customer Journey Analysis

The evaluation team planned to supplement findings from participating customer interviews with an analysis of customer interactions with product staff, trade partners, and account managers to further understand the product's influence on customer decision-making. We requested materials tracked through Salesforce, email, spreadsheet trackers or other correspondence (as available) that may help to map the history of interactions between staff and the customer for all participating customers to determine a storyline of participation. We attempted to compare this information to responses from participating customer interviews to understand whether there is a consistent story that describes Xcel Energy's influence on customer motivation to participate in the product, but the amount of customer data available did not provide enough insight into customer and product relationships to draw additional conclusions.

4. Non/Near-participating Customer Interviews

The evaluation team recommended conducting up to 38 near- and non-participating customer telephone interviews to meet process evaluation objectives. For the purposes of this research, near-participating customers were defined as customers who applied to install EMS equipment with support from the product, but ultimately did not install equipment through EMS product

[3] When interviews were conducted in Q2 of 2022, there were no new participating customers in EMS. The evaluation team initially planned to conduct multiple waves of interviews to include new 2022 participants but did not end up doing so because there were no new participants. The population of near-participating customers was 25.

(either because their application was rejected, or because they chose not to move forward). Non-participants were defined as customers who are eligible to participate in the product but have not. As Xcel Energy does not track non-participating customers, the evaluation team planned to work with Account Managers and trade partners to identify possible customers who are eligible but have not participated in the product, as necessary, but decided to prioritize contacting near-participating customers. Interviews were conducted over the phone and focused on the following topics:

- **Product experiences:** The evaluation team assessed near- and non-participating customer perceptions and awareness of the products, including barriers to product participation. For customers whose applications were rejected, the evaluation team asked questions to determine the customer's understanding of why they were rejected and how that impacted their perception of the program. We also asked near-participating customers if they continued to install EMS equipment without the support of the product.
- **Retrospective and prospective NTGR Impacts:** The team asked near/non-participating customers how their behavior differed in response to program design changes, which helped inform prospective NTG insights.

The evaluation team prioritized contacting near-participating customers (see Table 4).

Table 4. Sample for Near-participating Customer Interviews (January 2020 – December 2021)

Strata	Population Size	Sample Size
2020	24	2
2021	9	4
2022	3	0
Total	**25**	**6**

5. Peer Utility and Stakeholder Benchmarking Interviews

The objective of the peer utility and stakeholder benchmarking task was to understand how peer utilities are approaching key issues related to implementing energy management system products. The evaluation team used secondary research, as well as input from the product manager to identify four to six peer utilities to interview. We will consider the following criteria when selecting peer utilities: similar program designs, programs that utilize the Total Resource Cost test of cost-effectiveness to assess projects, programs known to have best practices or tools Xcel Energy is interested in pursuing, and utilities that operate in similar territories (including geography, use of peak demand shifting/TOU with EMS projects, number of customers, and/or number of small businesses in its territory).

The evaluation team will work to recruit staff in key management roles related to EMS programs at peer utilities with a target sample size of four to six interviews. These interviews will generally focus on the same discussion topics being explored in the interviews with Xcel Energy customers and trade partners, but will emphasize the following research objectives specific to peer benchmarking interviews:

- **Program Design:** The interviews focused on whether peak shifting is occurring, and if so, how peer utilities have successfully increased participation in their programs. The evaluation team specifically attempted to understand what technical support related to peak demand management for the product would be necessary for increasing participation. Interviews also assessed the challenges faced by peer programs, and what steps peers were taking to overcome these barriers. The interviews also followed-up on questions posed to trade partners about emerging or new technologies and determined how/if peers incorporated these technologies into their programs.
- **Cost Effectiveness:** The interviews focused on how peer utilities who employ the TRC test to assess EMS project cost effectiveness successfully approved enough projects to meet their savings and participation goals.

The evaluation team worked with the product manager to identify a list of peer utilities to include in the peer utility sample. The evaluation team reviewed these utilities and identified additional peer utilities for consideration prior to conducting the interviews.

Net-to-Gross Approach

The net-to-gross assessment aims to estimate the percentage of savings achieved that can be attributed to product actions, or a net-to-gross ratio (NTGR). The NTGR includes multiple metrics, which are described in the sections below. To estimate the ratio, the evaluation team primarily used participating customer self-report interviews, trade partner interviews, and self-report nonparticipating customer interviews to assess product attribution, including free-ridership, spillover, and market effects metrics. The evaluation 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 has been the basis for our evaluations conducted for Xcel Energy since 2017.[5] The evaluation team will estimate retrospective and prospective NTGRs. The remainder of this section presents our methodology for estimating the retrospective and prospective NTGRs.

Retrospective NTG

The evaluation team estimated retrospective NTGR 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 a NTGR for the product. This section describes how the evaluation team will estimate these components of the retrospective NTGRs.

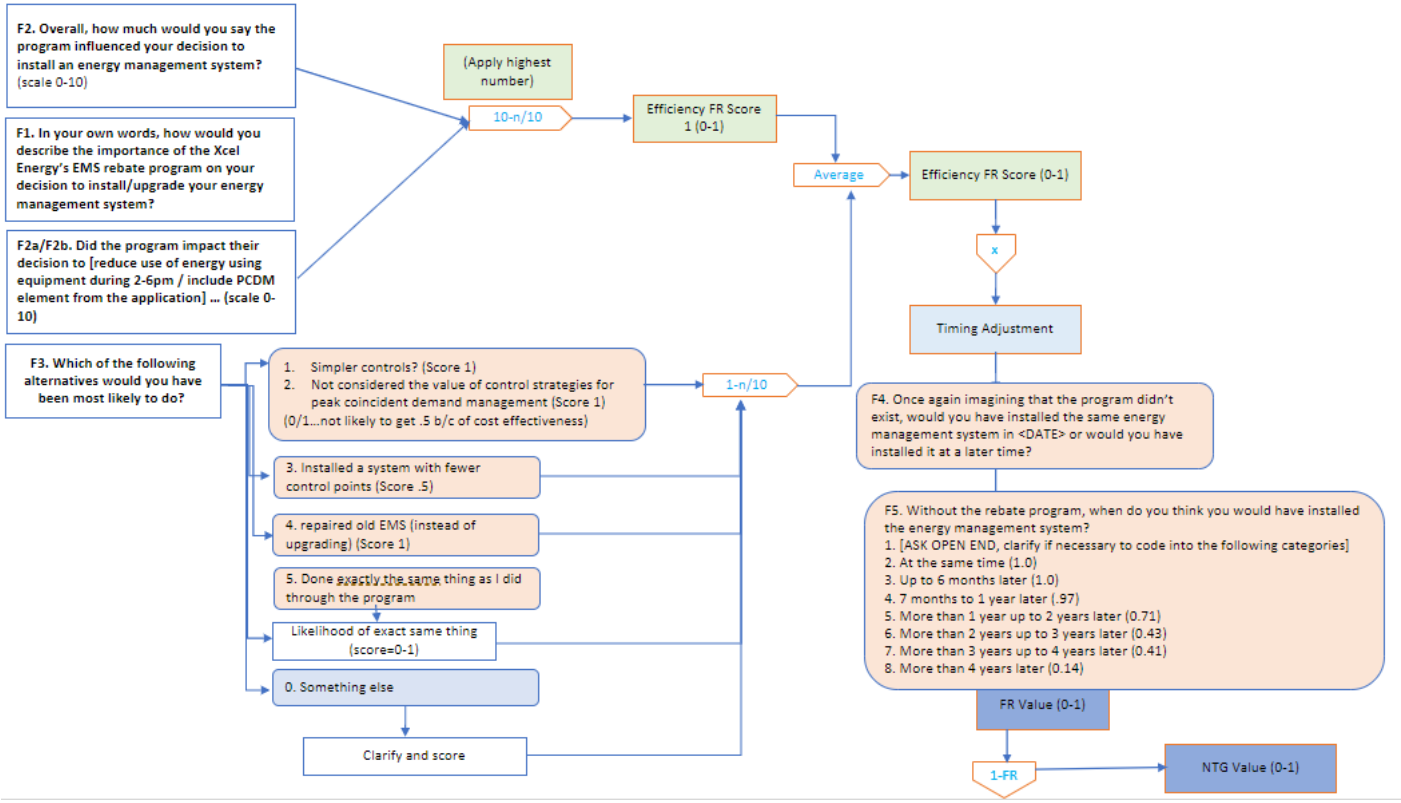
Free-Ridership

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.

[4] Illinois Energy Efficiency Stakeholder Advisory Group. Illinois Statewide Technical Reference Manual, Version 10.0, Volume 4, Attachment A: IL-NET-TO-GROSS Methodologies, Volume 4. September 24, 2021.
[5] The Xcel Energy evaluation team does not include the "Product Influence" score, which is one of three scores used to calculate free-ridership defined by the IL TRM. This decision was made in 2018 based on feedback from cognitive interviews with participating customers, which found that customers did not respond to this question as expected in the IL TRM.

To determine free-ridership, the evaluation team applied a similar procedure described in the Illinois TRM for energy efficiency programs most similar to the Energy Management Systems product. This procedure was based on the 2021 Illinois NTG Protocols and incorporated changes that Illinois stakeholders were discussing for 2022. The questions and procedure used to construct a free-ridership estimate are included in Figure 1 below.

Figure 1. Energy Management Systems Free-Ridership Procedure



Product Influence Score

The Product Influence Score is a measure of how influential the product was in a participant's decision-making process. To measure Product Influence, we used questions F2 and F2a/F2b in Figure 1 above to score the product's influence for each participating customers on a scale of 0-10. To increase confidence in these scores, each participating customer's score was also informed by their corresponding trade partner's perceptions of the product's influence on their decisions.

To produce matching scales with the Non-Product Score, the evaluation team took the Product Influence Score, reversed the scale (making a "10" now a "0"), and divided by 10, so scores would fall between "0" and "1." A Product Influence Score closer to 0 indicates a high level of product influence.

Since the Product Influence 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, described below.

No-Product Score

The No-Product Score is a measure of what the participant would have done if the product had never existed. In contrast to the Product Influence 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 measure the No-Product Score, the evaluation team used question F3 in Figure 1 to determine what the customer would have done if the product did not exist and provide a score on a 0-1 scale.

The evaluation team then averaged the Product Influence Score and the No-Product Score together to estimate an initial free-ridership score for each participating customer respondent.

Timing Adjustment

The evaluation team developed a timing adjustment to overall free-ridership using survey responses, based on questions F4 and F5 in Figure 1 above. Unlike the Product Influence Score and No-Product Scores, which measure product influence on equipment installation overall, the timing adjustment measures whether the product influenced the timing of equipment installation. To determine whether a timing adjustment should be attributed to a participating customer, the evaluation team asked respondents whether they installed their equipment earlier than they otherwise would have due to the product's influence.

Qualitative Adjustments

The population size for the EMS product was small, with a total participating population of 14 customers between 2020 and Quarter 2 of 2022. The evaluation team was able to interview three respondents from this population. Due to the limited data sources, qualitative feedback, in addition to quantitative indicators, played an important role in our analysis. Following the Illinois TRM Study-Based Protocol, the evaluation team built many open-ended questions into the interview to capture all key details regarding each participating customer's experience. Through the supplemental data analysis, we also reviewed Salesforce documentation and the custom rebate application to supplement interview findings, but we found limited supplemental information on product influence from Xcel Energy documentation. When applicable, the evaluation team adjusted participating customer free-ridership scores based on qualitative findings from participating customers and corresponding trade partner interviews.

Spillover

The evaluation team analyzed spillover based on feedback from participating customers. The following section describes our method for calculating spillover from participating customers.[6]

Participating Customer Spillover: The spillover metric represents additional savings achieved by participating customers as a result of product activities, but outside of rebated measure savings. 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

[6] For this evaluation, the evaluation team does not recommend including non-participant spillover, as projects that qualify for spillover would need to pass the product's cost effectiveness test and estimating this would be very difficult. The evaluation team also would not expect to see much, if any, non-participant spillover that would meet the cost effectiveness requirements (particularly for near-participants, whose applications were already rejected).

(Measure Attribution Score #2). The spillover score, as calculated below, must be greater than 5 in order for the additional measure to have qualified for spillover. When this criterion is met, the savings were added to savings attributed to the product.

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

Market Effects

The trade partner interviews offered important insights into "market effects" due to the EMS product. Such 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 EMS measures to C&I customers knowing that a rebate is available for customers. Over time, the contractor builds this into their general approach to marketing and selling EMS measures. The interviews included questions to assess any long-lasting changes to trade partner practices.

Estimating a Net-to-Gross Ratio

By design, our final estimated NTGR recommendation includes data from mixed methods research – both quantitative data and qualitative data. Our initial NTGR estimates were calculated separately and estimated using self-reported participating customer responses, trade partner reported NTGR interview responses, and nonparticipating customer interview responses. The formula to calculate the retrospective NTGR is as follows:

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

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

- Participating customer interviews
- Non-participating customer interviews (to inform prospective NTG, were used to determine spillover)
- Trade partner interviews

Based on these results, we then adjusted the NTGR to create a final recommended NTGR that was consistent with this narrative and is informed by the overall purpose and design of the product. The final NTGR estimate was based on the professional judgment of our team after considering all available quantitative and qualitative data. We also completed sensitivity testing by weighting our findings by both kW and kWh to determine whether weighting by one or the other has a significant impact on the NTGR.

Ultimately, evaluation team weighted each free-ridership score by the total savings for that measure, so that the score is representative of population-level savings (i.e., measures with a larger share of total kWh are weighted more heavily, as they have more influence on the total product savings).

Prospective NTG

The evaluation team recommended a prospective NTGR that was forward-looking and reflected upcoming changes to the market and the significant known changes coming to the product in the near future. The prospective NTGR provides insight to Xcel Energy to understand how NTGR may change prospectively to reflect expected changes to the EMS product design. The prospective NTGR reflected any recommended adjustments to the retrospective NTGR, based on evidence from the evaluation findings, including results from participating customers, non-participating customers, participating trade partners, non-participating trade partners, staff interviews, and peer utilities. Trade partners were asked about the importance of the rebates in driving the installation of C&I EMS measures in Colorado. In developing the final recommended NTGR, 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 incorporate those into the final estimated NTGR. We also incorporated results from the benchmarking research regarding prospective NTGRs used in other states to inform our estimate.

Appendix B: Data Collection Documents

Appendix B contains materials related to data collection including the staff interview guide, participating customer interview guide, near-participating customer interview guide, 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 2022 evaluation of the Xcel Energy DSM products. The interviews were semi-structured, with these questions serving 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 necessarily be asked verbatim, but served as a roadmap during the conversation.

Staff Interview Research Questions or Objectives

The staff interviews addressed the following research questions:

- Assess the extent to which the product design supports product objectives and customer service/satisfaction objectives.
- Understand Xcel Energy's current CO Energy Management Systems offerings.
- 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

[If 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 the products 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 CO Energy Management Systems product, what Xcel Energy hopes to achieve through implementing this product, how it operates, and a bit about your experiences with Energy Management Systems product. We are interested in asking you some questions about the Energy Management Systems product so we can benefit from your knowledge and experience to improve our understanding. I have a set of questions that should take approximately 30-45 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 Energy Management Systems product? [IF ALREADY KNOWN, REWORD TO CONFIRM]

[PROBE]

- 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 Energy Management Systems product, both overall and specific. Based on our discussion at the kickoff meeting, it sounded like broadly, the goals of the product are to encourage customers to install or upgrade automated controls in C&I buildings and reduce peak energy use through those sensors or controls.

B1. In your own words, can you take me through the key goals for the Energy Management Systems product?

[For staff outside of the Customer Solutions team] Can you take me through the key goals for the Energy Management Systems product, 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., by measure type)?

B1b. Any other, non-energy goals?

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

[PROBE]

B1b2. Any longer-term goals? For example, altering market behaviors, encouraging participation in other programs at Xcel?

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 2021?

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 Energy Management Systems product?

B4a. What are interim indicators that the Energy Management Systems product is or is not meetings its objectives or goals?

B5. What influences, if any, do you think the Energy Management Systems product 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.

Amy, you've already sent me materials, but if there are any formal documents you think of while we walk through these next questions, I'd appreciate getting that information.

[TAILOR BASED ON WHAT IS ALREADY KNOWN FROM KICKOFF, ONLINE, AND OTHER RESOURCES]

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:

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?

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 Energy Management Systems product as it is currently being run?

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

D2. During the kickoff we discussed some of the challenges the product faces. I will read through the main challenges I heard during the kickoff, and you can add on any details you think are missing or correct me if I haven't characterized it correctly. Does that sound okay?

- The first main challenge I heard was that the product struggles with cost effectiveness – the current model requires TRC cost effectiveness, reasons we talked about in the kickoff included:
  - Benefits from avoided revenue requirements have declined for kWh.
  - Cost of projects – retrofitting in existing buildings is expensive (particularly in Denver metro area), cost of EMS systems is expensive, which hurts in TRC model.
- Performance contractors are installing EMS but not applying for rebates.
  - 98% of public buildings are under performance contractors – related to TABOR laws in Colorado that say that capital expenses must be approved by bond issue by the public, performance contractors own these customers.
- Contractors who used to be heavy participators are focusing on installations in NCx which is out of the product's scope.
  - For existing buildings, TPs don't want to sell just a project or an "invoice" they want a subscription model, would rather sell it as a service.
- High proportion of project rejections
  - Due to cost effectiveness challenges
  - Impact on TP relationships – TPs invest time in filling out the applications, application rejections hurt TP's relationship with the customer, all contributing to TP dissatisfaction with the product.

Any others that I didn't mention here?

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?

PROBE: In the kickoff we discussed a few ideas: narrowing product to only measures that are expected to pass the cost effectiveness test, so TPs don't submit projects we know will fail; If I'm describing this correctly – offering a rebate for the EMS system but combining with a rebate or incentive for curtailing usage during peak coincidence use (is there another product that already offers this?)

Anything else that I didn't mention?

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?

E1d. 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.

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

F2. What kinds of data are collected for the Energy Management Systems product?

F3. Are there any data that you would like to collect for the Energy Management Systems product but haven't been able to?

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

F5. At the kickoff, we determined that speaking with near-participating customers and non-participating trade partners would be important. Would these customers/trade partners all be tracked in Salesforce?

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. What are your main priorities for this evaluation?

G1b. Something I heard in the kickoff was that peak coincidence will be interesting to look at, but that the evaluation needs to be careful about researching specific hours because the resource mix is changing. Trade partners need to communicate to customers that they need to use their EMS system to reduce usage during peak demand but be flexible because the timing of the peak window may shift. How do you see these questions incorporated into the evaluation? Is this something we should ask participants/near-participants? Focus on awareness? Or something we should be asking trade partners about – see if this is something they're communicating to their customers?

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. Are there any particular product staff members you would like to make sure we talk with?

G5. 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.

G5a. What criteria is most important to you when selecting a peer utility (e.g., similar climate, similar time in market, etc.)? PROBE: How are states with TRC tests addressing issues around costs?

G5b. Are there any performance indicators you are particularly 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 and impact evaluation of the 2022 Xcel Energy EMS product, the TRC evaluation team conducted telephone interviews with participating customers. For the purposes of these interviews, the evaluation team defined a participating customer as any customer who installed an EMS and received a rebate for that equipment through the product between 2020

and present. We conducted this research to enable us to assess key process and impact evaluation objectives.

The remainder of the introduction provides the evaluation objectives and research questions which the participating customer interviews were designed to address, a description of the sample population and the targeted completes. The introduction is followed by the interview guide.

Evaluation Objectives

The objectives for the Colorado EMS product evaluation were to:

- Understand opportunities to improve customer and trade partner understanding of **the interaction of EMS and peak coincident demand management**.
- Collect feedback on **customer and trade partner experiences** with the EMS product, including satisfaction with product elements.
- **Explore ways to grow the EMS market.**
- **Estimate an overall NTGR**, including the major drivers of free-ridership, spillover & market effects.

For reference, Table 5 provides the research activities used to meet each objective. The last column in this table indicates that the participating customer interviews were used to address all evaluation objectives.

Table 5. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Participating Customer Interview Objective
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Process	Participating customer interviews, and participating and nonparticipating trade partner interviews	✓
Collect feedback on customer and trade partner experiences with the EMS product, including satisfaction with product elements.	Process	Participating customer interviews, and participating and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the EMS market	Process	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTGR, including the major drivers of free-ridership, spillover & market effects	Impact	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓

Table 6 presents the research themes which this participating customer interviews were designed to address, linking each research theme to the associated evaluation objective and interview question.

Table 6. Evaluation Objective, Interview Research Themes & Interview Question Crosswalk

Evaluation Objective	Interview Research Themes	Question Number(s)
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Customer awareness and understanding of EMS technologies	A0-A6a, C12
	Customer awareness and understanding of cost-effectiveness	A8, A8a
	Customer interest in peak coincident demand management supported through EMS	C12, C12a, C12b
	Technical support, communication, and rebate opportunities needed to overcome barriers to participation	C10, C12b
	Customer awareness of non-energy benefits	B1a
Collect feedback on customer and trade partner experiences with the EMS product, including satisfaction with product elements.	Participants' perceptions of product strengths and opportunities for improvement	C4, C5, C7-C9, C9
	Motivations and barriers to EMS technology and program participation	F0a-F1, B1-B4, C1, C4, C7
	Participant satisfaction with application workbook, cost-effectiveness, staff support	C2a-C2k, C3-C3b
Explore ways to grow the EMS market.	Customer experience with and interest in emerging technologies	C11, C12
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects.	Document the extent to which customers believe the EMS product activities influenced their purchasing decisions	Section F, Section S

Sample & Target Completes

Table 7 summarizes the total sample that was targeted for the interviews. The population of participating customers between 2020 and present was small, so the evaluation team attempted to contact the entire population (conduct a census) of all participating customers. To achieve 90% confidence level with +/- 10% precision for the program, the evaluation team would have needed to speak with 18 participating customers, which would represent a 75% response rate. We spoke with 3 participating customers.

Table 7. Sample Population & Target Completes

Total Completes [a]	Total Population
3	**24 (Census)**

a. The total census of all 2020 and 2021 customers, and an estimate of 2022 participating customers was 24. The evaluation team attempted to recruit all participating customers from 2020, 2021 and through Q2 of 2022.

Sample Variables

Table 8 includes the sample variables that were used to conduct these interviews, as well as descriptions of these variables and potential codes.

Table 8. Sample Variables

Sample Variables	Variable Descriptions	Potential Codes
Interviewer Name	Name of interviewer from TRC	e.g., Emily Morton
MEASURE_DESC	The description of the specific equipment installed in the customer's business as part of the program, with article	e.g., a controls system with demand limiting chiller controls
Contact	Contact name	e.g., Hannah Justus
Phone	Phone number for contact	e.g., 555-555-5555
MONTH	Month equipment was installed	e.g., February
YEAR	Year equipment was installed	2020
FACILITYNAME	Name of facility where EMS was installed	123 Mulberry St.

Fielding Instructions

We attempted to schedule interviews via email if email addresses are available. We supplemented email recruiting efforts with telephone calls as needed.

The following fielding guidelines were used for participating customer recruiting and interviews:

- Attempt each record five 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" or immediate hang-ups) at least once.
- The interview is considered complete when CLOSE2 is answered.
- Calling hours are 9 AM to 5 PM MST.

Interview Sections

- **Intro.** Introduction & Screening
- **A.** Awareness of rebates, EMS equipment & peak coincident demand management
- **F.** Free Ridership
- **S.** Spillover
- **B.** Barriers & Motivations to install EMS Equipment, participate in the EMS program
- **C.** Motivations, Satisfaction & Feedback
- **D.** Business Characteristics
- **Close.** Closing

Interview Guide

Section Intro: Introduction & Screening

Intro1. Hello. This is **<Interviewer Name>** calling from TRC, a national research firm working with Xcel Energy. We're conducting a brief, 30-minute phone interview on Xcel Energy's behalf and offering a $25 Amazon gift card for your time. I'm hoping to speak to someone at your business who would be familiar with your company's [INSTALLATION/UPGRADE] of your Energy Management System on **<DATE>.** Our records show that you or your contractor received a rebate from Xcel Energy for installing **<MEASURE_DESC>**. May I speak with **<CONTACT>**?

[Probe if customer is unfamiliar]

Intro1a. Just to confirm, since January 2020 did you have a **<MEASURE_DESC>** installed at your business?

[ASK IF INTRO1 = Yes OR Intro1a = Yes]

Intro2. Are you the person at your business who is most familiar with the EMS system installed through the Xcel Energy's Energy Management System rebate program, or at least as familiar as anyone else?

[If person no longer works there]

Intro3. Is there someone else that is knowledgeable about your participation in the Energy Management System program?

- What is this person's name?
- Would I reach that person by dialing the same number I used to connect with you?

[ASK IF INTRO2 = Yes]

Intro6. Great! Is now a good time or should we call you back?

1. No objection – fine to continue
2. Objection **[SCHEDULE FOR ANOTHER TIME]**

[If INTRO6 = No Objection]

INTRO. What is your occupational title within your company? [PROBE: If property manager, internal or third party?]

Section A: Awareness of Rebates, Energy Management Systems & Peak Coincidence Demand Management

A0. I'd like to start by asking how you first learned about Energy Management System technology? [PROBE Where did you first learn about the potential to use Energy Management System technology at your business?]

A1. And how did you first hear about the Xcel Energy rebates available for installing or upgrading Energy Management Systems (EMS)? [PROBE Who first contacted you about EMS rebates?]

A2. Before you learned of the rebate how familiar would you say you were with EMS technology? How would you rate your familiarity on a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar? [PROBE: Why did you select that value?]

A2a. Has your familiarity with EMS technology changed since participating in the EMS rebate program through Xcel Energy? If so, how?

A3. Peak coincident demand management is the practice of reducing a building's energy demand during periods when the utility's electric or natural gas system's energy load is the highest. Are you aware of the practice of curtailing energy use during the peak coincident demand period?

[ASK If A3 = Yes]

A3a. How did you first learn about peak coincident demand management? [**PROBE** How did you first become aware of the potential to use peak coincident demand management at your business? Through the process of working with the contractor who installed your controls system?]

A4. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with peak coincident demand management or peak demand shifting? [PROBE: Why did you select that value?]

A6. Which (if any) elements of peak coincident demand management were confusing or difficult to understand? **[PROBE]** Was it difficult to program or imagine programming your controls system to help manage demand during peak coincident periods?

A7. Did your EMS project incorporate control strategies for peak coincident demand management?

[IF A7 = Yes]

A7a. Was there any piece of information or support materials provided to you, that encouraged you to include peak coincident demand management into your project?

[PROBE] Was there any piece of information that encourage you to include any other control strategies into your project?

A8. Did the contractor who installed your EMS discuss ways to make the project cost effective? [**Clarify if necessary** – In order to qualify for a rebate through Xcel Energy's program, your project needed to be cost effective]

A8a. What information did your contractor give you related to your project's cost effectiveness?

A8b. Did your contractor offer you an option with higher energy savings, that would be likely to qualify for an Xcel Energy rebate?

Section F: Free-Ridership

Next I am going to ask about factors that may have influenced your decision to install an Energy Management System at **[FACILITY NAME]**. I'll ask about a few different factors that may or may not have influenced your decision and will ask you to rate them on a scale of 0 to 10, where 0 is not at all influential and 10 is very influential.

F0a. How influential was the rebate dollars available through the EMS program on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]**

F0b. How influential was any information or encouragement you received from a contractor on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? Please use a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential." If this question does not apply to you (you did not work with an Energy Advisor), please let me know. **[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".]**

F0b_1. Was this contractor the same contractor who installed your EMS system?

F0c. How influential was any other 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 install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]

F0d. Have you or your company participated in an Xcel Energy rebate or energy efficiency program prior to this year? Which program?

[ASK IF F0d = Yes]

F0d_1. And how influential was your participation in that previous Xcel Energy program on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]**

F1. In your own words, how would you describe the importance of the Xcel Energy's EMS incentive program overall on your decision to install/upgrade your energy management system and implement control strategies for peak coincidence demand management?

F2. How much would you say the EMS program influenced your decision to install an Energy Management System. Again, please use a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," The bigger the number, the greater the influence.

F2a. Did the program influence your decision to include elements that would reduce or manage your facility's energy use during peak coincident periods? [Clarify if needed: 2-6pm, summer months]

[If F2a = Yes]

F2b. On a scale of 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," how much would you say the program influenced your decision to install an Energy Management System that incorporates control strategies for peak coincident demand management?

F3. Next, I'd like you to imagine that the Xcel Energy Energy Management Systems program, including the incentive, information, and support was not available. Which of the following alternatives would you have been mostly likely to do? [READ OPTIONS]

1. Installed a simpler controls system.
2. Installed a system not including control strategies for peak coincident demand management
3. Installed a system with fewer control points
4. Would have repaired an existing EMS system (instead of upgrading) OR would not have installed an EMS system at all
5. Done exactly the same thing as I did through the program
6. Something else **[PROBE FOR CLARIFICATION]**

99. REF

[ASK IF F3 ≠ 5 (Would NOT have done the same thing)]

F3a_1. Why would you have done it differently? [Why would you not have installed the exact Energy Management Systems project as you did?]

[ASK IF F3 = 5, REF; ELSE SKIP TO F6]

F3b. Using a scale from 0 to 10, where 0 means "not at all likely" and 10 means "extremely likely", please rate the likelihood that you would have installed the exact same Energy Management Systems project if the Xcel Energy **<PRODUCT>** program was not available.

[INTERVIEWER NOTE: CLARIFY ANY DISCREPANCIES BETWEEN INFLUENCE SCORE AND COUNTERFACTUAL SCORE]

[ASK IF F3 ≠ 5 (Would NOT have done the same thing)]

F4. Once again imagining that the program didn't exist, would you have installed the same energy management system in **<DATE>** or would you have installed it at a later time?

1. Yes, I would have installed it at a later time.
2. No, I would have installed it at the same time.

[IF F4 = Yes]

F5. Without the rebate program, when do you think you would have installed the energy management system?

1. [ASK OPEN END, clarify if necessary to code into following categories]
2. At the same time
3. Up to 6 months later
4. 7 months to 1 year later
5. More than 1 year up to 2 years later
6. More than 2 years up to 3 years later
7. More than 3 years up to 4 years later
8. More than 4 years later
9. 9. When my system was so outdated, it was no longer working well, or no longer working.

[IF F5 = 1 year or more later]

F5a. Why would it have been that much later?

[ASK IF MULTI_PREMISE = YES]

F6. Our records indicate that you have implemented projects through Xcel Energy's Energy Management Systems program at several locations. Thinking back to the projects you implemented at your other facilities, did you use the same decision-making process when deciding to install a rebate-eligible energy management system as you just described?

1. Yes, I used the same decision-making process at other facilities
2. No, I used a different decision-making process at other facilities

98. DK

99. REF

[ASK IF F6 = 2]

F6a. How did your decision-making process differ at your other facilities?

Section S: Spillover

Next, I'd like to ask you about other types of EMS you may have purchased since participating in the **Energy Management Systems** program with Xcel Energy.

S1. Since your participation in the **Energy Management Systems** program in **<MONTH> <DATE>**, has your company installed any additional controls without a rebate from Xcel Energy? When I say "controls," I mean any energy management system additions that are eligible for an Xcel Energy rebate.

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

S1a. Why did you not apply for an Xcel Energy rebate for purchasing these controls?

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

S2. Did your experience with the Energy Management System you installed through the Xcel Energy **Energy Management System** program influence your decision to install some or all of the additional controls on your own?

[ASK S3 IF S2 = Yes, ELSE SKIP TO S7]

S3. What type of controls did you install?

[ASK S4a – S4b IF S2 = Yes FOR UP TO TWO MEASURES]

I have a few questions about the **[S3]** equipment that you installed.

S4a. Approximately how many of **[S3]** equipment did you install?

S4b. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of **[S3]**.

S5. How important was your experience in the **Energy Management System** program in your decision to complete your **[S3]** project 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. If you had not participated in the **Energy Management System** program, how likely or unlikely is it that you would have installed these additional controls, 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

S7. Since your participation in the **Energy Management System** program, have you installed any additional energy-efficient equipment, other than controls?

[ASK S8 IF S7 = Yes]

S8. Did you receive a rebate for some or all of this equipment through Xcel Energy or any other energy efficiency program?

1. Yes, we received a rebate for all of the equipment
2. Yes, we received a rebate for some of the equipment
3. No
88. DK
99. REF

[ASK S8a IF S8 = 2 – 3]

S8a. **[IF S8 = 2: Thinking only about the equipment for which you did NOT receive a rebate,]** Do you know if this equipment was eligible for a rebate through an Xcel Energy program?

1. Yes, the equipment was rebate-eligible through an Xcel Energy program.
2. No, the equipment was not rebate-eligible through an Xcel Energy program.
88. DK
99. REF

[ASK S9 IF S8 = 2 – 3; ELSE SKIP TO E1]

S9. **[IF S8=2: Thinking only about the equipment for which you did NOT receive a rebate,]** Did your experience with the Xcel Energy **<PRODUCT>** program influence your decision to install some or all of these efficient products?

[ASK S10 IF S9 = Yes; ELSE SKIP TO E1]

S10. What equipment did you install? Please provide as much detail as you can. **[PROBE FOR NUMBER OF CONTROL POINTS, EQUIPMENT TYPE, CONTROL STRATEGIES IMPLEMENTED, SQ FOOTAGE CONTROLLED]**

[ASK S11 IF S = Yes; ELSE SKIP TO E1]

S11. How important or not important was your experience in the **Energy Management System** program in your decision to install this equipment, using a scale from 0 to 10, where 0 is “not at all important” and 10 is “extremely important”?

[ASK IF S9 = Yes; ELSE SKIP TO E1]

S12. If you had not participated in the **Energy Management System** program, how likely or unlikely is it that you would have installed these additional efficient products, 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?

Section C: Benefits, Satisfaction, & Feedback

[ASK ALL]

C1. We just talked a lot about your decisions to install your equipment, now I'm interested to hear about how you decided to participate in the EMS rebate program through Xcel Energy. Could you walk me through what motivated you to participate in the program?

C11. Are you interested or aware of any new or emerging EMS technologies? If yes, which ones and why?

C12. As more renewable energy becomes available over the next few years, it may become more important to manage your energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects the EMS you installed can help you to manage your energy use throughout the day. How comfortable would you feel using the EMS system you installed to manage your energy use at different peak coincident periods throughout the day?

C12a. How interested would you be in participating in programs through Xcel Energy intended to help manage your energy use throughout the day?

C12b. What other services could Xcel Energy use to support you in adjust your energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

[ASK ALL]

C2. Please rate your satisfaction with various aspects of your experiences with the EMS and rebate program. 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 C2a-C2f, PAUSE AFTER EACH FOR RATING, REPEAT SCALE IF NECESSARY]

1. **[NUMERIC OPEN END (1 – 5)]**
77. N/A
88. DK
99. REF

C2a. The performance of the EMS you installed

C2b. The information you received on how to operate / maintain installed EMS

C2c. The process of finding a contractor that specializes in EMS

C2d. The contractor that installed the EMS

C2e. The cost of the EMS system

C2f. Perceived payback of the system

C2e. The installation of the EMS

C2f. Information provided from Xcel Energy on peak coincident demand management opportunities

C2g. The rebate application process

C2h. Information or support provided from Xcel Energy during the rebate process

[For any C2a – C2f < 4]

C3a – C3f. Why weren't you satisfied with **<RESTORE WORDING FROM C4a – C4f>**

C2i. The amount of time it took to receive your rebate

[ASK IF C2i < 4]

C2i_1. Was there anything you are aware of that caused a delay in your rebate?

C2j. The amount of the rebate you received

[ASK IF C2j < 4]

C2j_1. Was the amount of the rebate you received different from what you were expecting?

[ASK IF C2j_1 = 1]

C2j_2. What amount were you expecting?

C2k. Xcel Energy as an energy and rebate provider

[ASK ALL]

C3. 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. N/A
88. DK
99. REF

[ASK IF C3 < 4]

C3a. Why weren't you satisfied with your experience with the rebate program?

[ASK IF C3 < 4]

C3b. What could program staff do to improve your satisfaction with the rebate program?

1. **[OPEN END]**
88. DK
99. REF

C4. What would you consider the biggest benefit of Xcel Energy's EMS program?

C5. What would you consider the biggest challenge of Xcel Energy's EMS program? [**PROBE** for application challenges, difficulty showing project cost effectiveness]

C7. 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]**

1. **[NUMERIC OPEN END (1 – 5)]**
77. N/A **[RECORD VERBATIM]**
88. DK
99. REF

C7a. Complete program applications, rebate forms, or other program paperwork

C7b. Get in touch with an Xcel Energy representative

C7c. Determine your project's eligibility

C7d. Determining the best equipment models for your business

C7e. Finding a contractor to complete the work

C7f. Understanding how to make your project cost effective

C7g. Understanding how to incorporate peak coincidence demand shifting

[Ask for any C7a – C7f < 4]

C8a – C8f. Why wasn't it easy to **<RESTORE ANSWER WORDING FROM C7a – C7f>**

1. **[OPEN END, RECORD VERBATIM]**
88. DK
99. REF

C9. What is the Energy Management Systems program doing that it should keep doing?

C10. What recommendations do you have for Xcel Energy to improve the Energy Management Systems program? [**PROBE** for additional resources or tools that would have make it easier to participate]

B: Barriers & Motivations to Install EMS, Participate in the EMS Product

B1. Now I want to ask you a few questions about the choices you made when you bought your energy management system. When you were in the process of purchasing this EMS, what factors did you consider when deciding what to install? [PROBE: What are the reasons you chose to install the particular Energy Management System you purchased?]

B1a. What were your initial perception of the benefits of an EMS system? [PROBE for any non-energy benefits like comfort, indoor air quality improvements, contribution to business energy savings or sustainability goals - clarify understanding of benefit and how important it was to motivating customer to participate]

B1b. What, if any, were your initial perceptions of the drawbacks of the EMS system you chose?

B2. When you were in the process of purchasing this energy management system, at any point did you consider installing a different EMS system? If so, what other controls did you consider and why?

B3. Did you have any concerns when purchasing or installing your energy management system? If so, what were they? [**PROBE** for Availability of contractors willing to install equipment, Equipment Costs, Energy bill concerns, technical knowledge of contractor, Comfort issues, Work disruptions, technical capabilities of equipment, tenant complaints about the EMS]

B4. Did you have any concerns with managing your demand during peak coincidence through your energy management system? If so, what were they? [**PROBE** for confusion around timing, work disruptions, tenant comfort issues, energy bill concerns]

Section D: Business Characteristics

We are almost done! I just have a few final questions about the characteristics of your business.

D1. Does your organization own or lease your facility?

[Ask if D6 = 1]

D2. Do you pay your Xcel Energy bill, or does someone else (e.g., building manager)?

D3. Does your organization have multiple locations in **Colorado?**

[If D3 = 1]

D3a. Do you know if any of these locations have participated in an Xcel Energy efficiency project?

Closing

Close1. These are all the questions I have. As a thank you for your input, we'd like to send you $25 Tango gift card. Please permit me to gather the information we need to email the gift card to the intended recipient—this could be you, personally, or anyone else of your choosing.

[COLLECT CONTACT INFORMATION]

B.3 Nonparticipating Customer Survey Instrument

To support the process and impact evaluation of the 2022 Xcel Energy EMS product, the TRC evaluation team conducted in-depth telephone interviews with near- and non-participating customers. For the purposes of this research, near-participating customers were defined as customers who applied to install EMS equipment with support from the product, but ultimately did not install equipment through EMS product (either because their application was rejected, or

because they chose not to move forward).[7] Non-participants were defined as customers who are eligible to participate in the product but did not. The evaluation team prioritized contacting near-participating customers and filled-in additional interviews with true non-participants as necessary.[8] As Xcel Energy does not track non-participating customers, the evaluation team would have worked with Account Managers and trade partners to identify possible customers who are eligible but have not participated in the product, if necessary. We conducted this research to enable us to assess key process and impact evaluation objectives.

The remainder of the introduction provides the evaluation objectives and research questions which the participating customer interviews were designed to address, a description of the sample population and the targeted completes. The introduction is followed by the interview guide.

Evaluation Objectives

The objectives for the Colorado EMS product evaluation were to:

- Understand opportunities to improve customer and trade partner understanding of **the interaction of EMS and peak coincident demand management**.
- Collect feedback on **customer and trade partner experiences** with the EMS product, including satisfaction with product elements.
- **Explore ways to grow the EMS market.**
- **Estimate an overall NTGR**, including the major drivers of free-ridership, spillover & market effects.

For reference, Table 9 provides the research activities used to meet each objective. The last column in this table indicates that the near/non-participating customer interviews are used to address all evaluation objectives.

Table 9. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Near/Non-Participating Customer Interview Objective
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Process	Participating customer interviews and near/non-participating customer interviews; and participating and nonparticipating trade partner interviews	✓
Collect feedback on customer and trade	Process	Participating customer interviews and near/non-participating	✓

[7] These customers are labeled “Closed/Loss” in Salesforce data.

[8] Evaluators ultimately conducted all interviews with near-participating customers.

partner experiences with the EMS product, including satisfaction with product elements.		customer interviews, and participating and participating and nonparticipating trade partner interviews	
Explore ways to grow the EMS market	Process	Participating and near/non-participating customer interviews; and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTGR, including the major drivers of free-ridership, spillover & market effects	Impact	Participating and near/non-participating customer interviews; and participating and nonparticipating trade partner interviews	✓

Table 10 presents the research themes which these near/non-participating customer interviews were designed to address, linking each research theme to the associated evaluation objective and interview question.

Table 10. Evaluation Objectives, Research Themes & Question Crosswalk

Evaluation Objective	IDI Research Themes	Question Number(s)
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Customer awareness and understanding of EMS technologies	A0, A1, A2, A2a, A9-A10, A15, A15a,
	Customer awareness and understanding of peak coincident demand management	A3-A7, A11-A13, A14a, A14b
	Technical support, communication, and rebate opportunities needed to overcome barriers to participation	C10, C7, B5, B5_1
Collect feedback on customer and trade partner experiences with the EMS product, including satisfaction with product elements.	Near- and non-participant product awareness	A17, A18
	Near-participants' perceptions of product strengths and opportunities for improvement	A18, B1, B1a, B2, C13
	Motivations and barriers to EMS technology and program participation	A16a, A16b, B3, C1

	Near-participant experience with the application process	B3_1-B3_4, B4, B5, B 5_1, B6
	Near-participant understanding of rejection and reasons for rejection	A8, A8a, C2-C7
	Near-participant actions after application rejection	C7-C9a
Explore ways to grow the EMS market.	Customer experience with and interest in emerging technologies	C11, C12, C13, C14
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects.	Program design changes influencing prospective NTG insights - Customer interest in peak coincident demand management supported through EMS.[9]	C11-C14

Sample & Target Completes

Table 11 summarizes the total sample that were be targeted for the interviews. The population of near-participating customers between 2020 and present was small, so the evaluation team will attempted contact the entire population (conducted a census) of all near-participating customers. To achieve 90% confidence level with +/- 10% precision for the program, the evaluation team would have needed to speak with 25 participating customers, which represented a 67% response rate. The evaluation team prioritized speaking with near-participating customers.

Table 11. Sample Population & Target Completes

Strata	Population Size
2020	25
2021	13
Total	**38**

Fielding Instructions

We attempted to schedule interviews via email if email addresses are available. We supplemented email recruiting efforts with telephone calls as needed.

[9] We did not include non-participant spillover, because it would have been too difficult to anticipate whether a non-participant's project would have been cost effective and been eligible for the product without review by an engineer. Near-participant projects do not qualify for spillover because they did not qualify for incentives through the EMS product.

The following fielding guidelines were used for near/non-participating customer recruiting and interviews:

- Attempt each record five 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" or immediate hang-ups) at least once.
- Calling hours are 9 AM to 5 PM MST.

Email Recruiting Text

Hello <<first_name>>,

Xcel Energy has hired my firm, TRC, to gather feedback from Xcel Energy customers regarding their experience with the Energy Management System Program. I am contacting customers who recently submitted an application through the Energy Management System program but did not ultimately did not receive a rebate for their project, to learn how Xcel Energy can improve the program. Would you be the best person to contact regarding these experiences?

If so, the number we have on file to contact you is <<phone>>. Please let me know if there is a better number to reach you.

Regardless of whether you've installed or upgraded your Energy Management System controls or not, I'd appreciate the opportunity to conduct a 30-minute interview with you to discuss your experience. We are offering a $25 incentive as a thank you for your time. If you are interested, please respond to this email or give me a call at (206) 388.0961 to let me know about your availability.

If you would like to contact Xcel Energy to verify the legitimacy of this study, you may contact Amy Hollander at Amy.J.Hollander@xcelenergy.com.

Best,

Consultant name

Consultant TRC signature

Interview Guide Sections

- **Intro.** Introduction & Screening
- **A.** Awareness of rebates, EMS equipment & peak coincident demand management
- **B.** Barriers & Motivations to participate in the EMS product
- **C.** Product Experience
- **D.** Business Characteristics
- **Close.** Closing

Section Intro: Introduction & Screening

Intro1. Hello. This is <Interviewer Name> calling from TRC, a national research firm working with Xcel Energy. We're conducting a brief, 20-minute phone interview on Xcel Energy's behalf and offering a $25 Tango gift card for your time.

[IF NEAR-PARTICIPANT] I'm hoping to speak to someone at your business who would be familiar with your company's application to receive a rebate for the [INSTALLATION/UPGRADE] of an Energy Management System through Xcel Energy. May I speak with **<CONTACT>**?

[IF NON-PARTICIPANT] Xcel Energy would like to better understand how businesses like yours think about and manage their energy use. Are you the best person to talk to about energy use at your business?

[IF NEAR-PARTICIPANT & If person no longer works there]

Intro2. Is there someone else that is knowledgeable about your application for participation in the Energy Management System program?

- What is this person's name?
- Would I reach that person by dialing the same number I used to connect with you?

[ASK IF INTRO1 = Yes]

Intro3. Great! Is now a good time or should we call you back?

1. No objection – fine to continue
2. Objection **[SCHEDULE FOR ANOTHER TIME]**

[If INTRO3 = No Objection]

INTRO4. What is your occupational title within your company? [PROBE: If property manager, internal or third party?]

Section A: Awareness of Rebates, Energy Management Systems & Peak Coincidence Demand Management

[ASK A0a – A8 IF NEAR-PARTICIPANT]

A0a. I'd like to start by asking how you first learned about Energy Management System technology? [PROBE Where did you first learn about the potential to use Energy Management System technology at your business?] Clarify if necessary: Building Controls, Building Management System, Building Automation System or Direct Digital Controls

A1. And how did you first hear about the Xcel Energy rebates available for installing or upgrading Energy Management Systems (EMS)? [PROBE Who first contacted you about EMS rebates?]

A1_1. Have you participated in other Xcel Energy incentive programs in the past? If yes, which ones?

A2. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, before you learned of the rebate how familiar would you say you were with EMS technology? [PROBE: Why did you select that value?]

A2a. Did your familiarity with EMS technology change after you engaged with Xcel Energy about installing or upgrading your controls? If so, how?

A3. Peak coincident demand management is the practice of reducing a building's energy demand during periods when the system's energy load is the highest. Are you aware of the practice of using control strategies through your EMS to manage demand during peak periods in order to reduce costs and GHG emissions from electricity?

[ASK A3a-A7 If A3 = Yes, if no jump to A8]

A3a. How did you first learn about EMS control strategies to manage demand during peak periods**? [PROBE** How did you first become aware of the potential to use your EMS to manage demand during peak coincident periods at your business? Through the process of working with the contractor who installed your controls system?]

A4. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with EMS control strategies for demand management? [PROBE: Why did you select that value?] PROBE: How familiar are you with how demand management can affect your costs and GHG emissions from electricity?

A6. Which (if any) elements of using EMS control strategies to manage demand during peak coincident periods were confusing or difficult to understand? **[PROBE]** Was it difficult to program your controls system to help manage demand during peak coincident periods?

A7. Did the EMS project that you submitted with your application for rebates through Xcel Energy's Energy Management System program incorporate elements of control strategies for peak demand management?

PROBE: Did your contractor discuss how demand management strategies can affect your costs or reduce GHG emissions from electricity?

A8. Did the contractor who helped you with your EMS project application discuss ways to make the project more cost effective? [**Clarify if necessary** – In order to qualify for a rebate through Xcel Energy's program, your project needed to be cost effective]

A8a. What information did your contractor give you related to your project's cost effectiveness?

Probe 1: When you were planning your project, did your contractor help you design your project with the rebate program in mind?

Probe 2 (if not already discussed): Did they discuss peak coincidence demand management with you?]

[ASK A9 – A17 IF NON-PARTICIPANT]

I'd like to understand a little more about your awareness of Energy Management System technology. **Clarify if necessary: Building Controls, Building Management System, Building Automation System or Direct Digital Controls**

A9. Are you familiar with Energy Management System technology?

A9a. Before today, on a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with Energy Management System technology? [PROBE: Why did you select that value?]

[IF A9 = Yes]

A10. How did learn about Energy Management System technology?

A11. Peak coincident demand management is the practice of reducing a building's energy demand during periods when the system's energy load is the highest. Are you aware of the practice of using control strategies through an EMS to manage demand during peak coincident periods?

[ASK A12-A14 If A11 = Yes]

A12. How did you first learn about EMS control strategies to manage demand during peak coincident periods? [PROBE How did you first become aware of the potential to use your EMS to manage demand during peak coincident periods at your business? Through the process of working with the contractor who installed your controls system?]

A13. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with EMS control strategies for peak coincident demand management or peak demand shifting? [PROBE: Why did you select that value?]

A14. Do you currently have an Energy Management System installed at your business?

[IF A14 = Yes]

A14a. Does that Energy Management System include control strategies for peak coincident demand management?

[IF A14a= No]

A14b. Have you ever considered using your Energy Management System to control demand during peak coincident periods? Why or why not?

[PROBE] Is there any factor that prevents you from using your Energy Management System to manage demand during peak coincident periods?

[IF A14 = No]

A15. Have you ever considered using Energy Management System technology at your business?

[IF A14 = No]

A15a. What is the likelihood you would consider installing an Energy Management System at your business in the next five years, on a scale of 1 to 5, where 1 means "not at all likely" and 5 means "extremely likely"?

[ASK A16a & A16b IF A15 = No]

A16a. What factors prevent you from considering EMS technology at your business?

A16b. Can you think of anything that would prevent you from using EMS technology to manage your demand during peak coincident periods at your business?

[ASK ALL]

A17. Are you familiar with the rebates available for installing or upgrading Energy Management Systems through Xcel Energy?

[IF A14 = Yes & A17 = Yes]

A18. Did you consider applying for rebates through Xcel Energy's Energy Management System program when you first installed your EMS system at your business?

[IF NO] Why not?

[IF YES] Why didn't you ultimately decide not to apply for rebates through the EMS program?

Section B: Barriers & Motivations to Participate in the EMS Product

[IF NEAR-PARTICIPANT]

B1. Now I want to ask you a few questions about the energy management system project you submitted for an Xcel Energy rebate. What were your initial perception of the benefits of installing EMS technology? [PROBE for any non-energy benefits like comfort, clarify understanding of benefit and how important it was to motivating customer to participate]

B1a. And what initially motivated you to submit an application to the EMS program?

B2. What, if any, were your initial perceptions of the drawbacks of EMS technology?

B3. What, if anything, was difficult about participating in the rebate program?

B3_1. Thinking specifically about the application process, was there anything difficult about submitting an application to the EMS program for your project? [PROBE: Was the application workbook confusing? Was it difficult to understand what information was required? Were there portions of the application that you found time consuming?]

B3_2. Did **<DIFFICULTY>** discourage you from completing the application process?

B3_3. Does **<DIFFICULTY>** make it less likely that you will submit an EMS rebate application with Xcel Energy in the future?

B3_4. When you were planning for your project, how easy was it to understand the eligibility requirements? [PROBE: Did you understand what made a project more likely to pass cost effectiveness requirements and qualify for a rebate?]

B4. Now I want to ask about your experience with your contractor with regards to your application. To what extent did your contractor assist you with completing the rebate application process?

B5. Do you think additional assistance with the application process from your contractor would have been beneficial?

B5_1. What kinds of assistance would have been helpful?

B6. What resources did you use to answer any questions you had about the workbook or rebate application process?

Section C: Product Experience

[ASK NEAR-PARTICIPANTS]

C1. Do you feel that your contractor helped you understand why certain projects might be approved?

C2. How did you learn that your application for the EMS program was rejected?

C3. To the best of your understanding, why was your application for the EMS program rejected?

C4. When you learned that your application was rejected, what information was communicated to you, and by whom?

C5. Do you feel like the amount of information provided to you on why your application was rejected was sufficient? Was there any other information you wish you had been provided or any information that was unclear?

C6. Did you make any adjustments or consider making any adjustments to your project at any point?

C6a. [IF NO – why not]

C6b_1. [IF YES] Did you make updates before or after receiving feedback from Xcel Energy? [**PROBE TO CLARIFY:** Was this before or after your application was rejected?]

C6b_2. [IF YES] What updates did you make?

C7. Did you install/upgrade your EMS without the rebates from Xcel Energy?

C7a. [IF YES] Did you make any changes to your project from the version you submitted with your application? What changes?

C7b. [IF NO] Do you still plan to install/upgrade your EMS in the next five years?

[If C7b = Yes]

C8. On a scale from 1 to 5, where 1 is “very unlikely” and 5 is “very likely”, how likely do you think you are to submit an application for Xcel Energy’s Energy Management System rebate program in the future? [PROBE Can you tell me a bit about why you gave that answer?]

C9. On a scale from 1 to 5, where 1 is “very unlikely” and 5 is “very likely”, how likely do you think you are to submit an application for other Xcel Energy incentive programs in the future? [PROBE Can you tell me a bit about why you gave that answer?]

C9a. What (if any) influence did your past experience with the EMS rebate program have on your answer?

C10. What recommendations do you have for Xcel Energy to improve the Energy Management Systems program? [**PROBE** for additional resources or tools that would have make it easier to participate]

[ASK ALL]

C11. Are you interested in or aware of any new or emerging EMS technologies? If yes, which ones and why?

C12. As more renewable energy becomes available over the next few years, it may become more important to manage your energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects EMS technology will be a good tool to help customers like you manage your energy use throughout the day. How comfortable would you feel using the EMS system you installed to manage your energy use throughout the day?

C13. How interested would you be in participating in programs through Xcel Energy intended to help manage your energy use throughout the day?

C14. What other services could Xcel Energy use to support you in adjust your energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

Section D: Business Characteristics

We are almost done! I just have a few final questions about the characteristics of your business.

D1. How would you describe your line of business?

D4. Approximately how many square feet is the facility where you installed your EMS project?

D6. Does your organization own or lease your facility?

[Ask if D6 = Lease]

D7. Do you pay your Xcel Energy bill, or does someone else (e.g., building manager)?

D8. Does your organization have multiple locations in Colorado?

[If D8 = 1]

D8a. Do you know if any of these locations have participated in an Xcel Energy efficiency project?

Closing

Close1. **These are all the questions I have.** As a thank you for your input, we'd like to send you $25 Tango gift card. Please permit me to gather the information we need to email the gift card to the intended recipient—this could be you, personally, or anyone else of your choosing.

[COLLECT CONTACT INFORMATION]

B.4 Participating Trade Partner Interview Guide

To support the process and impact evaluation of the 2022 Xcel Energy EMS product, the TRC evaluation team conducted in-depth telephone interviews with participating trade partners. This guide presents the questions covered in the in-depth interviews of trade partners who participated in the Colorado EMS product.

Given the total 2021 and 2022(Q1) population of EMS trade partners is 8, the evaluation team attempted to contact all 8 trade partners for an interview as part of this effort. To understand trade partner influence on customer decisions, we prioritized speaking with the 8 active trade partners in 2021, as of June 17, 2022. During these interviews, we asked trade partners about their process and experience working with their customer who participated in EMS to better understand the customer journey and identify topics identified as being particularly influential to their decision-making process. To gain additional insight on questions most relevant to the market problems faced by trade partners, the evaluation team attended a meeting of the EMS Trade Partner Advisory Board and incorporated those themes in the development of the following interview guide.

The remainder of the introduction provides the evaluation objectives and research questions that guided the design of this guide, as well as fielding instructions for the interviewers.

Evaluation Objectives

The evaluation objectives for the Colorado EMS product were to:

- Identify opportunities to improve customer and trade partner understanding of **the interaction of EMS and peak coincident demand management**.
- Collect feedback on **customer and trade partner experiences** with the EMS product, including satisfaction with product elements.
- **Explore ways to grow the EMS market.**
- **Estimate an overall NTGR**, including the major drivers of free-ridership, spillover & market effects

The participating trade partner interviews addressed all evaluation objectives. For reference, Table 12 provides the evaluation efforts used for each objective.

Table 12. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Trade Partner Interview Objective
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak load shifting.	Process	Participating customer interviews, and participating and nonparticipating trade partner interviews	✓
Collect feedback on customer and trade partner experiences	Process	Participating customer interviews, and participating and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the EMS market	Process	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓

Evaluation Objective	Impact or Process Objective	Research Activity	Trade Partner Interview Objective
Estimate an overall NTGR, including the major drivers of free-ridership, spillover & market effects	Impact	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓

The evaluation team used participating trade partner interviews to help address both process and impact objectives. These interviews addressed the following topics within each objective:

- **Identify opportunities to improve customer and trade partner understanding of the interaction between EMS and peak coincident demand management:** The evaluation team will explore trade partner awareness of using EMS to implement peak load shifting strategies. We will also collect trade partner feedback on approaches to integrate peak demand shifting strategies and the potential value peak load shifting strategies with EMS brings to trade partners.
- **Collect feedback on customer and trade partner experiences, satisfaction, and interactions:** The evaluation team will discuss trade partners' product experience and satisfaction with the EMS product including their interactions with product staff. We will assess their awareness and understanding of the EMS product. We will also explore their broader experience and satisfaction with Xcel Energy and account managers, as well as identify opportunities, if any, to improve the products' delivery.
  - The evaluation team will assess trade partner feedback on customer awareness, motivations, and barriers to product participation. We will also explore what types of projects trade partners implement for participating customers without the support from Xcel Energy products and reasons why they do or do not complete additional projects. This can provide insight into broader market experiences to help target interview questions for the participant and non-participant customer interviews.
- **Opportunities for Growing the EMS Market:** The evaluation team will ask trade partners about new equipment or technology that they expect to drive the EMS market in the future, including wireless EMS, machine learning, fault detection and diagnostics, integrated lighting controls, and two-way automated communication (ex: ADR technology). The evaluation team will also ask trade partners about their awareness of lower-cost options for EMS technology. The potential for and experience with alternate product designs including more predictable rebates and opportunities for small buildings will also be discussed. These responses will be used to inform our peer utility research.
- **Retrospective and Prospective NTG Impacts:** Finally, the team will ask questions on product attribution, or the impact the product had on their decision to recommend an EMS and or peak coincidence demand management for their customers. In particular, we will explore what energy management measures, if any, customers are including in their projects and explore the motivation for those actions. This is important in assessing "standard practice" within the market.

Table 13 presents the research questions that our participating trade partner interviews intended to address, linking each research theme to the associated evaluation objective and interview question.

Table 13. Evaluation Objective, Interview Research Themes & Interview Question Crosswalk

Evaluation Objective	Interview Research Themes	Question Number(s)
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Trade partner awareness of EMS product and peak demand management Tools trade partners find most helpful in educating customers about EMS and demand management How trade partners discuss EMS technology & peak coincident demand management with their customers Trade partner strategies to communicate cost-effectiveness to customers	I8-I9, P2-P4, P6, M2, S2h-S2j
Collect feedback on customer and trade partner experiences	Trade partner understanding and awareness of the EMS product Trade partner perception of the application process Trade partner understanding of customer perceptions, motivations and barriers related to the EMS product Trade partner satisfaction with the EMS product	P1-P4, S1-S5, M1-M4a, B1 – B3
Explore ways to grow the EMS market	Gauge trade partner awareness and perspectives of new or upcoming EMS technologies and program designs Understand how to rebuild public perception of and trust in the EMS product Gauge trade partner perception on the influence of carbon impact on customer EMS installation or upgrade Understand if indoor air quality will drive EMS installations post-covid	P5-P6, M3a, M5, S5
Estimate NTG impacts	Document the extent to which trade partners believe the EMS product activities influenced customer purchasing decisions	I1-I16

Fielding Instructions

We attempted to schedule interviews via email if email addresses were available. We supplemented email recruiting efforts with telephone calls as needed.

The following fielding guidelines were used for trade partner recruiting and interviews:

- Attempt each record five 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" or immediate hang-ups) at least once.

- Calling hours are 9 AM to 5 PM MST.
- Record Interviews.

Interview Sections

- **F.** Background & Product Familiarity
- **I.** Product Influence on the Market
- **P.** Perceptions/Awareness: EMS
- **M.** Trade Partner Marketing
- **B.** Trade Partner Perception of Customer Barriers/Motivations
- **S.** Satisfaction & Program Experiences
- **CLOSE.** Closing

INTERVIEW GUIDE

Section F: Background & Product 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.

F1. 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 SOMEONE WITH CUSTOMER EXPERIENCE: Owner, Sales Manager, Salesperson, Engineer, or Technician]**

F2. Can you describe what kind of involvement you typically have with the EMS rebate program? This would include interaction with Xcel Energy staff, marketing rebates to customers, installing equipment, filling out program paperwork, providing invoices, or fulfilling other requirements.

Section I: Product Influence on the Market

Next, I am going to ask some specific questions about your project with **<CUSTOMER NAME>** that you completed with an EMS rebate in **<YEAR>**. Do you recall completing that project?

I1. Thinking specifically about that project, how and when did your customer become aware of the rebates available through the Xcel Energy EMS program?

I1a. Did **<CUSTOMER NAME>** consider peak-coincident savings in their decision to install the EMS? By peak coincidence I mean lower energy demand during Xcel's peak demand period, usually between 2 – 6 pm

[If Yes]

I1b. When did your customer decide to include peak coincidence demand management elements in their project? **[PROBE]** Was that before or after you decided to apply for a rebate through the EMS program?

I2. On a scale of 0 to 10 where 0 is Not at all Influential and 10 is Extremely Influential, overall, how much would you say the Xcel Energy's EMS program influenced **<CUSTOMER>**'s decision to complete the EMS project they did?

I2a. Great, and could you tell me a bit about why you rated the influence of the program on this customer's project a <I1 Response>? Please tell me in your own words, how influential the EMS program was in your decision.

[IF NOT ANSWERED IN I1a]

I3. Did the program influence your decision to include elements of peak coincidence demand management into your project? If so, how?

I4. If the EMS program did not exist, what alternative would your customer have been most likely to do? [Do not read – ask open end and code response]

a. Installed a simpler controls project/Not incorporate peak coincidence demand management.
b. Installed a smaller system – fewer control points.
c. Repaired their old EMS system instead of upgrading.
d. Done exactly the same thing as they did through the program.
    a. On a scale of 0 – 10, where 0 is very unlikely and 10 is very likely, how likely is it that your customer would have done the exact same thing?
e. Something else [CLARIFY]

Consistency check [Ask If (I2 > 7 AND I5 = d & > 6) else skip to I9]

I5. You just gave <I4 RESPONSE> points to the importance of the program in CUSTOMER's decision install the energy efficient MEASURE, I would interpret that to mean that the program was quite important to them. Later, when I asked about what they would have done in the absence of the program I recorded some answers that would imply that the program was not that important. Just to make sure I have recorded this properly, I have a couple of questions to ask you.

I5a. When I asked you about the importance of the program for CUSTOMER, including incentives, you gave a rating of ...<I2 RESPONSE> ... out of ten, indicating that the program and the incentives were important to the customer. Can you tell me why the program was important to them?

In general, how would you describe the influence that the EMS program has on the types of EMS technology you recommend to your customers?

I7. In general, how would you describe the influence that the EMS program has on your decision to recommend EMS systems **that incorporate elements that reduce demand (kW) during the peak coincident period?**

I8. In approximately what percent of projects did you recommend <PEAK DEMAND MANAGEMENT ELEMENT/generation demand management elements> BEFORE you learned about Xcel Energy's programs?

I9. And approximately, in what percent of projects do you recommend <PEAK DEMAND MANAGEMENT ELEMENT/generation demand management elements > now that you have worked with Xcel Energy's programs?

I10. Did you make any other adjustments to your project to improve the likelihood of it qualifying for an Xcel Energy rebate? [PROBE: to improve the project's cost effectiveness?]

If so, what were those adjustments? [PROBE: Are these adjustments you would make for other projects, or were these specific to the process of submitting this project through the EMS program?]

I11. How has your perception of the EMS program changed in recent years, if at all? [PROBE: In about what year did that change?]

Now, we are going to talk through two scenarios to understand how the rebates and other benefits offered by Xcel Energy's EMS product impact the type of equipment you sell.

SCENARIO 1: STATUS QUO

I12. First, thinking about the current market, roughly what percent of the EMS you sell incorporate peak coincident demand management strategies [PROBE: such as cooling setpoint adjustments, RTU duty cycle adjustments, or pre-cooling]? Other strategies to increase cost-effectiveness?

SCENARIO 2: NO EMS PROGRAM

I13. Now imagine that the Xcel Energy EMS program was not available today, and you were not able to offer rebates for EMS or have any program support.

I13a. About what percent of the EMS you sell do you think would incorporate peak coincident demand management strategies? Other strategies to increase cost-effectiveness?

I13b. What effects would this have on your business? **[PROBE: employees, sales techniques, number of clients, time it takes to sell projects]**

Now, I will ask some questions about your sales process, and how the EMS program does or does not influence your business decisions.

[INTERVIEWER NOTE: CHECK FOR CONSISTENCY IN RESPONSES. SEEK CLARITY AS NEEDED.]

I14. At what point in the sales process do you discuss the Xcel Energy EMS program with your customers? [**PROBE** Are there certain customers or project characteristics that would make it more or less likely for you to suggest the EMS rebates offered through Xcel Energy with your customers?]

I15. What effects, if any, has the program had on your business?

I15a. Have you changed any of your business practices or sales strategies in any way to leverage the EMS product? **[PROBE]** Have you hired more staff to complete the work demand?

[If time permits and relevant to Trade Partner]

I15b. Do you think the EMS program has influenced the amount or type of EMS equipment available in the market? Why or why not?

How has your participation in the EMS program changed over the past years? [PROBE] Has it increased, decreased, or stayed about the same?

I16a. What has caused your involvement to change? [PROBE: Specifically, what has been driving the number of rebate-eligible projects customers complete?]

I17. Do you do any EMS work for customers served by another utility? [IF YES, PROBE] In what regions?

I17a. About how many EMS projects do you complete with those customers?

I17b. What percent of the EMS you sell in those regions incorporate peak demand management strategies?

I17c. About how many incorporate other strategies to increase cost effectiveness?

[IF I17 = YES]

I18. Do the other utilities you work with offer rebates for EMS systems?

[If I18 = YES]

I18a. How does the rebate compare to Xcel Energy's program? [PROBE for ease of application, incorporation of peak coincidence demand management, rebate structure and amount]

Section P: Perceptions / Awareness: EMS

P1. What types of EMS does your company have experience installing?

P2. How experienced are you and your company in selling and installing EMS technology to implement peak coincident demand management on a scale from 1 – 5, where 1 is "not at all experienced" (Clarify if necessary: no experience with the technology) and 5 is

"very experienced" (Clarify if necessary: the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

P3a. What do you see as the primary benefits of EMS technology in Colorado? **[PROBE** for benefits of peak coincident demand management] [**PROBE** for what they tell customers about the benefits of peak coincident demand management, non-energy benefits like indoor air quality, contributions to company sustainability goals]

P3b. What do you see as the primary drawbacks of EMS technology in Colorado **[PROBE** for drawbacks of peak coincidence demand management]?

P3c. What do you tell customers about the benefits of EMS?

P3d. What percentage of your retrofit customers do you think will install EMS five years from now? **[PROBE if not discussed]** What percentage of your retrofit customers do you think will practice peak coincident demand management five years from now? **[PROBE for reasons for answer, are your customers ready? Are you to serve those customers?]**

P3e. What needs to change, if anything, to make EMS more viable to C&I customers? **[IF NEEDED examples could include equipment costs, electricity costs, policies, carbon-free electricity]**

P5. Are you aware of any emerging technologies related to EMS? If yes, which? **[PROBE]** Any you are particularly interested in?

P5a. There are a few EMS-related technologies that Xcel Energy is interested in learning more about Trade Partners' perspectives on. I'll read a list of these technologies – Please let me know if you are familiar with any of these, or have any thoughts on them.

[Read list and pause after each, skip technologies discussed in last question – **PROBE** for experience with the technology, barriers to implementation, opportunities for including in EMS product or opportunities for facilitating peak coincident demand management]

a. Wireless EMS
b. Machine learning
c. Fault detection & diagnostics
d. Integrated lighting controls

P6. What do you see as new/emerging peak coincident demand management opportunities for your customers?

P7. Are you aware of any opportunities to reduce the upfront costs of EMS technology? **[PROBE for low-cost options, lower cost technologies]**

Section M: Trade Partner Marketing

Now, I have some questions about customer motivations and how you sell EMS equipment and peak coincidence demand management strategies to customers.

M1. Do you promote the EMS rebate program with your customers? If so: How?

M2. What tools or resources could Xcel Energy provide, that would be most helpful in explaining the connection between EMS project cost-effectiveness and peak coincidence demand management?

M3. Do you sell any EMS retrofit equipment to Xcel Energy C&I customers without submitting an application for the rebate?

[ASK NEXT THREE QUESTIONS IF M3 = 1]

M3a. How frequently does this happen?

M3b. What are the reasons why?

M3c. 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 not rejected?]**

M5. Can you think of any other changes to the program that would improve your ability to market the EMS program? **[PROBE** for more predictable rebate amounts, increased engineering support from Xcel Energy, and/or opportunities for small buildings]

M6. What barriers do you experience to selling EMS technology generally? [PROBE: Market conditions, increase in cost of equipment?]

PROBE: The program saw a decrease in the number of submissions to the EMS rebate program in 2018. Can you think of anything that would have led to that decrease? [PROBE: e.g., increase in equipment costs?]

Section B: Customer Barriers/Motivations

B1. How do your customers generally learn about opportunities to participate in the EMS rebate program?

B2. What is the main reason customers pursue rebates through the Xcel Energy EMS program?

B2b. Have the reasons why customers participate in the EMS program changed over the years?

B2c. Do you think that your customers use their EMS to market the carbon reductions they see because of their EMS? Do they have company sustainability efforts or goals that their EMS contributes to?

B3. What, if anything, about the EMS program keeps customers from participating more?

Section S: Satisfaction & Product Experiences

Now, I'd like to talk more specifically about your experiences with the EMS 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 satisfaction with:

a. The EMS program overall?
b. The application workbook?
c. The pre-approval process?
d. The rebate amount?
e. The time it takes to complete the application process?
f. The eligibility requirements?
g. Your interactions with EMS program staff?

[ASK ONLY IF S1 < 5]

S1a. What could Xcel Energy do to increase your satisfaction with the EMS program? **[PROBE: as needed for specific factor]**

S2. How difficult or easy would you say it was to complete the following tasks associated with the Xcel Energy EMS product on a scale from 1 to 5, where 1 is "extremely difficult" and 5 is "extremely easy"?

S2a. Complete product application workbook

S2b. Submit product applications

S2e. Meet product deadlines

S2f. Understand a project's eligibility for an EMS rebate

S2g. Get in touch with a program manager.

S2h. Get in touch with an Xcel Energy engineer or technical advisor.

S2i. Identify opportunities to incorporate peak coincident demand management into your projects

S2j. Communicate or explain peak coincident demand management to your customers

S2k. Communicate or explain the benefits of the EMS product to your customers

[ASK FOR ANY S2 ANSWERS < 4]

S2l. What are the reasons why it wasn't easy?

[ASK ALL]

S3. What is the EMS program doing well that they should keep doing?

S4. Are there any other challenges you've experienced while participating in the EMS program that we haven't discussed yet? **[PROBE for specifics of the challenge- what was most difficult? understanding cost effectiveness, application workbook, implementing peak-coincident demand management, submitting passing projects]**

S5. What else can Xcel Energy do to increase your participation in the EMS program?

CLOSING

CLOSE1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences working with the EMS program?

CLOSE2. We are interested in speaking with Xcel Energy customers who considered installing an EMS system through the program, but ultimately did not end up doing so. Do you have any customers who fit this description, whose name you would be willing to share with us? We would contact them via phone or email to see if they wanted to participate in a short phone interview.

CLOSE3. Would it be ok to follow up with email if we have any outstanding questions?

CLOSE4. As a thank you for your input, we'd like to send you a $100 Tango gift card, which is an online card that can be applied to a wide variety of retailers or nonprofits of your choice. Alternately, we could also donate $100 to your local United Way in the name of your choice.
What would you prefer?

1. TANGO: Let me ask the information we need to email the gift card to the intended recipient—this could be you, personally, or anyone else of your choosing. **[COLLECT CONTACT INFORMATION]**
2. UNITED WAY: What zip code should we use to find your local United Way? In what name should I donate the $100? **[COLLECT INFO]**

Those are all the questions I have today. **[THANK AND TERMINATE]**

B.5 Nonparticipating Trade Partner Interview Guide

To support the 2022 process and impact evaluation of Xcel Energy's Energy Management Systems (EMS) product, members of the TRC evaluation team conducted in-depth telephone interviews with non-participating trade partners. This guide presents the questions covered in the in-depth interviews of trade partners who had stopped participating in the EMS product since 2018. We conducted this research to enable the evaluation team to assess key process and impact evaluation objectives.

The evaluation team planned to interview up to 23[10] non-participating trade partners as part of this effort, as shown in Table 14. The remainder of the introduction provides the evaluation objectives and research questions which the non-participating trade partner interviews were designed to address, a description of the sample population and the targeted completes. The introduction is followed by the interview guide.

Table 14. Non-Participating Trade Partner Target Interviews

Trade Partner Type	Population	Target Interviews
Non-Participating (Previously Participating) Trade Partners	34	23[ab]

[a]Target is based on achieving 90/10 confidence, based on a population of 34.

[10] The population of viable contacts for non-participating trade partners ultimately totaled 19. The evaluation team was able to conduct interviews with four of these trade partners.

Evaluation Objectives

The objectives for the Colorado EMS product evaluation were to:

- Understand opportunities to improve customer and trade partner understanding of **the interaction of EMS and peak coincident demand management**.
- Collect feedback on **customer and trade partner experiences** with the EMS product, including satisfaction with product elements.
- **Explore ways to grow the EMS market.**
- **Estimate an overall NTGR**, including the major drivers of free-ridership, spillover & market effects.

The 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	Non-Participating Trade Partner Interview Objective
Identify opportunities to improve customer and trade partner understanding of the interaction of EMS and peak coincident demand management.	Process	Participating customer interviews, and participating trade partner interviews	
Collect feedback on customer and trade partner experiences with the EMS product, including satisfaction with product elements.	Process	Participating customer interviews, and participating and participating and nonparticipating trade partner interviews	✓
Explore ways to grow the EMS market	Process	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓
Estimate an overall NTGR, including the major drivers of free-ridership, spillover & market effects	Impact	Participating and nonparticipating customer interviews, and participating and nonparticipating trade partner interviews	✓

Table 16 presents the link between each evaluation objective, interview research theme, and interview question.

Table 16. Interview Questions by Evaluation Objective Addressed

Evaluation Objective	Interview Research Theme	Interview Question Number(s)
Collect feedback on customer and trade partner experiences	Trade partner perceptions, motivations and barriers related to the EMS product	P8, P9
	Trade partner challenges with participation and reason they no longer participate in the program	B1-B4
	Trade partner awareness and understanding of EMS technology and control strategies for peak coincident demand management	P1-P7
Explore ways to grow the EMS market	Gauge trade partner awareness and perspectives of new or upcoming EMS technologies and program designs	M1, M2
	Understand whether trade partners prefer to complete new construction projects versus retrofits	M3
	Gauge trade partner perception on the influence of carbon impact on customer EMS installation or upgrade	P9
	Understand if indoor air quality will drive EMS installations post-covid	M5
Estimate NTG impacts	Influence the product has had on trade partner business strategy or model	M4
	Perspective on potential product design changes	M6, M7, M8

Fielding Instructions

We attempted to schedule interviews via email if email addresses were available. We supplemented email recruiting efforts with telephone calls as needed.

The following fielding guidelines were 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 MST.
- Record interviews

Interview Sections

- **F:** Background & Program Familiarity
- **H:** Perceptions/Awareness of Energy Management Systems
- **B:** Barriers for Trade Partners
- **M:** The EMS Market
- **I:** Closing

Section F: 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.

F1. 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.]

F2. What are your primary responsibilities at COMPANY NAME?

F3. How many employees does your company have?

F4. What Xcel Energy programs have you participated in previously?

Section P: Perceptions/Awareness: Energy Management Systems

P1. What types of EMS does your company have experience installing?

P2. How experienced are you and your company in selling and installing EMS technology to implement control strategies for peak coincident demand management on a scale from 1 – 5, where 1 is "not at all experienced" (Clarify if necessary: no experience with the technology) and 5 is "very experienced" (Clarify if necessary: the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

[**Define peak coincident demand management if necessary:** By this we mean, using the EMS to implement control strategies to lower energy use during peak demand periods, which occur from 2-6pm, Monday through Friday, June through September.]

P3a. What do you see as the primary benefits of EMS technology in Colorado? [**PROBE** for benefits of peak coincident demand management]

P3b. What do you see as the primary drawbacks of EMS technology in Colorado [**PROBE** for benefits of peak coincidence demand management]?

P3c. What do you tell customers about the benefits of EMS? [**PROBE** for what they tell customers about the benefits of peak coincident demand management, non-energy benefits like indoor air quality, contributions to company sustainability goals]

P4. Are you familiar with the Xcel Energy's Energy Management Systems program? [**PROBE:** This is a program offered by Xcel Energy that provides rebates for installing or upgrading a customer's Energy Management System at their business]

[IF P4 = YES, OTHERWISE SKIP TO NEXT SECTION]

P5. Do you recall how you first heard about the Energy Management System Program?

P6. What initially motivated you to sign up as a qualified trade partner for the Energy Management Systems Program?

P7. What were your perceptions of the Energy Management Systems program when you first heard of the program?

- **[PROBE]** What did you perceive as the value to customers offered through the Energy Management Systems Program?
- **[PROBE]** Have your perceptions of the program changed at all, since you first heard of it?

P8. And how do you think your customers learned about the rebates offered through the EMS program? [PROBE: Did you talk to them about the EMS rebates offered by Xcel Energy?]

P9. Why were your customers motivated to participate in the Energy Management System program?

PROBE: Are they ever motivated by business sustainability goals or targets? Do they ever market the EMS or their energy savings as an indicator of sustainable or "green" values?

P9a. How influential do you feel like the program is/has been on your clients' decision to install an EMS?

- If the program didn't exist, what would you have done differently with your client's project?

P9b. When a customer's application is rejected, do they typically go on to install the same project? Or do you make changes to a project (for example, make it cheaper, change/remove elements that had been added for the rebate program, etc.?)

P9c. Did you ever work with an engineer or other Xcel Energy staff to make updates to a project so that passes cost effectiveness tests and is eligible for a rebate?

P9d. When an application is rejected, would you (are you willing to) make changes to the project so that it passes cost effectiveness tests and is eligible for a rebate?

- What barriers or challenges would you experience, if you had to make changes to a project in order for it to qualify for a rebate?

Section B: Barriers for Trade Partners

B1. I understand that you participated in the EMS program through Xcel Energy in the past, most recently in <YEAR>, but have not participated since then. Could you tell me why you have not recently participated in Energy Management Systems?

PROBE:

- Did you experience any challenges while participating in the EMS program that prevented you from continuing to participate? If so, what were those challenges?
- Were there any changes to the program that made it more challenging to participate? If so, what were those changes and why were they challenging?
- Did you have any challenges with your submitted projects being rejected by the EMS program? If so, could you tell me about why your application(s) was rejected?
- Were there any challenges outside the program (like in the wider EMS market) that prevented you from continuing to participate?

B3. What about the EMS program would need to change in order for you to resume submitting EMS projects to the program for rebates in the future?

B4. Do you continue to sell EMS projects to customers in existing buildings without applying for rebates?

[If yes] Why do you sell these projects without applying for rebates through Xcel Energy's EMS program?

PROBE: Do these projects include control elements addressing peak coincident demand management?

B5. More generally, what challenges do you experience selling and installing EMS technology for your customers?

Section M: The EMS Market

Next, I'm going to ask some question about the type of equipment you sell to customers.

M1. Are you aware of any emerging technologies related to EMS? If yes, which? **[PROBE]** Any you are particularly interested in?

M2. There are a few EMS-related technologies that Xcel Energy is interested in learning more about Trade Partners' perspectives on. I'll read a list of these technologies – Please let me know if you are familiar with any of these, or have any thoughts on them.

[Read list and pause after each, skip technologies discussed in last question – **PROBE** for experience with the technology, barriers to implementation, opportunities for including in EMS product or opportunities for facilitating peak coincident demand management]

a. Wireless EMS
b. Machine learning
c. Fault detection & diagnostics
d. Integrated lighting controls

M3. Do you primarily install EMS technology in new construction or as retrofits?

PROBE: Do you have a preference for one scenario over the other?

PROBE: Do you feel like there are more opportunities in Colorado for one scenario over the other?

M4. Does your previous participation in the Energy Management Systems rebate program impact your current business or sales practices, at all? (i.e., learning about new equipment, availability of equipment, market acceptance of equipment)

M5. In the near future, do you think increased interest in improving indoor air quality will drive EMS sales?

M6. As more renewable energy becomes available over the next few years, it may become more important to help customers manage their energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects the EMS installed at customer facilities can help them to manage their energy use throughout the day. How comfortable do you think your customers would feel using the EMS system you install to manage their energy use throughout the day?

- Are you comfortable supporting customers in managing their energy use throughout the day in response to peak demand, through their EMS system? Do you have the resources to provide this type of support?

M7. How interested would you be in participating in programs through Xcel Energy intended to help customers manage their energy use throughout the day? [for example: incentives, technical support, rate structures]

M8. What other services could Xcel Energy use to help you support your customers in adjusting their energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

Section I: Closing

I1. Is there anything we didn't cover that you'd like to mention or discuss about either your experiences with the Energy Management Systems program or experiences installing multiple measures at a customer site?

I2. Would it be ok to follow up with email if we have any outstanding questions?

I3. As a thank you for your input, we'd like to send you a $50 Tango gift card, which is an online card that can be applied to a wide variety of businesses or non-profits of your choice or donate the money to your local United Way in the name of your choice.

What would you prefer?

IF TANGO: Let me ask the information we need to email the gift card to the intended recipient—this could be you, personally, or anyone else of your choosing. **[COLLECT CONTACT INFORMATION]**

IF UNITED WAY: What zip code should we use to find your local United Way?

In what name should I donate the $50?

I4. 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 2022 Xcel Energy efficiency products, the TRC evaluation team benchmarked the Xcel Energy products against peer utilities. The objective of the benchmarking was to identify opportunities to improve the Xcel Energy products based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allowed 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 performed secondary research on the peer utilities identified and in-depth interviews with program managers at the peer utilities.

This document presents the in-depth utility interview guide for the Colorado Energy Management System (EMS) product. Interviews were conducted with four of Xcel Energy's peer utilities detailed in Table 17 below and one representative from an industry stakeholder. Target respondents are managers of EMS programs.

Table 17. List of Peer Utilities

Utility	Program Name	Priority Level
Dominion (VA)	Office Energy Management System Efficiency	High
Puget Sound Energy (WA)	Major HVAC Controls Upgrade Rebates	High
DTE (MI)	C&I emerging measures (custom)	High
ComEd (IL)	Energy Management Systems	Medium
Consumers Energy (MI)	Building Automation Systems (prescriptive) & Custom	Medium
Rocky Mountain Power (Utah)	Wattsmart Business	Medium
Mass Save (MA)	Energy Management Systems	Medium
National Grid (NY)	Retrofit Program: Energy Management Systems	Medium
Tampa Electric Company (FL)	Facility Energy Management System	Low
NYSERDA (NY)	Real Time Energy Management	Low
Riverside Public Utilities (CA)	Energy Management Systems	Low
SMUD (CA)	Power Direct Auto DR program	Low
SDGE (CA)	Technology Incentives Program	Low

Table 18 identifies the interview questions related to each key performance indicator of peer utility programs. This information was used to benchmark the size and relative success of other programs in the market. TRC performed secondary research ahead of conducting the peer utility interviews and only asked these questions of program administrators as confirmation of our understanding or to fill in missing information.

Table 18. Mapping of Interview Questions to Indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings and demand reduction goals	2021 program energy savings goals (MWh) 2021 program's savings (MWh) 2021 total energy efficiency portfolio goal (MWh) 2021 program peak demand reduction goals (MW) 2021 program's peak demand reduction (MW) 2021 total energy efficiency portfolio goal (MWh & MW)	B2, B4, B5
Program budget cost of acquisition **(e.g., $/MWh, $/Mcf)**	2021 program budget 2021 total gross energy savings and demand reduction for each peer program	B4, B6
Customer Participation Levels	Number of customers participating	B1
Cost test values	Cost-effectiveness values (TRC)	B7
Net-to-gross	NTG ratio	B3

Table 19 identifies the interview questions related to each contextual theme or research objective.

Table 19. Mapping of Interview Questions to Contextual Themes

Contextual themes	Data Needed	Interview Question
Program description and tracking	• Overall program objectives, both energy and demand related • Implementation strategies and customer types targeted for participation • Program staffing, the length of program operation, any recent changes to the program, and future outlook • Ability of the program to incorporate demand management at peak coincident	A1, A2, A3, A4, B5
Program performance	• Program and overall C&I portfolio energy savings and demand reduction goals • Challenges with achieving savings • Understanding how peer utilities who employ the TRC test to assess EMS project cost effectiveness successfully approve enough projects to meet their savings and participation goals	B1 – B10, A4
Customer engagement	• Strategies for increasing customer engagement to grow the EMS market • Strategies for getting performance contractors to participate in Colorado, given barriers to working with custom program. • Methods used to increase customer awareness of EMS technology to reduce peak demand	C1, C2, C3, D1-D3

Recruiting Instructions

The evaluation team plan sent advance emails to any program managers with available emails. This email contained 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 were recruited by consultants on the evaluation team who conducted interviews and had been trained on the purpose and goals of the Colorado EMS evaluation. The evaluation team was as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews, when possible, to accommodate busy schedules. The evaluation team left a voicemail or receptionist message on the first attempt whenever possible, and then used discretion to determine any additional messages left on subsequent attempts. The evaluation team strived 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 evaluation team might have attempted some contacts more times to ultimately reach the correct person.

Interview

Introduction/Recruitment

INTRO 1 Hello, this is INTERVIEWER NAME, calling from TRC on behalf of Xcel Energy. Is CONTACT NAME available?

INTRO 2 We are working with Xcel Energy on a benchmarking and best practices study of commercial and industrial energy management system program offerings. As part of this study, we are reaching out to leaders of EMS programs to learn about innovative strategies and best practices in the field.

We would like to include [UTILITY] in this study, as your [PROGRAM NAME] has been identified as an innovative or peer program. In your interview, we will talk about your program design and implementation, as well as its successes and challenges. As a thank you for your time, we would be happy to share an anonymized version of our report with you once we've completed our research.

[IF NEEDED:] We will not be requesting any customer or participant data.

INTRO 3 Can we include your utility in the study?

a. Yes **[RECORD CONTACT INFORMATION; SETUP INTERVIEW TIME; EMAIL INTERVIEW TOPICS]**

b. No **[DISCUSS CONCERNS; ANSWER QUESTIONS; ATTEMPT TO CONVERT TO "YES"]**

Section A: Program Description & 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. Is your program run by utility staff or a third-party implementer? (Ex: Franklin Energy, DNVGL, Clear Result)

c. How many [PROGRAM STAFF OR IMPLEMENTER STAFF] members support the program? (Ex: Prog. Manager, Field Rep., engineer, others? %FTE on this program?)

d. Have there been any recent changes to the program?

e. What will the program be like in the near future?

A2. Can you describe the implementation strategies used by staff or implementers? (Audits? Direct install?)

a. What is the typical length of a project? (From initial contact through installation)

A3. 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: Prescriptive, Custom, Design]

b. Can you recommend a web page or other resource where I can find a list of your available measures and their incentive values?

If "NO": What specific measures are offered? What are the incentive levels for each measure?

A4. **[IF CUSTOM MEASURES:]** How do you set baselines for custom measures?

a. What documentation is needed?

b. Do projects have to show cost effectiveness in order to be approved for a rebate?
[If so] What type of cost test do you use?

- Is it a challenge for customers/trade partners to submit projects that are cost effective? Why is this a challenge?
- Do you provide any resources or information to customer to help customer understand cost effectiveness? **[PROBE]** Do you explain the relationship between peak coincident demand management and cost effectiveness? What has been the most effective strategy to explain these details to customers?
- Are you able to approve enough projects to meet your savings and participation goals? **[If yes]** What strategies have helped ensure that enough projects pass to meet these goals?

Section B: Program Performance

Next, I'd like to talk about the participation and energy savings achieved through the program in 2021. **[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 projects were completed in 2021?

a. How many incentive applications were submitted in 2021?
b. How many applications were accepted in 2021?
c. What were common reasons applications were not accepted?
d. Have high numbers of application rejections been a challenge for your program?
e. Has the percentage of rejected applications changed at all over the years?

- Why do you think is the reason for the change?

B2. What were the program's energy savings? (MWh) (MW)?

B2a. Does your program have any quantitative goals related to peak demand reduction?

[If yes] What are those goals?

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 and demand savings did the program report in 2021?

B5. What was the total energy efficiency and demand savings portfolio goal in 2021?

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 (TRC), what was the program TRC in 2021?
b. If Utility Resource Cost (UTC), what was the UTC in 2021?

B8. What strategies, if any, have been used to improve the cost-effectiveness of the program?

B9. What do you feel are the biggest challenges your program faces?

B10. What are the program's greatest strengths?

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?

Probes:

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 partners or allies.

a. Approximately how many trade allies are active in the program? Do trade allies come from a list of approved contractors?
b. What types of companies typically serve as the primary trade ally contact?

c. What activities do program staff conduct to engage trade allies?

Probes:

Provide training?

Require registration?

Support connections between contractors and customers?

c. What roles do trade allies play in driving customer participation in the program?
d. What have you found to be the most effective ways of engaging trade allies to drive participation in the program?
e. Do you engage distributors? How? Why?

g. Do you work with performance contractors? Are there any challenges working with performance contractors on custom-based projects? If yes, how do you get around those challenges?

C3. How do you work with trade partners to communicate information on peak coincidence demand management?

- How knowledgeable of peak coincidence demand management do you think your trade partners are?
  - How do your trade partners learn about peak coincidence demand management?
- How knowledgeable of peak coincidence demand management do you think your customers are?
- How do your customers learn about peak coincidence demand management?

Section D: Perceptions of EMS Market

Next, I would like to talk about the EMS market served by your program.

D1. Does your program incentivize peak coincident demand management? If so, how?

D1a. Will this change in the future?

D1b. How have/will increasing renewable energy on the grid affect peak coincident demand management?

D2. Does your program have a typical customer, or are there specific customers that your program targets?

- What opportunities exist to capture new EMS customers? [Probe: smaller buildings, new construction]

D3. What are your perceptions of the following new and emerging technologies? [Probe: Integrated controls, machine learning, fault detection, diagnostics, and wireless control systems?]

a. Integrated controls
b. Machine learning
c. Fault detection
d. Diagnostics

e. Wireless control systems
f. Others?

Section E: Closing

E1. 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

To support the 2022 impact and process evaluation of the Xcel Energy Colorado Energy Management Systems (EMS) product, the TRC evaluation team conducted telephone interviews with key staff managing and implementing the Xcel Energy EMS product. 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 product:

- Current and Former Product Managers
- Xcel Energy Team Lead
- Product Engineer
- Trade Relations Manager
- Account Managers

This memo contains our summary of the key takeaways, an overview of the Xcel Energy EMS product, an inventory of the Product's current strengths and barriers, and feedback from staff on evaluation priorities.

Key Takeaways

Below are key takeaways from staff experiences with the EMS product. These key takeaways provide a summary of the evaluation context and feedback received during the kick-off meeting and the subsequent staff interviews.

- The product's ability to achieve savings has decreased over time and it is not considered successful by internal staff. Furthermore, program staff felt that trade partners shared a similar negative perception – that it is generally not worth the effort to complete applications for the product because they are likely to be rejected.
- There is a low (<33%) application approval rate because most submitted projects are not cost effective. Most trade partners and customers do not understand cost effectiveness and perceive the approval process as a "black box," partially due to its proprietary nature. As a result, when projects are rejected, it is difficult for product staff to explain why, which can negatively impact relationships with customers and trade partners.
- Reduction in cost effectiveness is driven by savings occurring primarily during off-peak times, and non-summer months. As a result of a change in the cost-effectiveness calculation used by the product, to meet cost-effectiveness requirements EMS systems projects must direct savings to on-peak, summer months by incorporating demand management and addressing declining avoided revenue requirements (ARRs) associated with zero/near-zero cost renewable energy.

- The product expects to make significant changes in the next few months to direct trade partners and customers to submit passing projects that are cost-effective and incorporate peak demand management to deliver future savings. Product staff indicated that, while they feel this is the best direction for the product, they need support determining which measures are likely to pass. The product also hopes to discover market-ready controls with automated signaling to the utility for load shifting savings opportunities.

Product Overview

The following section presents the evaluation team's understanding of the EMS product based on staff interviews and review of available product documentation. It presents the product's goals and objectives, activities implemented through the product, product strengths and challenges, any recent and notable changes made to the product, and resources staff rely on to implement the EMS product.

Goals and Objectives

Xcel Energy staff identified the following goals and objectives for the product in 2022:

- Create and deliver a cost-effective product (meaning that the cost-benefit analysis (CBA) and total resource cost (TRC) tests are both greater than 1.0) that is relevant to Xcel Energy's customers' needs and encourages customers to install/upgrade automated controls in Commercial & Industrial buildings.

  Net benefits need to meet filed net benefit goals (included in Table 20 below).

- Improve project cost-effectiveness by learning how to best support customers to reduce peak energy use through sensors or controls.

  Increase customer clarity around cost-effectiveness and peak demand.

  Understand customer interest and level of understanding for demand response. This could lead to a better understanding of how to best support customers in installing controls and participating in summer peak demand response events given shifts in peak demand.

- Improve customer and trade partner experience with the product and consequently, improve public perception of the EMS product. Develop the product into an experience that feels beneficial to customers and worth the customers' time.

  Increase application pass rate.

- Drive market toward known cost-effective solutions.

  Update list of qualifying measures that are likely to pass cost effectiveness tests on all program materials. Project applications that are able to pass initial cost-effectiveness evaluations are capable of achieving TRC results greater than 1, but the ambiguity of measure cost-effectiveness contributes to the high rejection and customer frustrations.

The 2022 EMS product has an energy savings goal of 6.5 GWh. Table 20 presents the 2021 achievements and its achievements compared to the planned goal. The product did not reach its kWh savings goals in 2021 but achieved beyond its target for kW savings.

Table 20. Colorado Energy Management Systems Net Energy Savings Goals and Product Budgets, 2021

Source	Participants *(% of Goal)*	Net kW *(% of Goal)*	Net kWh *(% of Goal)*	Net Dth *(% of Goal)*	Budget *(% of Goal)*	Net Benefits
Electric	8 *(22%)*	552.532 *(321%)*	3,483,818 *(48%)*	--	$368,369 *(66%)*	$727,642
Gas	3 *(30%)*	--		2,397 *(83%)*	$22,223 *(65%)*	$18,818

Product Activities

The EMS product offers rebates for existing commercial and industrial (C&I) buildings to upgrade or install new energy management controls and sensors. The product is part of a suite of complementary Xcel Energy products that can help customers maximize savings associated with energy management system measures, such as Demand Response, Recommissioning, Infosystems, or Energy Information Systems. The EMS product focuses on incentivizing measure adoption and exposing customers to opportunities for load-shifting process changes. The rest of this section details the product activities employed by the EMS product to support customer adoption of EMS measures.

- The product is available to Xcel Energy's commercial and industrial customers receiving either electric or natural gas service.
- Eligible equipment includes new (not used):

  Updated control systems

  Additional control points for an existing system

  Microprocessor-based controls (including lighting)
- Customers often learn of the product through their account manager or business solutions representative, who direct their customer to EMS based on their relevant energy efficiency goals.

  Customers also learn about EMS through relationships with trade partners, which are supported by trade partner representatives (channel manager).
- To participate, customers or trade partners first obtain pre-approval of their projects, and then submit an application workbook with their project details.

  The pre-approval notice date is the same as the application date, which streamlines the customer experience.

  The early pre-approval date allows customers to begin invoicing expenses to the project with confidence that it could qualify for an incentive without delaying the process.
- Rebates are provided on a custom basis, at a rate of:

  Up to $700 per kW saved for system peak savings, plus up to $0.035 per annual kWh saved for electric customers.

  $4 per Dth saved for natural gas customers.

Rebates are based on modeled savings.

Product Changes

This product was last evaluated in 2013 and has undergone several changes since then. Within the last two years, the product implemented the following changes:

- In 2020, Xcel Energy adopted a new standard for analyzing cost-effectiveness and net benefits. This analysis required customers and trade partners to provide more information than was previously required and was overly complicated. To correct for this, product staff and engineers streamlined the product application workbook for customers and trade partners providing information on their controls projects.

  The application workbook update directed customers to report fewer data points, focusing on critical aspects reported in units most relevant to product engineers. This decreased the time it takes to fill out and process an application, resulting in quicker turn-around times for project approval.

- The pre-approval date became the same date as the application, allowing customers the ability to invoice projects immediately without risking it not qualifying for incentives.

Xcel Energy anticipates making the following changes to the product in 2022/2023:

- Direct customers to focus on peak coincidence savings to boost project cost-effectiveness.
- Narrow the scope of the EMS product to only include the most cost-effective technologies.
- Increase customer support around demand management and cost-effectiveness.
- Re-establish relationships with trade partners whose participation levels in the EMS product have declined to re-build and strengthen public perception of the product.

Resources

Product staff rely on the following resources to implement the Product.

- Product staff use Salesforce to track aggregated customer savings.
- All product information is managed by the Xcel Product team that oversees operations for EMS, this includes a product manager, an analysis engineer, and a marketing assistant.
- Implementation of the EMS product is carried out primarily by trade partners. Trade partners are supported by a dedicated channel manager and the product engineer.

Product Strengths and Challenges

During interviews, staff identified the following strengths and challenges related to implementing the EMS product. Overarching strengths include factors that product staff identified as supporting the success of the product; challenges include factors that product staff identified as preventing the product from reaching its goals.

Strengths

- The new application workbook successfully streamlines the data collection process, which decreases turn-around time for customers and product staff.

- The Xcel Energy product team is committed to the success of the EMS product; there is a lot of momentum and buy-in at the portfolio level to develop positive changes.
- In 2022 the product has a dedicated product development team that examines how to make the product more successful and increase/improve the use of controls systems in buildings.
- The product has a large potential to reach a diversity of customer business types if the product moves to incentivize demand management.
- EMS acts as a gateway to introduce customers to demand response and other more holistic products.
- Changing the pre-approval date to the application date streamlines the process for customers, gets them a quicker response, and adds flexibility to make changes quickly if need.
- There is opportunity for lucrative incentives to complete controls projects if customers understand how to employ controls projects and operate them effectively.

  There are many buildings that have older pneumatic controls that could be easy to upgrade.

Challenges

- The vast majority (>70%) of applications fail cost-effectiveness tests.

  Most customers do not understand what is causing their applications to be rejected.

  There is poor public perception and low customer satisfaction with the product due to high rejection rates.

  Avoided revenue requirements (ARR) have decreased due to the increasing share of near-zero cost renewable energy. With increasing share of zero/near-zero cost renewable energy, it makes off-peak savings hard to substantiate in the product, particularly as peaks shift to later in the day.

  There are workable ARR for kW (generation peak demand) but building controls that save energy by turning equipment/lights off have limited benefit during non-peak times.

  The cost of EMS equipment has increased in past years, contributing to the likelihood for a project to fail cost-effectiveness tests.
- Program staff has identified that future projects will need to incorporate peak demand management, but they are unsure how to best support customers to manage demand.

  Based on staff understanding of the market, many building engineers feel they are already doing everything they possibly can to manage their peak demand, indicating that they are likely unfamiliar with incorporating demand management through controls.

  The rebate structure will be examined to incentivize load shifting, including asking regulatory to modify the incremental cost attributed in the Modified Total Resource Cost (MTRC) test.

  The EMS product development team is collaborating with the Demand Response team to learn how customers can understand and maximize both opportunities.

- The pool of trade partners actively engaging with the product is small primarily because many are shifting their focus to new construction which is not eligible for rebates through the EMS product. Additionally, there is currently a negative perception of the product among trade partners.

  There are few qualified trade partners who have not already engaged with the product and re-establishing a positive perception will be required to gain trust.

  Trade partners also often prefer to sell a subscription service instead of project-based model.

- Turnover both internally and at customers' businesses has resulted in some loss of program knowledge, which combined with a steep learning curve in rapidly evolving marketplace and the complexity of EMS technology, makes the product difficult to implement and effectively meet growing customer needs.

  Similarly, customer building engineers are experiencing high rates of turnover and difficulty back-filling positions. This gap in continuity can lead to a loss in the relationship between a building engineer and product staff, and as a result, of visibility into opportunities for customers to participate in Xcel Energy products.

Feedback on Evaluation Priorities

During our interviews, staff identified research topics they would like the evaluation to address. This section summarizes 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 we are able, incorporate them into the final evaluation plan for the EMS product. The following topics were raised as evaluation priorities by product staff.

- Improve the customer experience and training.

  Understand how product staff can best communicate cost-effectiveness to customers.

  - Help product staff identify the most cost-effective solutions and determine which measures that are known to be commonly rejected would be good candidates to remove from product materials.

  Understand the cause(s) of low customer satisfaction with the EMS product, looking particularly into how low pass rates, the complexity of the custom application, lack of marketing and other market attributes affects satisfaction rates.

  - Parse customers descriptions of the product as "too complicated" to determine what elements are truly complicated and what can be attributed to frustration about not knowing why a project did not pass cost effectiveness tests.

  Research what information, trainings, and tools product staff can provide that would help customers better manage their peak demand.

  - Explore opportunities for EMS product staff to leverage existing internal demand response resources within other Xcel Energy products.
  - Understand customer experiences with successful EMS projects and document the factors that contribute to a project's success.

Understand customers experiences with demand response and identify opportunities to increase customer engagement through technical support implementing demand response.

- Understand program best practices.

  Explore peer utilities' experiences with managing similar demand response-based EMS products.

  - In particular, understand Puget Sound Energy's method for reducing incremental cost burden within their cost benefit calculations.

  Understand if peers have experienced challenges with achieving cost-effectiveness, particularly for programs that use the TRC test.

  Determine what technologies, tips, and information have worked well for peer programs when motivating customers to manage peak demand.

  Identify strategies and technologies for improving the cost-effectiveness of applications.

- Enhance product effectiveness.

  Explore program processes and delivery improvement opportunities needed to re-build public perceptions.

  Explore opportunities to breakdown internal silos, including the potential for future coordination with other Xcel Energy products.

  Identify ways to re-establish trade partner faith and rebrand the product, specifically related to cost-effectiveness and demand response.

In addition to topics explicitly discussed by the product team, the evaluation team also identified the following priority:

- Understand how to support customers as the product moves toward incentivizing load shifting.

  Explore opportunities to provide technical engineering support to customers, including a more comprehensive evaluation of customer sites.

  Identify opportunities to improve the tracking of data on customer peak demand reduction and ARRs.

C.2 Participating Customer Survey Results

To support the process and impact evaluation of the 2022 Xcel Energy efficiency products, members of the TRC evaluation team conducted in-depth telephone interviews with participating customers. This section presents the results from the questions covered in the in-depth interviews of customers who have participated in the Colorado Energy Management Systems product.

Section A: Awareness of Rebates, Energy Management Systems & Peak Coincidence Demand Management

A0. I'd like to start by asking how you first learned about Energy Management System technology?

- Two respondents learned about EMS technology from hands-on experience in the industry combined with a need to upgrade equipment.
- One first learned about EMS technology from Xcel Energy.

A1. And how did you first hear about the Xcel Energy rebates available for installing or upgrading Energy Management Systems (EMS)?

- Two respondents learned about the rebates from their Xcel Energy account representative.
- One respondent learned about the rebates from a lighting supplier.

A2. Before you learned of the rebate how familiar would you say you were with EMS technology? How would you rate your familiarity on a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar?

A2a. Has your familiarity with EMS technology changed since participating in the EMS rebate program through Xcel Energy? If so, how?

- All three respondents rated their familiarity with EMS technology before learning of the rebate as a three out of five.

A3. Peak coincident demand management is the practice of reducing a building's energy demand during periods when the utility's electric or natural gas system's energy load is the highest. Are you aware of the practice of curtailing energy use during the peak coincident demand period?

- Two respondents were generally aware of PCDM but did not consider very familiar.
- One respondent was confident they were familiar with the practice of PCDM.

[ASK If A3 = Yes]

A3a. How did you first learn about peak coincident demand management? [**PROBE** How did you first become aware of the potential to use peak coincident demand management at your business? Through the process of working with the contractor who installed your controls system?]

- All three respondents became aware of PCDM from their past experience managing buildings.

A4. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with peak coincident demand management or peak demand shifting? [PROBE: Why did you select that value?]

- Two respondents rated their familiarity with PCDM a two out of five and the other respondent rated their familiarity a three out of five.

A6. Which (if any) elements of peak coincident demand management were confusing or difficult to understand? **[PROBE]** Was it difficult to program or imagine programming your controls system to help manage demand during peak coincident periods?

- The element of PCDM that caused the primary difficulty was knowing where to shed load while meeting the needs of occupants. Respondents didn't know what opportunities there were for reducing demand without sacrificing comfort or production.

A7. Did your EMS project incorporate control strategies for peak coincident demand management?

- None of the respondents incorporated any PCDM strategies into their projects.
- One respondent mentioned considering PCDM but could not identify any feasible strategies given the age of the building.

[IF A7 = Yes]

A7a. Was there any piece of information or support materials provided to you, that encouraged you to include peak coincident demand management into your project?

[PROBE] Was there any piece of information that encourage you to include any other control strategies into your project?

- Question not asked.

A8. Did the contractor who installed your EMS discuss ways to make the project cost effective? [**Clarify if necessary** – In order to qualify for a rebate through Xcel Energy's program, your project needed to be cost effective]

- Two respondents said their contractor discussed ways to make their project more cost-effective and one reported no such discussion took place.

A8a. What information did your contractor give you related to your project's cost effectiveness?

- One respondent mentioned discussions with their contractor about project cost-effectiveness focused of qualifying for the rebate before deciding on the specific equipment.

Section F: Free-Ridership (C&I)

Next, I am going to ask about factors that may have influenced your decision to install an Energy Management System at **[FACILITY NAME]**. I'll ask about a few different factors that may or may not have influenced your decision and will ask you to rate them on a scale of 0 to 10, where 0 is not at all influential and 10 is very influential.

F0a. How influential was the rebate dollars available through the EMS program on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]**

- One respondent rated the influence of the rebate dollars as a ten, while the two others rated it a one or zero.

F0b. How influential was any information or encouragement you received from a contractor on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? Please use a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential." If this question does not apply to you (you did not work with an Energy Advisor), please let me know. **[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".]**

- Two respondents rated the information or encouragement received highly, as a seven or an eight out of ten.
- The other respondent rated the information or encouragement received low, as a two out of ten.

F0c. How influential was any other 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 install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]**

- Two respondents rated the information received from Xcel Energy low, as a 3 out of ten. The other respondent did not rate this item.

F0d. Have you or your company participated in an Xcel Energy rebate or energy efficiency program prior to this year? Which program?

- Two respondents indicated they have participated in an Excel Energy rebate before, and one respondent indicated they had not.

[ASK IF F0d = Yes]

F0d_1. And how influential was your participation in that previous Xcel Energy program on your decision to install/upgrade your EMS system and implement control strategies for peak coincidence demand management? 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".]**

- Both respondents that indicated they had participated in a previous Xcel Energy rebate indicated that previous participation was highly influential in their decision to upgrade their EMS, rating it an eight or nine out of ten.

F1. In your own words, how would you describe the importance of the Xcel Energy's EMS incentive program overall on your decision to install/upgrade your energy management system and implement control strategies for peak coincidence demand management?

- Respondents focused on cost-reduction as a primary driver in their decision to upgrade their EMS.

F2. How much would you say the EMS program influenced your decision to install an Energy Management System. Again, please use a scale from 0 to 10, where 0 means "not at all influential" and 10 means "extremely influential," The bigger the number, the greater the influence.

- Both respondents were divided on the influence of the rebate on their decision to upgrade their EMS, rating it either a two or seven out of ten.

F2a. Did the program influence your decision to include elements that would reduce or manage your facility's energy use during peak coincident periods? [Clarify if needed: 2-6pm, summer months]

- Both respondents reported that the program did not influence their decision to incorporate PCDM.

F3. Next, I'd like you to imagine that the Xcel Energy Energy Management Systems program, including the incentive, information, and support was not available. Which of the following alternatives would you have been mostly likely to do?

- If the EMS program were not available, one respondent indicated that they would have installed the same equipment, and another said they would have installed a simpler controls system.

[ASK IF F3 ≠ 5 (Would NOT have done the same thing)]

F3a_1. Why would you have done it differently? [Why would you not have installed the exact Energy Management Systems project as you did?]

- Question not applicable

[ASK IF F3 = 5, REF; ELSE SKIP TO F6]

F3b. Using a scale from 0 to 10, where 0 means "not at all likely" and 10 means "extremely likely", please rate the likelihood that you would have installed the exact same Energy Management Systems project if the Xcel Energy **<PRODUCT>** program was not available.

- The respondent that said they would have installed the same equipment without the program said they would have been extremely likely to install the same without assistance, rating that likelihood a ten out of ten.

[ASK IF F3 ≠ 5 (Would NOT have done the same thing)]

F4. Once again imagining that the program didn't exist, would you have installed the same energy management system in **<DATE>** or would you have installed it at a later time?

- One respondent indicated they would have installed it at a later time.

[IF F4 = Yes]

F5. Without the rebate program, when do you think you would have installed the energy management system?

- One respondent indicated that without the rebate they would have delayed the installation of a new EMS by more than 2 years up to 3 years later.

[IF F5 = 1 year or more later]

F5a. Why would it have been that much later?

- The respondent would have delayed the installation by more than one year because they said they would prefer to spread the installation out over the course of a few years rather than all at once, since the EMS was part of a larger project.

Section S: Spillover (C&I)

S1. Since your participation in the **Energy Management Systems** program in **<MONTH> <DATE>**, has your company installed any additional controls without a rebate from Xcel Energy? When I say "controls," I mean any energy management system additions that are eligible for an Xcel Energy rebate.

- One respondent said they installed additional controls without a rebate from Xcel Energy.
- Two respondents had not installed any additional controls.

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

S1a. Why did you not apply for an Xcel Energy rebate for purchasing these controls?

- The respondent that indicated they installed controls without assistance from Xcel Energy did not apply for a rebate because they felt the project was minimal and was still in the process of installation.

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

S2. Did your experience with the Energy Management System you installed through the Xcel Energy **Energy Management System** program influence your decision to install some or all of the additional controls on your own?

- The respondent that installed additional controls without assistance from Xcel indicted that they were influenced to install that additional equipment as a result of experience with the Xcel Energy EMS program.

[ASK S3 IF S2 = Yes, ELSE SKIP TO S7]

S3. What type of controls did you install?

- The additional controls the respondent installed without assistance were VAV boxes from pneumatic controls to electronic to facilitate automation. Not eligible for spillover because they were still in the process of installation and the project was too small.

[ASK S4a – S4b IF S2 = Yes FOR UP TO TWO MEASURES]

I have a few questions about the **[S3]** equipment that you installed.

S4a. Approximately how many of **[S3]** equipment did you install?

- Question not asked (not applicable)

S4b. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of **[S3]**.

- Question not asked (not applicable).

S5. How important was your experience in the **Energy Management System** program in your decision to complete your **[S3]** project on your own? Please use a scale from 0 to 10, where 0 is "not at all important" and 10 is "extremely important".

- The respondent rated the influence of their previous experience with the Xcel Energy EMS program on their decision to complete their VAV project on their own as extremely important, assigning it a ten out of ten.

S6. If you had not participated in the **Energy Management System** program, how likely or unlikely is it that you would have installed these additional controls, 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?

- The respondent indicated that if they had not previously participated in the EMS program it might have been likely that they would have installed the VAV project, rating it a five out of 10.

S7. Since your participation in the **Energy Management System** program, have you installed any additional energy-efficient equipment, other than controls?

- The respondent also indicated they installed variable frequency drives (VFDs) on motors, but that was not related to automation.

[ASK S8 IF S7 = Yes]

S8. Did you receive a rebate for some or all of this equipment through Xcel Energy or any other energy efficiency program?

- The respondent indicted they received rebates for the VFDs through an Xcel Energy program.

[ASK S8a IF S8 = 2 – 3]

S8a. **[IF S8 = 2: Thinking only about the equipment for which you did NOT receive a rebate,]** Do you know if this equipment was eligible for a rebate through an Xcel Energy program?

- Question not asked (not applicable)

[ASK S9 IF S8 = 2 – 3; ELSE SKIP TO E1]

S9. **[IF S8=2: Thinking only about the equipment for which you did NOT receive a rebate,]** Did your experience with the Xcel Energy **<PRODUCT>** program influence your decision to install some or all of these efficient products?

- Question not asked (not applicable).

[ASK S10 IF S9 = Yes; ELSE SKIP TO E1]

S10. What equipment did you install? Please provide as much detail as you can. **[PROBE FOR NUMBER OF CONTROL POINTS, EQUIPMENT TYPE, CONTROL STRATEGIES IMPLEMENTED, SQ FOOTAGE CONTROLLED]**

- Question not asked (not applicable).

[ASK S11 IF S = Yes; ELSE SKIP TO E1]

S11. How important or not important was your experience in the **Energy Management System** program in your decision to install this equipment, using a scale from 0 to 10, where 0 is "not at all important" and 10 is "extremely important"?

- Question not asked (not applicable).

[ASK IF S9 = Yes; ELSE SKIP TO E1]

S12. If you had not participated in the **Energy Management System** program, how likely or unlikely is it that you would have installed these additional efficient products, 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?

- Question not asked (not applicable).

Section C: Benefits, Satisfaction, & Feedback

[ASK ALL]

C1. We just talked a lot about your decisions to install your equipment, now I'm interested to hear about how you decided to participate in the EMS rebate program through Xcel Energy. Could you walk me through what motivated you to participate in the program?

- Question not asked.

[ASK ALL]

C2. Please rate your satisfaction with various aspects of your experiences with the EMS and rebate program. 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 C2a-C2f, PAUSE AFTER EACH FOR RATING, REPEAT SCALE IF NECESSARY]

C2a. The performance of the EMS you installed.

- All three respondents rated the performance of the EMS they installed very high, rating it a five out of five.

C2b. The information you received on how to operate / maintain installed EMS.

- The respondents rated the information they received on how to operate and maintain installed EMS high, with two respondents rating it a five out of five and another rating it a four out of five.

C2c. The process of finding a contractor that specializes in EMS.

- The respondents had mixed perceptions of the process of finding a contractor that specialized in EMS, with one respondent each rating it a three, four, or a five out of five.

C2d. The contractor that installed the EMS

- The respondents had mostly favorable perceptions of the contractor that installed the EMS, with two respondents rating the contractor a five out of five and on rating their contractor a three out of five.

C2e. The installation of the EMS

- The respondents reported mixed satisfaction of the installation of their EMS with one rating it a five out of five and another rating it a three out of five.

C2f. Information provided from Xcel Energy on peak coincident demand management opportunities.

- The respondents reported minimal satisfaction with the information provided from Xcel Energy on PCDM opportunities, with one respondent rating it a three out of five and another rating it a one out of five.

C2g. The rebate application process

- The respondents reported satisfaction with the rebate application process; with two respondents rating it a four out of five.

C2h. Information or support provided from Xcel Energy during the rebate process.

- One respondent was satisfied with the information or support provided from Xcel Energy during the rebate process, rating it a four out of five.

C2i. The amount of time it took to receive your rebate.

- Both respondents were satisfied with the amount of time it took to receive their rebate, rating it a four out of five.

C2j. The amount of the rebate you received.

- Respondents reported mixed satisfaction with the amount of the rebate they received. One respondent rated it a four out of five. The other two respondents were not satisfied with the amount of the rebate and rated it a three out of five. Those respondents felt the amount of the rebate seemed small relative to the overall size of the project.

C2k. Xcel Energy as an energy and rebate provider

- Respondents reported mixed satisfaction with Xcel Energy as an energy provider, with one rating Xcel Energy as a five out of five and another rating it a three out of five.

[ASK ALL]

C3. 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"]**

- Respondents reported satisfaction about the rebate program as a whole, rating it either a four or five out of five.

C4. What would you consider the biggest benefit of Xcel Energy's EMS program?

- Respondents considered assistance with updating equipment to gain more control over their building to be the biggest benefit of Xcel Energy's EMS program.

C5. What would you consider the biggest challenge of Xcel Energy's EMS program? [**PROBE** for application challenges, difficulty showing project cost effectiveness]

- Respondents felt the biggest challenges of the Xcel Energy EMS program were the upfront cost of the equipment and the application process.

C7. 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".

C7a. Complete program applications, rebate forms, or other program paperwork

C7b. Get in touch with an Xcel Energy representative.

C7c. Determine your project's eligibility.

C7d. Determining the best equipment models for your business

C7e. Finding a contractor to complete the work.

C7f. Understanding how to make your project cost effective.

C7g. Understanding how to incorporate peak coincidence demand shifting.

- Question not asked due to time constraints.

[Ask for any C7a – C7f < 4]

C8a – C8f. Why wasn't it easy to **<RESTORE ANSWER WORDING FROM C7a – C7f>**

- Question not asked.

C9. What is the Energy Management Systems program doing that it should keep doing?

- Question not asked due to time constraints.

C10. What recommendations do you have for Xcel Energy to improve the Energy Management Systems program?

- Question not asked due to time constraints.

C11. Are you interested or aware of any new or emerging EMS technologies? If yes, which ones and why?

- One respondent indicated they were interested in emerging EMS technologies, specifically controlling outside air based on carbon dioxide levels.

C12. As more renewable energy becomes available over the next few years, it may become more important to manage your energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects the EMS you installed can help you to manage your energy use throughout the day. How comfortable would you feel using the EMS system you installed to manage your energy use at different peak coincident periods throughout the day?

- One respondent indicated they would be comfortable using the EMS they installed to implement PCDM.

- Another respondent said they would not be comfortable implementing PCDM using their EMS because they felt there was no load to shift or shed.

C12a. How interested would you be in participating in programs through Xcel Energy intended to help manage your energy use throughout the day?

- Two respondents indicated they would be interested in learning more about participating in program through Xcel Energy intended to help manage their energy use throughout the day.

C12b. What other services could Xcel Energy use to support you in adjust your energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

- Two respondents mentioned a need for additional technical support how to identify and implement PCDM that have the largest impact without sacrificing comfort or production.

B: Barriers & Motivations to Install EMS, Participate in the EMS Product

B1. Now I want to ask you a few questions about the choices you made when you bought your energy management system. When you were in the process of purchasing this EMS, what factors did you consider when deciding what to install?

- When one respondent was in the process of purchasing their EMS, they primarily factored in capability with existing systems and building infrastructure such as wiring.

B1a. What were your initial perception of the benefits of an EMS system?

- Two respondents' initial perceptions of the benefits of an EMS systems focused on more precise control of a building.

B1b. What, if any, were your initial perceptions of the drawbacks of the EMS system you chose?

- Two respondents felt there were no drawback to the EMS system they installed.

B2. When you were in the process of purchasing this energy management system, at any point did you consider installing a different EMS system? If so, what other controls did you consider and why?

- One respondent said they did not consider installing any other EMS due to limitations integrating equipment from multiple manufacturers.

B3. Did you have any concerns when purchasing or installing your energy management system? If so, what were they? [**PROBE** for Availability of contractors willing to install equipment, Equipment Costs, Energy bill concerns, technical knowledge of contractor, Comfort issues, Work disruptions, Technical capabilities of equipment, tenant complaints about the EMS]

- One respondent said their biggest concern when purchasing their EMS was the price.

B4. Did you have any concerns with managing your demand during peak coincidence through your energy management system? If so, what were they?

- Question not asked.

Section D: Business Characteristics

We are almost done! I just have a few final questions about the characteristics of your business.

D1. Does your organization own or lease your facility?

- One respondent said they leased their facility.

[Ask if D6 = 1]

D2. Do you pay your Xcel Energy bill, or does someone else (e.g., building manager)?

- Question not asked.

D3. Does your organization have multiple locations in **Colorado?**

- One respondent said indicated their company had three locations in Colorado.

[If D3 = 1]

D3a. Do you know if any of these locations have participated in an Xcel Energy efficiency project?

- Of the three locations across Colorado held by that respondent, one location had previously participated in an LED rebate program.

C.3 Nonparticipating Customer Interview Results

To support the process and impact evaluation of the 2022 Xcel Energy EMS product, the TRC evaluation team conducted in-depth telephone interviews with near- and non-participating customers. For the purposes of this research, near-participating customers were defined as customers who applied to install EMS equipment with support from the product, but ultimately did not install equipment through EMS product (either because their application was rejected, or because they chose not to move forward). Non-participants were defined as customers who are eligible to participate in the product but did not. This section presents the results from the questions covered in the in-depth interviews of customers who have not participated in the Colorado Energy Management Systems product.

Section A: Awareness of Rebates, Energy Management Systems & Peak Coincidence Demand Management

[ASK A0a – A8 IF NEAR-PARTICIPANT]

A0a. I'd like to start by asking how you first learned about Energy Management System technology? [PROBE Where did you first learn about the potential to use Energy Management System technology at your business?] **Clarify if necessary: Building Controls, Building Management System, Building Automation System or Direct Digital Controls**

- Learned from personal building management experience (n=4)
- Informed by HVAC (n=1)
- Through CPACE, building upgrades financial assistance program (n=1)

A1. And how did you first hear about the Xcel Energy rebates available for installing or upgrading Energy Management Systems (EMS)? [PROBE Who first contacted you about EMS rebates?]

- Learned from thermostat vendor who said their product had a good chance of getting a rebate (n=1)
- HVAC contractor informed (n=1)
- Xcel Energy email (n=1)
- Xcel Energy rep (n=1)
- Previous experience applying for other Xcel Energy rebates (n=1)

A1_1. Have you participated in other Xcel Energy incentive programs in the past? If yes, which ones?

- Lighting rebates (n=3)
- Chiller rebates (n=2)
- VFDs and motors (n=2)
- One noted that they thought they had participated, but typically has contractor take care of rebates (n=1)

A2. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, before you learned of the rebate how familiar would you say you were with EMS technology? [PROBE: Why did you select that value?]

- 3, 1.5, 4, 2, 1; mean: 2.3, median: 2; (n=6)
- [NOTE: one respondent answered "1-2", response was averaged to 1.5]

A2a. Did your familiarity with EMS technology change after you engaged with Xcel Energy about installing or upgrading your controls? If so, how?

- Increased (n=4)
- No change (n=2)

A3. Peak coincident demand management (PCDM) is the practice of reducing a building's energy demand during periods when the system's energy load is the highest. Are you aware of the practice of using control strategies through your EMS to manage demand during peak periods in order to reduce costs and GHG emissions from electricity?

- All were aware of PCDM (but 1 described nighttime load shedding. Seems to not understand PCDM) (n=6)
- 4 report knowingly not doing PCDM right now. (n=4)
- 1 says it is hard to find places to load shed: "We've looked at it and tried to make some adjustments, but it's really tough when we're a business that operates mostly during peak demand times, it's hard to shed that load or shift it to a different time. So, we haven't been able to utilize any of that. But we've looked into it."

[ASK A3a-A7 If A3 = Yes, if no jump to A8]

A3a. How did you first learn about EMS control strategies to manage demand during peak periods? [**PROBE** How did you first become aware of the potential to use your EMS to manage demand during peak coincident periods at your business? Through the process of working with the contractor who installed your controls system?]

- Ownership talked about it (n=1)
- Boss/senior chief talked about it (n=1)
- Benefits discussed: Cost (n=2), Efficiency (n=2), Environmental benefits (n=1)

A4. On a scale of 1 to 5, with 1 being unfamiliar and 5 being familiar, how familiar would you say you were with EMS control strategies for demand management? [PROBE: Why did you select that value?] PROBE: How familiar are you with how demand management can affect your costs and GHG emissions from electricity?

- 1.5, 5, 2.5; mean: 3, median: 2.5 (n=3)

A6. Which (if any) elements of using EMS control strategies to manage demand during peak coincident periods were confusing or difficult to understand? **[PROBE]** Was it difficult to program your controls system to help manage demand during peak coincident periods?

- Knowing where to shift load when clients (tenants) do not want to sacrifice comfort. (n=2)

  "The guest still doesn't understand that they might need to sacrifice comfort for the good of the planet. [...] When they [the guest] left they set their thermostat at 69. And they're thinking that when they walk back in, their rooms going to be 69. And it's not. They're walking into the room that's 75."

  "The best energy savings we saw was turning off lights. And still maintaining good comfort and people are more attuned to that. 'Hey, we're going to shut off the lights for a couple hours here, then.' OK, great. Great. You know, but you start messing with their climate, they really got agitated."

- Cost of system and long-term ROI (n=1)
- Nothing, just have not implemented PCDM yet. (n=1)

A7. Did the EMS project that you submitted with your application for rebates through Xcel Energy's Energy Management System program incorporate elements of control strategies for peak demand management?

PROBE: Did your contractor discuss how demand management strategies can affect your costs or reduce GHG emissions from electricity?

- Had capability, but they would often have to override the temperature sensor EMS for guest comfort, especially on peak (hot) days. Hotel wanted them to incorporate less EMS, not more. Saving money and energy was coming at a detriment of customer satisfaction. (n=1)
- No (n=1)

A8. Did the contractor who helped you with your EMS project application discuss ways to make the project more cost effective? [**Clarify if necessary** – In order to qualify for a rebate through Xcel Energy's program, your project needed to be cost effective]

- No, they had the system they needed or were told they needed, so there were not alternatives discussed. (n=2)

A8a. What information did your contractor give you related to your project's cost effectiveness?

Probe 1: When you were planning your project, did your contractor help you design your project with the rebate program in mind?

Probe 2 (if not already discussed): Did they discuss peak coincidence demand management with you?]

- Contractor was very confident that the system would qualify for a rebate, and it did in the past. By the time they got their rejection, months had passed, and they had already installed the system (n=1).

[ASK A9 – A18 IF NON-PARTICIPANT]

A9-A18 Questions not asked – All respondents were Near-Participants

B: Barriers & Motivations to Participate in the EMS Product

[IF NEAR-PARTICIPANT]

B1. Now I want to ask you a few questions about the energy management system project you submitted for an Xcel Energy rebate. What were your initial perception of the benefits of installing EMS technology? [PROBE for any non-energy benefits like comfort, clarify understanding of benefit and how important it was to motivating customer to participate]

- Better equipment control, usage tracking, and efficiency (n=4)
- Reduce electric bill (n=4)
- Reducing carbon footprint (n=1)

B1a. And what initially motivated you to submit an application to the EMS program?

- Contractor recommendation (n=2)
- Saving money (n=2)
- Building owners value efficiency (n=1)

B2. What, if any, were your initial perceptions of the drawbacks of EMS technology?

- Upfront cost, financing, long payback periods (n=3)
- Difficulty/complexity of operating (n=2)
- System installation, design, aesthetics of product (n=1)
- Guest satisfaction (n=1)
- No drawbacks (n=1)

B3. What, if anything, was difficult about participating in the rebate program?

- Application was confusing. Uncertainty about what was eligible (n=2).

Wanted Xcel Energy to be proactive about what would be approved (n=1).

- Nothing was difficult (n=2)
- Timeline - Xcel Energy bureaucracy causing delays (n=1)

B3_1. Thinking specifically about the application process, was there anything difficult about submitting an application to the EMS program for your project? [PROBE: Was the application workbook confusing? Was it difficult to understand what information was required? Were there portions of the application that you found time consuming?]

- No (1 not difficult, 1 contractor did the application) (n=2)

B3_2. Did **<DIFFICULTY>** discourage you from completing the application process?

- Not applicable

B3_3. Does **<DIFFICULTY>** make it less likely that you will submit an EMS rebate application with Xcel Energy in the future?

- Not applicable

B3_4. When you were planning for your project, how easy was it to understand the eligibility requirements? [**PROBE**: Did you understand what made a project more likely to pass cost effectiveness requirements and qualify for a rebate?]

- Not clear (1 because contractor handled it, 1 did not know) (n=2)

B4. Now I want to ask about your experience with your contractor with regards to your application. To what extent did your contractor assist you with completing the rebate application process?

- Contractor or engineer handles all or almost all of application. Just have to provide information (n=4).
- Done in house without contractor (n=1)

B5. Do you think additional assistance with the application process from your contractor would have been beneficial?

- No, it was fairly easy (n=3)

B5_1. What kinds of assistance would have been helpful?

B6. What resources did you use to answer any questions you had about the workbook or rebate application process?

Section C: Product Experience

[ASK NEAR-PARTICIPANTS]

C1. Do you feel that your contractor helped you understand why certain projects might be approved?

- No (n=4)

One respondent was "pretty removed from the process", letting engineer and energy consultant handle it (n=1)

- Yes (n=1)

C2. How did you learn that your application for the EMS program was rejected?

- Email (n=4)
- Phone (n=1)
- Engineer (n=1)
- Rep (n=1)

C3. To the best of your understanding, why was your application for the EMS program rejected?

- One said they received "just those four bullets" from the Xcel email, and that contractor was fatigued at the back and forth and gave up (n=1).
- One respondent said they knew that it was for failing cost-benefit analysis but does not know why she failed and is frustrated by that (n=1).
- One respondent did not know at all and was not interested (n=1).
- One respondent thought that they were rejected because they had already applied for a rebate in the last 6 months (n=1).
- Two respondents did not know why they were rejected (n=2).

C4. When you learned that your application was rejected, what information was communicated to you, and by whom?

- Two respondents learned from email that they were rejected, with no substantial further details (n=2).

C5. Do you feel like the amount of information provided to you on why your application was rejected was sufficient? Was there any other information you wish you had been provided or any information that was unclear?

- No (n=3)

  "It just felt like we tried, and we lost. So, it was very much disappointing given the time and energy involved."

- Don’t know (n=1).

C6. Did you make any adjustments or consider making any adjustments to your project at any point?

- One said yes, they would have made changes if they knew what changes were required (n=1).
- Two respondents said they could not make adjustments because the measures were already installed by the time they were rejected (n=2).
- One said no, the upgrades they made were required (n=1).

C6a. [IF NO – why not]

- Upgrades they made were required (n=1)
- Systems were already installed by the time they heard they were rejected (n=2)

C6b_1. [IF YES] Did you make updates before or after receiving feedback from Xcel Energy? [**PROBE TO CLARIFY:** Was this before or after your application was rejected?]

C6b_2. [IF YES] What updates did you make?

C7. Did you install/upgrade your EMS without the rebates from Xcel Energy?

- Yes (n=5)

C7a. [IF YES] Did you make any changes to your project from the version you submitted with your application? What changes?

- One respondent said he would have installed the measure even if he did not have a rebate available at all. The building needed upgrades, and he needed to increase profitability by reducing their utility bills, as well as increase comfort for renters" (n=1).

C7b. [IF NO] Do you still plan to install/upgrade your EMS in the next five years?

[If C7b = Yes]

C8. On a scale from 1 to 5, where 1 is "very unlikely" and 5 is "very likely", how likely do you think you are to submit an application for Xcel Energy's Energy Management System rebate program in the future? [**PROBE** Can you tell me a bit about why you gave that answer?]

- 3,5,3,5,4.5,4, mean = 4.1, median = 4.3.
- One respondent was unhappy with their rejection and said they will adjust expectations and be less confident that he could qualify. "It's still nice to get rebates/ [...] But now I will have a different set of expectations going into it and knowing that I can no longer bank on a rebate and our ROI analysis definitely hampers our ability to feel confident about moving forward with the project" (n=1)
- One respondent was frustrated by rejection but felt like she had no other option because there is only one electric utility. "I probably will very likely [to apply for rebates in the future], but they need to be more progressive in giving feedback and explaining why one person would not qualify. What is their standard?" (n=1).
- One respondent thought he was rejected because the project was too similar to a previous project and was a continuation of a prior project that qualified. In the future he says he will be more specific to say it is a continuation of a project.

C9. On a scale from 1 to 5, where 1 is "very unlikely" and 5 is "very likely", how likely do you think you are to submit an application for other Xcel Energy incentive programs in the future? [**PROBE** Can you tell me a bit about why you gave that answer?]

- 5 – Very likely (n=4), mean=5, median=5.
- One respondent thought other programs were easier to apply for (n=1).
- One respondent thought other programs were more proactive, and that Xcel Energy had an issue with timelines (n=1).

C9a. What (if any) influence did your past experience with the EMS rebate program have on your answer?

- Not asked

C10. What recommendations do you have for Xcel Energy to improve the Energy Management Systems program? [**PROBE** for additional resources or tools that would have make it easier to participate]

- One respondent suggested that Xcel Energy could increase its proactive outreach and speed of processing applications.
- One respondent wants Xcel Energy to provide more information about rebate and EMS options: "I don't have my own contact at Xcel that just kind of checks in on me and knows what I'm thinking about and even reviewing you know our utility usage and pointing out things like those peak demands and having that creative discussion around energy management."
- Three respondents felt the major issue was timeline (n=3).
- Three respondents did not understand what qualified and why (n=3)

[ASK ALL]

C11. Are you interested in or aware of any new or emerging EMS technologies? If yes, which ones and why?

- Wireless EMS (n=1)
- Analytics platform integrated into automated system – Respondent was “excited to see what it can help…with as far as saving energy and reducing the downtime of equipment and extending the life of equipment” (n=1).
- One respondent was not aware of anything but was interested in working with Xcel Energy to identify “creative” approaches to energy management at his facility.
- One respondent did not know, because it was something his engineer takes care of.

C12. As more renewable energy becomes available over the next few years, it may become more important to manage your energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects EMS technology will be a good tool to help customers like you manage your energy use throughout the day. How comfortable would you feel using the EMS system you installed to manage your energy use throughout the day?

- Four respondents were resistant to idea (n=4).

  Two said there was no room to make adjustments, because machines have to run when required and tenants or people in the building demand a certain degree of comfort.

  One said that OSHA requirements about temperature could be a barrier.

  Two respondents felt it would be difficult, but if there was a way to have the system work with their needs, or override if necessary, they would be open to it. Both of these respondents expressed some wariness around sacrificing performance.

C13. How interested would you be in participating in programs through Xcel Energy intended to help manage your energy use throughout the day?

- Two respondents said they would be interested, but again raise concerns that PCDM would disrupt their business operations (n=2).
- One respondent was skeptical about how Xcel Energy programs are run, would be more open to a 3rd party implementing the program (n=1).

C14. What other services could Xcel Energy use to support you in adjust your energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

- Better understanding of the requirements for rebates (n=2).
- Incentives to reduce cost of implementing PCDM (n=1)
- Technical support (n=2)

  "I think I just need to get schooled better on how [PCDM] all works…so I don't know enough yet to offer any suggestions in that space."

- One respondent said they did not know, but they are interested in signing up for demand response programs as long as the "energy being used in the building and if it's actually being produced in a friendly manner."

Section D: Business Characteristics

D1-D8a Questions not asked due to time constraints.

We are almost done! I just have a few final questions about the characteristics of your business.

D1. How would you describe your line of business?

D4. Approximately how many square feet is the facility where you installed your EMS project?

D6. Does your organization own or lease your facility?

[Ask if D6 = Lease]

D7. Do you pay your Xcel energy bill, or does someone else (e.g., building manager)?

D8. Does your organization have multiple locations in **Colorado?**

[If D8 = 1]

D8a. Do you know if any of these locations have participated in an Xcel Energy efficiency project?

C.4 Participating Trade Partner Interview Results

This appendix presents full results from the participating trade partner interviews.

Section F: Background & Product Familiarity

F1. 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 SOMEONE WITH CUSTOMER EXPERIENCE: Owner, Sales Manager, Salesperson, Engineer, or Technician]**

- 5 years
- 4 years
- 5 years
- 6 years
- 4-5 years

F2. Can you describe what kind of involvement you typically have with the EMS rebate program? This would include interaction with Xcel Energy staff, marketing rebates to customers, installing equipment, filling out program paperwork, providing invoices, or fulfilling other requirements.

- 5/5 fill out paperwork for client.
- 1/5 will sometimes have the customer submit the paperwork, “depends on the customer.”
- 3/5 state that they propose the program to their customers.

Section I: Product Influence on the Market

I1. Thinking specifically about that project, how and when did your customer become aware of the rebates available through the Xcel Energy EMS program?

- 2/4 customers knew about the program before trade partner.
- 2/4 had the program brought to them by the trade partner.

I1a. Did **<CUSTOMER NAME>** consider peak-coincident savings in their decision to install the EMS? By peak coincidence I mean lower energy demand during Xcel’s peak demand period, usually between 2 – 6 pm

[If Yes]

- 3/5 did not consider peak-coincident savings at all.
- 1/5 said peak-coincident savings factored into the customer’s decision.
- 1/5 tried to consider it but customers are reluctant to implement.

I1b. When did your customer decide to include peak coincidence demand management elements in their project? **[PROBE]** Was that before or after you decided to apply for a rebate through the EMS program?

- 2/2 said at the beginning during application process.

  1 of those respondents said they involved a commissioning agent to write a sequence of operations to make the chilled water plant more efficient and is making an assumption that they considered peak coincidence demand.

I2. On a scale of 0 to 10 where 0 is Not at all Influential and 10 is Extremely Influential, overall, how much would you say the Xcel Energy's EMS program influenced <CUSTOMER>'s decision to complete the EMS project they did?

- 3/5 rated the program somewhat influential (6-7).
- 1/5 rated the program a 4 because their customer was going to install regardless.
- 1/5 did not want to answer.

I2a. Great, and could you tell me a bit about why you rated the influence of the program on this customer's project a <I1 Response>? Please tell me in your own words, how influential the EMS program was in your decision.

- 3/3 said the program incentives helped make the financials look better and got the project "over the finish line."
- 2/3 said the projects would have eventually come to fruition but the incentives expedited the timeline.

[IF NOT ANSWERED IN I1a]

I3. Did the program influence your decision to include elements of peak coincidence demand management into your project? If so, how?

- 2/3 said no influence.
- 1/3 said indirectly yes as they scheduled equipment to slowly ramp up.

I4. If the EMS program did not exist, what alternative would your customer have been most likely to do? [Do not read – ask open end and code response]

a. Installed a simpler controls project/Not incorporate peak coincidence demand management.
b. Installed a smaller system – fewer control points.
c. Repaired their old EMS system instead of upgrading.
d. Done exactly the same thing as they did through the program.
  a. On a scale of 0 – 10, where 0 is very unlikely and 10 is very likely, how likely is it that your customer would have done the exact same thing?
e. Something else [CLARIFY]

- 4/5 said the project will still move forward with the same equipment and process.
- 2/5 said the project would have been delayed.
- 1/5 did not want to answer.

Consistency check [Ask If (I2 > 7 AND I5 = d & > 6) else skip to I9]

I5. You just gave <I4 RESPONSE> points to the importance of the program in CUSTOMER's decision install the energy efficient MEASURE, I would interpret that to mean that the program was quite important to them. Later, when I asked about what they would have done in the absence of the program I recorded some answers that would imply that the program was not that important. Just to make sure I have recorded this properly I have a couple of questions to ask you.

I5a. When I asked you about the importance of the program for CUSTOMER, including incentives, you gave a rating of ...<I2 RESPONSE> ... out of ten, indicating that the program and the incentives were important to the customer. Can you tell me why the program was important to them?

- One rating was adjusted to account for a respondent inconsistency.

I6. In general, how would you describe the influence that the EMS program has on the types of EMS technology you recommend to your customers?

- 3/5 rep specific product lines and the program doesn't affect the types of technology they recommend. They bring all that is available to the customer.
- 1/5 said looking through the application itself sparks ideas for possible installs.
- 1/5 thinks all technology is the same and does not think the program has an effect.

I7. In general, how would you describe the influence that the EMS program has on your decision to recommend EMS systems that **incorporate elements that reduce demand (kW) during the peak coincident period?**

- 4/5 respondents do not incorporate demand reduction during peak coincident period. They all work on reducing demand overall. 1 respondent said “it is difficult to shave off peak demand due to comfort concerns.
- 1/3 goes after any and all savings possible.

I8. In approximately what percent of projects did you recommend <PEAK DEMAND MANAGEMENT ELEMENT/generation demand management elements> BEFORE you learned about Xcel Energy’s programs?

- 2/3 did not previously discuss the peak demand prior to the program.
- 1/3 always knew about the program during the course of his career.

I9. And approximately, in what percent of projects do you recommend <PEAK DEMAND MANAGEMENT ELEMENT/generation demand management elements > now that you have worked with Xcel Energy’s programs?

- One respondent said they recommend it to all customers.

I10. Did you make any other adjustments to your project to improve the likelihood of it qualifying for an Xcel Energy rebate? [PROBE: to improve the project’s cost effectiveness?]

If so, what were those adjustments? [PROBE: Are these adjustments you would make for other projects, or were these specific to the process of submitting this project through the EMS program?]

- 5/5 said they made adjustments.
- 3/5 looked at sequence adjustments and commissioning.
- 2/5 focus on selecting the appropriate building/project for the program.
- 1 said program works better for bigger projects.

I11. How has your perception of the EMS program changed in recent years, if at all? [PROBE: In about what year did that change?

- 3/4 said the process has gotten more difficult over the years.
- 1 said there is no insight on the calculations.
- 1 prefers the process prior to the spreadsheet.

Now, we are going to talk through two scenarios to understand how the rebates and other benefits offered by Xcel Energy's EMS product impact the type of equipment you sell.

SCENARIO 1: STATUS QUO

I12. First, thinking about the current market, roughly what percent of the EMS you sell incorporate peak coincident demand management strategies [PROBE: such as cooling setpoint adjustments, RTU duty cycle adjustments, or pre-cooling]? Other strategies to increase cost-effectiveness?

- 2/4 do not focus on it at all.
- 1 will focus on it 25% of the time.
- 1 will focus on it 100% of the time.

SCENARIO 2: NO EMS PROGRAM

I13. Now imagine that the Xcel Energy EMS program was not available today, and you were not able to offer rebates for EMS or have any program support.

- 1 said without the program payback will be tough for owners who only hold buildings for 5 years.
- 1 does not think he gets any support from Xcel.

  I13a. About what percent of the EMS you sell do you think would incorporate peak coincident demand management strategies? Other strategies to increase cost-effectiveness?

- One respondent said 80% would move forward, but not clear whether those projects would incorporate peak coincident demand management.

  I13b. What effects would this have on your business? **[PROBE: employees, sales techniques, number of clients, time it takes to sell projects]**

- 2/2 said there would be a slight reduction in business.

I14. At what point in the sales process do you discuss the Xcel Energy EMS program with your customers? [**PROBE** Are there certain customers or project characteristics that would make it more or less likely for you to suggest the EMS rebates offered through Xcel Energy with your customers?]

- 4/4 bring this up early in the sales process.

I15. What effects, if any, has the program had on your business?

- 3/3 state the program has had a positive impact on their business. This incentive helps cover the costs.

  I15a. Have you changed any of your business practices or sales strategies in any way to leverage the EMS product? **[PROBE]** Have you hired more staff to complete the work demand?

- 1 respondent said they were hired for this purpose.
- 1 respondent said no, they have not gotten that far.

[If time permits and relevant to Trade Partner]

I15b. Do you think the EMS program has influenced the amount or type of EMS equipment available in the market? Why or why not?

- Not asked.

I16. How has your participation in the EMS program changed over the past years? [PROBE] Has it increased, decreased, or stayed about the same?

- 1 respondent said probably stayed the same.

I16a. What has caused your involvement to change? [PROBE: Specifically, what has been driving the number of rebate-eligible projects customers complete?]

- 1 respondent said knowledge from the customer side, owner building reps do not know about it and do not pay attention because it does not fit the model of low hanging fruit and does not fit their payback model.

I17. Do you do any EMS work for customers served by another utility? [IF YES, PROBE] In what regions?

- 2 work in other areas of CO.
- 1 works in MO and IL.

I17a. About how many EMS projects do you complete with those customers?

- Not asked.

I17b. What percent of the EMS you sell in those regions incorporate peak demand management strategies?

- Not asked.

I17c. About how many incorporate other strategies to increase cost effectiveness?

- One respondent said that their other strategies include turning off equipment and/or implementing appropriate modulation and scheduling.

[IF I17 = YES]

I18. Do the other utilities you work with offer rebates for EMS systems?

- Yes (n=1)
- One respondent said they will search for programs but generally not.

[If I18 = YES]

I18a. How does the rebate compare to Xcel Energy's program? [PROBE for ease of application, incorporation of peak coincidence demand management, rebate structure and amount]

- 3 trade partners worked with other utilities, but do not have enough experience with either Xcel or the other utility to make comparisons.

Section P: Perceptions / Awareness: EMS

P1. What types of EMS does your company have experience installing?

- 1 respondent said Automated Logic – owned by Carrier.
- 1 respondent said ABB, Johnson Facility Explorer (fx), Easy IO, Backnet IP.
- 1 respondent said they do only retrofits. Primarily installs Honeywell, Niagara control system. Not proprietary like TRANE, etc.

P2. How experienced are you and your company in selling and installing EMS technology to implement peak coincident demand management on a scale from 1 – 5, where 1 is "not at all experienced" (Clarify if necessary: no experience with the technology) and 5 is "very experienced" (Clarify if necessary: the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

- 3 (n=1)
- 4 (n=2)
- 5 (n=1)

P3a. What do you see as the primary benefits of EMS technology in Colorado? [**PROBE** for benefits of peak coincident demand management] [**PROBE** for what they tell customers about the benefits of peak coincident demand management, non-energy benefits like indoor air quality, contributions to company sustainability goals] are customers ever interested in NEBs like indoor air quality or sustainability goals.

- 3/3 stated the primary benefits as some version of automated controls.

P3b. What do you see as the primary drawbacks of EMS technology in Colorado [**PROBE** for drawbacks of peak coincidence demand management]?

- 2/4 site the cost as a drawback.
- 1/4 mentioned complexity of systems and need for training.
- 1/4 mentioned proprietary equipment that cannot communicate with one another.

P3c. What do you tell customers about the benefits of EMS?

- 1 respondent said there is pretty wide scale adoption, very few buildings still running with pneumatic systems, people understand the value and in the commercial side everyone understands they need it.
- 1 respondent said it is easier to have a single user interface to schedule all the equipment.

P3d. What percentage of your retrofit customers do you think will install EMS five years from now? **[PROBE if not discussed]** What percentage of your retrofit customers do you think will practice peak coincident demand management five years from now? **[PROBE for reasons for answer, are your customers ready? Are you to serve those customers?]**

- Out of 3 respondents average was 70% for both install and peak demand.

  1 said 100% to install, 20% for practice peak coincident demand management.

1 said 20% to install, 100% because they will set them all up to do that.

1 said about 85-90% of them.

- Respondents thought more education and utility pressure will drive this.

P3e. What needs to change, if anything, to make EMS more viable to C&I customers? **[IF NEEDED examples could include equipment costs, electricity costs, policies, carbon-free electricity]**

- 3/3 cite more financing and/or reduced equipment cost.
- 1/3 recommended a case study to show a set-up that does not sacrifice tenant comfort.

P4. What needs to change, if anything, to make peak coincident demand management more feasible for C&I customers? **[IF NEEDED examples could include equipment costs, electricity costs, policies, carbon-free electricity]**

- Not asked

P5. Are you aware of any emerging technologies related to EMS? If yes, which? **[PROBE]** Any you are particularly interested in?

- 3/4 mentioned interest in autonomous/continuous commissioning.

P5a. There are a few EMS-related technologies that Xcel Energy is interested in learning more about Trade Partners' perspectives on. I'll read a list of these technologies – Please let me know if you are familiar with any of these or have any thoughts on them.

[Read list and pause after each, skip technologies discussed in last question – **PROBE** for experience with the technology, barriers to implementation, opportunities for including in EMS product or opportunities for facilitating peak coincident demand management]

a. Wireless EMS
b. Machine learning
c. Fault detection & diagnostics
d. Integrated lighting controls

- a: 3/3
- b: 2/3
- c: 3/3 - 1 respondent said this is required by code.
- d: 3/3

P6. What do you see as new/emerging peak coincident demand management opportunities for your customers?

- 1 respondent said developing good sequences to simplify when it does come along, creating the process so someone can sequence and create demand reduction as needed.

P7. Are you aware of any opportunities to reduce the upfront costs of EMS technology? [PROBE for low-cost options, lower cost technologies]

- 1 respondent said from their side, do not approach it that way and cannot list it that way.

Section M: Trade Partner Marketing

Now, I have some questions about customer motivations and how you sell EMS equipment and peak coincidence demand management strategies to customers.

M1. Do you promote the EMS rebate program with your customers? If so: How?

- Not asked

M2. What tools or resources could Xcel Energy provide, that would be most helpful in explaining the connection between EMS project cost-effectiveness and peak coincidence demand management?

- 1 respondent says the application feels like a black box and would like a webinar for more information.
- 1 respondent said to engage more with trade groups as contractors sell to customers.
- 1 respondent recommended customer education, e.g., showing info about peak demand on energy bill.

M3. Do you sell any EMS retrofit equipment to Xcel Energy C&I customers without submitting an application for the rebate?

- 1 respondent said yes, if the project is already fully financed.

[ASK NEXT THREE QUESTIONS IF M3 = 1]

M3a. How frequently does this happen?

- Not asked

M3b. What are the reasons why?

- Not asked

M3c. 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 not rejected?]**

- 1 respondent said filling out the application vs. taking care of existing customers; sending out an email; scheduling a call, filing the application for them would save time.

M5. Can you think of any other changes to the program that would improve your ability to market the EMS program? **[PROBE** for more predictable rebate amounts, increased engineering support from Xcel Energy, and/or opportunities for small buildings]

- Not asked

M6. What barriers do you experience to selling EMS technology generally? [PROBE: Market conditions, increase in cost of equipment?]

PROBE: The program saw a decrease in the number of submissions to the EMS rebate program in 2018. Can you think of anything that would have led to that decrease? [PROBE: e.g., increase in equipment costs?]

- 1 respondent said cost is the biggest barrier.
- 1 respondent said there was back and forth, pulled out some of the graphics, etc.

Section B: Customer Barriers/Motivations

B1. How do your customers generally learn about opportunities to participate in the EMS rebate program?

- 1 respondent said customers learn from them (the trade partner).

B2. What is the main reason customers pursue rebates through the Xcel Energy EMS program?

- 2/2 said cost savings- 1 said it helps them get justification for a project, a project that can get payback in 3 years is more likely to get approved.

B2b. Have the reasons why customers participate in the EMS program changed over the years?

- Not asked

B2c. Do you think that your customers use their EMS to market the carbon reductions they see because of their EMS? Do they have company sustainability efforts or goals that their EMS contributes to?

- 1 respondent said that is always a thought in the back but does not know if in the past 3 years those ca been a driver.

B3. What, if anything, about the EMS program keeps customers from participating more?

- Not asked

Section S: Satisfaction & Product Experiences

Now, I'd like to talk more specifically about your experiences with the EMS 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 satisfaction with:

a. The EMS program overall?
b. The application workbook?
c. The pre-approval process?
d. The rebate amount?
e. The time it takes to complete the application process?
f. The eligibility requirements?
g. Your interactions with EMS program staff?

- a. Responses: 5, 4, 4, 4, 2
- b. Responses: 4, 3.5, 3, 4, 2
- c. Responses: 4, 3, 4, 4, 3
- d. Responses: 4, 4, 5, 3, 1
- e. Responses: 4, 3, 3, 4, 2
- f. Responses: 5, 5, 4, 4, 2

- g. Responses: 5, 5, 5, 5

[ASK ONLY IF S1 < 5]

S1a. What could Xcel Energy do to increase your satisfaction with the EMS program? **[PROBE: as needed for specific factor]**

- Not asked

S2. How difficult or easy would you say it was to complete the following tasks associated with the Xcel Energy EMS product on a scale from 1 to 5, where 1 is "extremely difficult" and 5 is "extremely easy"?

- Not asked

S2a. Complete product application workbook.

S2b. Submit product applications.

S2e. Meet product deadlines.

S2f. Understand a project's eligibility for an EMS rebate.

S2g. Get in touch with a program manager.

S2h. Get in touch with an Xcel Energy engineer or technical advisor.

S2i. Identify opportunities to incorporate peak coincident demand management into your projects.

S2j. Communicate or explain peak coincident demand management to your customers.

S2k. Communicate or explain the benefits of the EMS product to your customers.

[ASK FOR ANY S2 ANSWERS < 4]

S2l. What are the reasons why it wasn't easy?

- Not asked

[ASK ALL]

S3. What is the EMS program doing well that they should keep doing?

- Not asked

S4. Are there any other challenges you've experienced while participating in the EMS program that we haven't discussed yet? **[PROBE for specifics of the challenge- what was most difficult? understanding cost effectiveness, application workbook, implementing peak-coincident demand management, submitting passing projects]**

- 1 respondent said they would like to know the methodology for how they come up with the numbers.
- 1 respondent said to make it as easy as possible to get the rebates approved and processed.

S5. What else can Xcel Energy do to increase your participation in the EMS program?

- 1 respondent said because of the location they are unlikely to participate any longer.

C.5 Nonparticipating Trade Partner Interview Results

This appendix presents full results from the in-depth interviews of trade partners who had stopped participating in the EMS product since 2018.

Section F: 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.

F1. 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.]

- A year and a half (n=1)
- Three years for this company (n=1)
- Two years (n=1)
- Twenty-seven years (n=1)

F2. What are your primary responsibilities at COMPANY NAME?

- Service & sales (n=1)

  Sales for new and existing customers

  Energy service – helping customers reduce energy, upgrade aging infrastructure, identify rebates, grants, incentives to pay for infrastructure upgrades.

- Regional director of technical services (n=1)

  Sales ops, consulting services for high performance buildings

- Sales (n=1)

  Work with customers to come up with best ways to reduce energy consumption, making it more user friendly for staff.

- Business development across state of Colorado (n=1)

  Four branches – mechanical contractor, maintenance, project offering, facilities offering.

  Oversee sales engineers and sales reps.

  Execution of project work throughout the state

F3. How many employees does your company have?

- In Colorado – 75 (n=1)
- 50 (n=1)
- 48 (n=1)
- 325 (n=1)

F4. What Xcel Energy programs have you participated in previously?

- Controls
- Recommissioning
- HVAC
- Lighting
- Motors & Drives
- Self-Direct
- Custom

Section P: Perceptions/Awareness: Energy Management Systems

P1. What types of EMS does your company have experience installing?

- Allerton controls
- Delta controls
- Distech controllers
- IP-based controllers
- Niagara platform
- Johnson
- Honeywell
- ASI Controls
- Vendor agnostic (n=2)

P2. How experienced are you and your company in selling and installing EMS technology to implement control strategies for peak coincident demand management on a scale from 1 – 5, where 1 is “not at all experienced” (Clarify if necessary: no experience with the technology) and 5 is “very experienced” (Clarify if necessary: the primary technology you work with)? **[PROBE: Why would you give it that rating?]**

[**Define peak coincident demand management if necessary:** By this we mean, using the EMS to implement control strategies to lower energy use during peak demand periods, which occur from 2-6pm, Monday through Friday, June through September.]

- 3 (n=3)

One respondent said: "Years ago we used to do way more, it was more commonplace. [...] A lot of the demand limiting depends on the owners and the owners' relations with their tenants. And how their tenants perceive and try to reduce the energy costs."

- 2 (n=1)

  Respondent stated: "Not very…The customer wants to stay comfortable. Demand side management has an opportunity to make people uncomfortable or less comfortable" This respondent thought there was appetite in the market 15 years ago, then desire went away, but thought lately acceptance has increased.

P3a. What do you see as the primary benefits of EMS technology in Colorado? [**PROBE** for benefits of peak coincident demand management]

- Better building management (n=4)
- Environmental concerns (n=1)
- Reduce energy load to help prevent blackouts and brownouts (n=1)

P3b. What do you see as the primary drawbacks of EMS technology in Colorado [**PROBE** for benefits of peak coincidence demand management]?

- Minimal or no drawbacks overall (n=2).
- Proprietary systems that need to be upgraded often (costly) or cannot integrate with other systems and meet customer needs (n=2).
- Expensive (n=1).
- Too complex to operate (n=1).
- Users may not have agency they want for comfort of their building (n=1).

P3c. What do you tell customers about the benefits of EMS? [**PROBE** for what they tell customers about the benefits of peak coincident demand management, non-energy benefits like indoor air quality, contributions to company sustainability goals]

- Better building and data management (n=2).
- Comfort (n=2).
- Contribute to carbon reduction goals (n=1).
- Automation opportunities are driven by and address an issue on site (for example, comfort, obsolescence/functionality) (n=1).

P4. Are you familiar with the Xcel Energy's Energy Management Systems program? [**PROBE:** This is a program offered by Xcel Energy that provides rebates for installing or upgrading a customer's Energy Management System at their business]

- Yes (n=4)

[IF P4 = YES, OTHERWISE SKIP TO NEXT SECTION]

P5. Do you recall how you first heard about the Energy Management System Program?

- From prior company (n=1)

- From Xcel Energy representative (n=1)
- Xcel Energy event (n=1)
- Did not recall (began using the program a long time ago) (n=1)

P6. What initially motivated you to sign up as a qualified trade partner for the Energy Management Systems Program?

- Gain knowledge about the program and people at Xcel who could help with projects (n=1)
- Opportunity to save clients' money (n=2)
- Helps with selling to have Xcel Energy "endorsement" that installing EMS is a good idea (n=1).

P7. What were your perceptions of the Energy Management Systems program when you first heard of the program?

- **[PROBE]** What did you perceive as the value to customers offered through the Energy Management Systems Program?
- **[PROBE]** Have your perceptions of the program changed at all, since you first heard of it?

- One respondent felt that the programs from other utilities he had worked with were more "advanced" and user-friendly. Other programs were also not so narrowly focused on peak demand and included incentives for new technology as well as analytics.
- One respondent was happy to see Xcel take EMS technology seriously, and thought it seemed like a good opportunity to save clients' money and help the environment.
- One respondent felt that when they first heard of the program and started using it, it was easier to implement that it is now.

  > "I remember when if first started out, I was able to go into the building and talk to the owners about upgrading. And they would put down, almost prescriptive in the sense of, oh we're changing out your pneumatic boxes to fan powered VAV boxes, to DDC. I used to be able to say to a customer, you've got 16 VAV boxes you're changing out on this floor, this is what your rebate would be. It doesn't apply that way anymore."

- One respondent was frustrated that a series of small jobs, even if they added up to a larger job (for example, which was installed over time) didn't qualify.

  > "Now, if you pre-qualify, you have to have a certain amount of space. In my line of work, most of the buildings don't qualify because the original job doesn't have enough square footage, even though they may over a period of time be doing 20,000 sq ft. But that might be over the course of three or four years. They don't qualify because they've been doing it in little chunks at a time."

- A crosscutting theme was that prescriptive projects are easier to work with.

P8. And how do you think your customers learned about the rebates offered through the EMS program? [PROBE: Did you talk to them about the EMS rebates offered by Xcel Energy?]

- Not asked

P9. Why were your customers motivated to participate in the Energy Management System program?

PROBE: Are they ever motivated by business sustainability goals or targets? Do they ever market the EMS or their energy savings as an indicator of sustainable or "green" values?

- They are motivated to participate because of the rebates (n=1)

  P9a. How influential do you feel like the program is/has been on your clients' decision to install an EMS?

  - If the program didn't exist, what would you have done differently with your client's project?

- One respondent said that they encourage the customer to apply, but it's not always a guarantee – even when the project is approved. He has some customers who do not qualify and still install their project, and some who do qualify for rebates but never install. "[The rebate] influences it, but it's not the biggest part of a customer's decision-making process. I would say most of our customers, I think it's just a nice [bonus]. The customers that were going to do it were probably going to do it anyways, which is a bummer to say."

  P9b. When a customer's application is rejected, do they typically go on to install the same project? Or do you make changes to a project (for example, make it cheaper, change/remove elements that had been added for the rebate program, etc.?)

- Yes (n=2)

  P9c. Did you ever work with an engineer or other Xcel Energy staff to make updates to a project so that passes cost effectiveness tests and is eligible for a rebate?

- No, there is not usually room to cut any part of the proposal. The respondent puts in what is needed, and does not want to go back and forth with Xcel Energy (n=1)

  P9d. When an application is rejected, would you (are you willing to) make changes to the project so that it passes cost effectiveness tests and is eligible for a rebate?

  - What barriers or challenges would you experience, if you had to make changes to a project in order for it to qualify for a rebate?

Section B: Barriers for Trade Partners

B1. I understand that you participated in the EMS program through Xcel Energy in the past, most recently in <YEAR>, but have not participated since then. Could you tell me why you have not recently participated in Energy Management Systems?

- Four respondents felt the process of applying for and waiting on a rebate was cumbersome, difficult, and or time consuming (n=4)

- Four respondents also did not understand why projects did not qualify for rebate, or their in-house cost benefit analysis did not seem to match Xcel Energy's method for establishing cost effectiveness.
- Three respondents were very not interested in demand response focused projects (n=3).
- One respondent said that organizational complexities made applying for rebates hard to keep track of (n=1).
- One was discouraged by low rates of project approvals.

  "We [got] very little feedback as far as why we didn't get the rebates."

  "And so, getting more information around that would be helpful. How they analyze a project and really working with the different vendors to really develop these projects… After they sent us a letter, and said 'No, you don't qualify', we did actually get the opportunity after the fact on one of the projects to say, 'hey, can we at least get with your engineering team, understand what things we can do better and need to do better to make these that your to get these things approved as well.' So that was a positive, but just kind of felt like we were left on an island."

B3. What about the EMS program would need to change in order for you to resume submitting EMS projects to the program for rebates in the future?

- If they had the ability to add smaller, non-concurrent projects together and be approved for projects (n=1).
- If the speed of analysis and response was faster (n=1).
- If there was a higher rate of projects that were accepted by the program (n=1).
- If Xcel Energy was more explicit about what would get approved (n=1).

B4. Do you continue to sell EMS projects to customers in existing buildings without applying for rebates?

- Yes (n=4)

  [If yes] Why do you sell these projects without applying for rebates through Xcel Energy's EMS program?

  PROBE: Do these projects include control elements addressing peak coincident demand management?

B5. More generally, what challenges do you experience selling and installing EMS technology for your customers?

- No major challenges (n=2)

  One respondent felt that customers in Denver are environmentally conscious, making it pretty easy to sell EMS technology (n=1).

- Cost/ROI (n=2)

Section M: The EMS Market

Next, I'm going to ask some question about the type of equipment you sell to customers.

M1. Are you aware of any emerging technologies related to EMS? If yes, which? **[PROBE]** Any you are particularly interested in?

- Analytics and continuous commissioning (n=3)

  For smaller buildings: "Being able to use the data in the building from the BAS and transpose or allow that to be sent to an analytics program to help the customer optimize the operation of their building…I think Xcel may have a program for that, called EIS. But it seems to only be for large installations. It's not accessible to smaller businesses and customers. Which, 90% of the building automation systems out there are going to be smaller."

- Open-source systems (n=1)

  "Not JCI, not Siemens, and not some of the standard ones that are more proprietary even though they may note back net capabilities. It's just a little bit harder to make that happen. Those are the ones that are really rising up more to allow for more flexibility."

- AI (n=1)

  "I think AI is probably a big thing, like automated learning and trying to identify changes that happened and get ahead of issues before they appear."

M2. There are a few EMS-related technologies that Xcel Energy is interested in learning more about Trade Partners' perspectives on. I'll read a list of these technologies – Please let me know if you are familiar with any of these or have any thoughts on them.

[Read list and pause after each, skip technologies discussed in last question – **PROBE** for experience with the technology, barriers to implementation, opportunities for including in EMS product or opportunities for facilitating peak coincident demand management]

e. Wireless EMS

- Yes, currently installed or have installed before (n=3)
- No, do not install wireless (n=1)
- Three said they had reliability issues, connectivity issues with wireless (n=3)

  "I was just going to say we've had projects where it's been installed, these sensors are within eyesight of the device and they still act out because, like for downtown this big building…they had continuous issues with it. We had to go ahead and pull all the wireless out to put hard wire in everywhere, after many hours of troubleshooting and replacing parts."

f. Machine learning

- One respondent said they installed AI as part of controls (n=1)
- Three respondents said they did not utilize AI (n=3)

  Two were aware of it as part of existing control systems (n=2)

  Two felt that AI is not currently good enough to be useful but think it may improve in the coming years.

g. Fault detection & diagnostics

- All respondents view it positively (n=4)

- Three respondents install it currently (n=3)
- One does not currently install (n=1)

h. Integrated lighting controls

- Three respondents view it positively (n=3)
- One felt it can be expensive to incorporate into existing building (n=1)
- Two respondents currently install integrated lighting controls (n=2).
- Two respondents do not currently install integrated lighting controls (n=2).

M3. Do you primarily install EMS technology in new construction or as retrofits?

- All respondents primarily install EMS technology as retrofits (n=4)

  One respondent said 60% retrofit/40% new construction.

  One respondent said 80% retrofit/20% new construction.

  Two respondents said, “mostly retrofit.”

  PROBE: Do you have a preference for one scenario over the other?

  PROBE: Do you feel like there are more opportunities in Colorado for one scenario over the other?

  Lots of new construction, but respondent still primarily focuses on retrofit: “There is a tremendous amount of new construction. But when it comes down to it, we focus on retrofit. Just because retrofit, retrofit is a whole different animal as in you have to be able to work around in an occupied building, you have to keep everything running while you're doing the work. You have to know how to stage the project properly so that you don't take your building down or cause a major issue of for tenant comfort. So, we do specialize in retrofit.”

M4. Does your previous participation in the Energy Management Systems rebate program impact your current business or sales practices, at all? (i.e., learning about new equipment, availability of equipment, market acceptance of equipment)

- No (n=1)

M5. In the near future, do you think increased interest in improving indoor air quality will drive EMS sales?

- Two respondents saw an increase in air quality interest (n=2).

  One respondent specifically noted interest in using "infrared lighting" that kills germs/purifies and interest in higher density filters (n=1).

- One respondent has seen small increases in interest, particularly from schools (n=1).
- One has not seen an increase (n=1).

M6. As more renewable energy becomes available over the next few years, it may become more important to help customers manage their energy use throughout different periods of the day (not just during the current peak coincident time of 2-6pm). Xcel Energy expects the EMS installed at customer facilities can help them to manage their energy use

throughout the day. How comfortable do you think your customers would feel using the EMS system you install to manage their energy use throughout the day?

- Two respondents felt that PCDM is something customers could do.

  One noted that Xcel Energy had 15-minute interval data, which, if they had access to, would make it easier to manage.

- One respondent felt that many people don't like to cut energy and sacrifice comfort, but younger generations may be more open to it (n=1).
- One respondent reiterated the difficulty of participating in Xcel's EMS program.
  - Are you comfortable supporting customers in managing their energy use throughout the day in response to peak demand, through their EMS system? Do you have the resources to provide this type of support?

M7. How interested would you be in participating in programs through Xcel Energy intended to help customers manage their energy use throughout the day? [for example: incentives, technical support, rate structures]

M8. What other services could Xcel Energy use to help you support your customers in adjusting their energy use to different times of the day? [PROBE for incentives, technical support, rate structures]

- Adopt a pay for performance model (n=2).
- Having different programs and applications for each different measure is difficult and confusing (n=2).
- Proactively educate trade partners about EMS technology and opportunities (n=1).
- Improve speed of response and project approval rate (n=1).

  "There's many different electric companies throughout the country that use this concept. You take readings prior to implementing strategies. And this could be anything from building automation systems, adding in new equipment, but understanding what the baseline is before the strategies are implemented. And then taking readings after the fact. Do that for like a three-year period of time, to be able to see what the actual savings are, and then pay incentives based on that. I think that is just so easy to do. And I could actually send you a document that Seattle Power and Light uses, and some of the different rebates that they provide just for the kW reduced."

C.6 Peer Utility Benchmarking Interview Results

As part of the TRC evaluation of the Xcel Energy Energy Management Systems (EMS) Product in 2022, TRC conducted secondary research and in-depth interviews with key staff at peer utilities that implement programs similar to the EMS Product. The objective of the peer utility benchmarking research was to understand how peer utilities approached key issues related to implementing comparable EMS programs.

The evaluation team's findings were informed by interviews with key informants (e.g., program managers) at four utilities (shown in this appendix as Utilities A-D, seen in Table 21). We selected these utilities because they have comparable territories and programs to the Xcel

Energy EMS Product. This enables the evaluation team to provide an “apples-to-apples” comparison of program plans at peer utilities.

Specifically, the peer utility selection was based on one or some of the following criteria:

- Comparable program designs
- Comparable territories (e.g., geographically located in the southwest United States, similar number of customers, and similar number of small businesses in territory)
- Other programs known to have best practices or tools Xcel Energy is interested in pursuing.

Table 21. Customer Definitions

Utility	Territory	Service Type
Xcel Energy	Midwest	Electric and Gas
Utility A	West	Electric
Utility B	Northeast	Electric
Utility C	Midwest	Electric and Gas
Utility D	Northwest	Electric and Gas

These interviews generally focused on the same discussion topics being explored in the interviews with Xcel Energy customers and trade partners but emphasized the following research objectives specific to peer benchmarking interviews:

- **Program Design and Performance Benchmarking**: The interviews focused on whether peak-coincident demand savings was occurring. If so, interviewers asked how peer utilities have successfully increased participation in their programs, specifically focusing on what technical support related to peak coincident demand management (PCDM) for the product was necessary for increasing participation. Interviews also assessed the challenges faced by peer programs, and what steps peers were taking to overcome these barriers. The interviews also followed-up on questions posed to trade partners about emerging or new technologies and determined how/if peers were incorporating these technologies into their products.
- **EMS Project Cost Effectiveness:** The interviews also looked at how peer utilities who employ the TRC test to assess EMS project cost effectiveness successfully approved enough projects to meet their savings and participation goals.
- **Customer Engagement**: We discussed strategies for increasing customer engagement to grow the EMS market through PCDM, as well as for shifting perceptions of contractors, given barriers associated with custom products and complicated applications. In addition, we probed for methods used to increase customer awareness of EMS technology to reduce peak demand.

The remainder of this memo presents results based on each research objective.

Key Takeaways

Below are key takeaways from interviews with peer utility representatives regarding their EMS programs.

- Programs operated on a continuum of complexity from focusing on prescriptive equipment or sequence-based programs, to more custom performance-based programs, to carbon-based market development programs.
- No other peer was currently targeting peak-coincident demand savings or integrating strategies for encouraging customers to implement PCDM into their program design. Half of the peers (n=2) were actively exploring how to incorporate peak-coincident demand savings into their program design.
- Program performance was variable among peers, as was budget, however all peer programs were cost-effective and indicated some influence on the market to encourage the adoption of EMS technology.
- Peers focused on large managed accounts and relied on trade ally networks, both open and closed, to drive program participation.
- Peers expressed broad support for emerging EMS technologies, but also cautious optimism regarding vendor claims surrounding the capabilities of autonomous systems.

Program Design

This section outlines the similarities and differences between the Xcel Energy EMS Product and the other four peer utility programs. The evaluation team asked peer utilities about the structure of their programs, including basic design, program objectives, implementation strategies, and incentive structures. Summary findings can be found in the bullets below and in Table 22.

- Three programs stated that their program objectives included a behavior focus, noting that they want customers to use their EMS correctly, in addition to just installing it: “So our initiative was really to solve…a big problem with energy management technologies and in general controls in general, which is that controls don't give you any savings unless you actually use them right, you could have the most efficient piece of equipment in the world if you don't use the controls, you're going to use more energy than if you had an inefficient piece of equipment that you controlled perfectly.”
    - Different from other peer programs, the peer with the carbon-based program does not have energy goals at the program level – they are committed to achieving a portfolio-level cost effectiveness ratio based on carbon reduction. As a result, their program goals are focused on growing the technologies and markets for vendors and customers that will advance their carbon reduction goals.
- No peer utility explicitly factored in peak-coincident demand savings into their cost effectiveness calculations for evaluating proposed projects.
    - While it did not have any peak coincident demand-related goals specifically, the carbon-based market development program said that demand management strategies are commonly implemented by their customers.
- Peer utilities designed their programs along a continuum; from prescriptive equipment or sequence-based offerings, to more custom performance-based programs, to carbon-based market development programs.
- All programs were primarily focused on large projects.
- All four peer utilities described a strong commitment to workforce development and training as a way to ensure proper use of EMS systems and engage trade partners.

- In response to challenges determining the incremental costs associated with energy savings while conducting cost effectiveness assessments on projects, Utility C streamlined the process of verifying project cost effectiveness. They remove 50% of incremental project costs to account for non-energy related building management features, like safety or fire sensing. The peer conducted research with their trade partners to determine what percentage of a typical EMS project were related to energy savings, versus other elements and used this data to determine an average of 50%. Applying this flat reduction in costs has helped the peer more accurately characterize the costs of energy saving components of EMS equipment as the market costs associated with EMS technology continue to rise, without adding a lot of administrative burden on project engineers or trade partners by asking them to separate out costs.

Table 22. Peer Utility EMS Product Overview

Utility	Custom/ Prescriptive	Rebate Structure	Standalone Program or Embedded	Incorporates PCDM	Objectives
Xcel Energy	Custom	$700 per kW saved for system peak savings, plus up to $0.035 per annual kWh saved $4 per Dth saved	Standalone	Yes	kWh Reduction and PCDM through equipment incentives
Utility A	Custom	$0.02/kWh	Embedded	No	kWh reduction through equipment incentives, performance incentives, and workforce development
Utility B	Custom & Prescriptive	Demand control ventilation $0.09/sqft New EMS $0.18/sqft Expanding existing system $0.27/sqft	Standalone	No	kWh reduction through equipment incentives, performance incentives, and workforce development
Utility C	Custom	30 percent cost-share incentive paid after installation	Standalone	No	Carbon reduction at the portfolio level targeted at a cost-effectiveness ratio of $15/ton of CO2
Utility D	Custom	$0.40/kWh $6/therm Performance Incentive paid after year of operation	Standalone	No	kWh reduction through equipment incentives, performance incentives, and workforce development

The list below outlines any recent and expected changes to peer utility programs.

- **Utility A** experienced no recent changes to their product and is not expecting any in the near future.
- **Utility B** has begun routing projects into a tiered custom pathway from previously prescriptive pathways based solely on number of control points. The custom approach

allows them to incorporate size and system complexity into the project assessments. Additionally, in the future they were expecting to develop trainings to educate building owners.

- **Utility C** shifted to carbon-based cost-effectiveness calculations and developed a robust trade ally network. At the time of the interview, they were in the process of launching a pilot program focused on using EMS to enable peak-coincident demand management for long durations, based on 15-minute response times: "The hypothesis that we're looking to prove through the pilot…would essentially be that [real-time energy management] control systems can be operated in such a way that…they can do demand management in such a way that they can be as cost effective a resource as battery storage would be. So, what we're going to be looking to do is fund pilot projects that can reduce the load for long durations up to 8-hour periods based on 15-minute response times. There's a lot that still being developed right now. But it's going to be looking to prove out that there can be [real-time energy management] strategies put in place at a building that will allow the building to perform as if it was a battery storage bank. You know, so that's what we're starting to look to prove, but that is not on the market yet. It's still kind of in development."
- **Utility D** recently increased their base incentive by $0.10/kWh and a $2/therm. The peer anticipated making minimal changes to program design in the future beyond code revisions and continuing to increase the base incentive amount.

Program Performance

This section outlines the similarities and differences between the performance of the Xcel Energy EMS Product and the other four peer utility programs. The evaluation team asked question related to program performance as well as overall program challenges and strengths. Summary findings can be found in Table 23, and the bullets below them.

Table 23. Peer Utility Program Performance (FY 2021)

Utility	Savings model	Program Reported Savings	Budget	Cost-effectiveness
Xcel Energy	Net	• 3,483 MWh • .552 MW • 23,974 Therms	$877,228 YTD Capital Cost	MTRC 1.24 (2021 goal)
Utility A	Gross	• 174,858 MWh • 25 MW	$ 378,577 Incentives Paid	TRC1.18
Utility B	Net	From 2012-2021 • 523,652 MWh • 82.4 summer MW • 85,7 winter MW	From 2012-2021 $210,694,239 Total Program Cost	TRC 2.60
Utility C	Gross	• 254,132 MWh	$36,400,239 total program cost	N/A
Utility D	Net	• 5,000 MWh • 3,5000 Therms	$360,000 incentives paid	TRC 2.1

The retrospective net-to-gross ratio calculated for Xcel Energy's EMS program was slightly lower than those applied to peer EMS programs, as seen below in Table 24.

Table 24. Peer Utility Net-to-Gross Ratios

	Xcel Energy	Utility A	Utility B	Utility C	Utility D[ab]
Program Overall	**0.75**	**.98**	**0.94**	**N/A**	1.0
Evaluated or Stipulated	PY 2021 Evaluation	Evaluated	Evaluated	N/A	Stipulated

Peers described a variety of program strengths and challenges that impacted their program's performance in 2021.

- **Utility A** reported experiencing a slow down across the market from pandemic-induced supply chain issues and inflation-related issues.

  Utility A's support for behavioral training around EMS usage by paying for a portion of an energy manager's salary as an incentive for customers was a key strength for the program, helping it achieve its behavior-related objectives.

- **Utility B** mentioned difficulties balancing the interplay of the technical potential of the EMS and the behavioral operational component of the equipment when assessing savings potential. The peer noted that the age of the system is just one indicator of how well the EMS operates, but it really depends on how the systems is operated as much as any other factor.

  One of the programs strengths was providing workforce development through a trade partner training series in partnership with a local university.

- **Utility C** expressed challenges with collecting the right data from trade partners to accurately assess their energy savings. At the beginning of the program, they did not initially collect all the data they needed or ask trade partners to collect necessary data going forward. They are currently working on going back to trade partners to ask for utility data for their participating customers but are often finding that the trade partner no longer works with the customer or the data they receive is incomplete.

  Utility C felt their program's biggest strength was the ongoing service component and technical support, which helps customers use their systems effectively, analyzes usage data and helps maintain EMS performance as projected. They felt that this helped bolster trust in EMS technologies and will help grow the controls market: "Technical expert… can actually help the customer use their system so that the customer doesn't pay a lot of money for this system that then they don't get savings and…feel ripped off. We're trying to build trust in energy management technologies and controls technologies and all of that comes down to service - if customers aren't [making] the savings they aren't going to trust it. They aren't going to want it. It's not going to go anywhere in the market."

- **Peer Utility D** mentioned that parsing through overall project costs for energy savings-related costs was difficult before coming to a standard deduction to discount non-energy costs (described above). Even after the adjustment, they reported some projects are still "hugely" expensive and cannot meet cost-effectiveness criteria. Despite this challenge, the peer reported that their approach to standardizing project cost evaluation was one of the programs biggest strengths on top of generous incentives.

Customer Engagement

We asked interviewees about strategies for shifting perceptions of contractors, to increase program participation and customer awareness of using EMS technology to reduce peak demand. Additionally, we asked about interest in emerging EMS technologies. Summary findings can be found in the sections below.

Increasing Program Participation and Awareness of PCDM

While no peer was currently actively promoting the use of peak coincident demand management through their EMS programs, peers provided a variety of interesting strategies to increase participation in EMS programs, and to improve awareness of PCDM generally or in the future.

- **Utility A** focused engaging large accounts that were already in consistent contact with their account manager or enrolled in a Strategic Energy Management program for participation in their EMS program. Their program was open to all trade allies, but trade partners that were approved by the utility are featured on the program's website as a vetted vendor. As a result, most projects, roughly 80%, are driven by 20% of the trade partner pool.

  At the time of the interview, the utility was focused on implementing PCDM through residential air conditioning and non-residential irrigation programs only. Furthermore, they felt their trade partner pool would not prioritize PCDM due to ongoing supply chain and labor issues that causes them to be less interested in selling new EMS components.

- **Utility B** primarily focused on large managed C&I accounts, municipal accounts, and national chains, targeting communications to sustainability officers or operations officers within those customers. While they did not restrict trade partners to a closed network, they did certify trade partners that completed trainings as "project expeditors" featured on the program's website. The utility also offered a training series in partnership with a local university.

  At the time of the interview there was no communication with trade partners about PCDM, but mentioned they were in the process of adapting their program design to help pay for training to implement PCDM and automated demand response solutions based on real-time price signals.

- **Utility C** this utility relied on vetted trade ally network to drive the program including conducting sales, completing applications and revisions, as well as educating customers on EMS technology and the program offerings.

  While the peer believed some trade allies were helping customers implement PCDM, their program was not tracking the impacts. This peer was in the process of launching a pilot program to integrate EMS with real-time energy markets to enable PCDM.

- **Utility D** recruited participants primarily from large office buildings and schools. This peer relied on long-standing relationships with mechanical trade allies to drive customer participation and expressed a need to re-engage with the new generation of trade allies as more established contractors continue to retire.

  While the peer thought a few trade allies have tried to incorporate PCDM, they felt it was isolated to more specialized software than standard controls their trade partners typically offered.

Perceptions of Future Technologies in the EMS Market

Several peers offered insights on their perceptions of the future of the EMS market and emerging technologies:

- Utility C helps customers by providing quality control and verification of vendors who say they incorporate emerging technologies like artificial intelligence and machine learning into their projects. They felt that, because “artificial intelligence” and “machine learning” were buzzwords in the market, many vendors said they offered those components without there being an industry standard yet, so quality varied. They are also working with trade allies to develop industry standard definitions for emerging technologies.
- Utility D felt that with the new clean building laws that went into effect in their region, controls projects have been ramping up.

  Utility D had a participating customer who was interested in integrating monitoring-based commissioning with machine learning to develop streamlined their monitoring systems and go above and beyond what their fault detection software can currently do. The utility was working with customer to provide incentives and technical support for this project. The representative from Utility D was also aware of a third-party contractor with proprietary strategic energy management (SEM) software that integrates artificial intelligence. The program streamlines the process of onboarding and scaling SEM customers in a more cost-effective way, particularly for smaller customers: “We have an SEM program but it's not really cost effective for customers that are less than a certain size, but they're using software [that allows them to] add on to their existing controls to streamline or fine tune their certain set points and schedules and it seems like a really good scalable way of doing strategic energy management for those smaller maybe enterprise customers.”

Energy Management Systems Evaluation

2022 Program Evaluation: Recommendations and Responses

The Xcel Energy, Energy Management Systems product in Colorado offers custom electric and gas rebates to customers who install automated control systems resulting in energy savings. These systems are centralized networks programmed to monitor and control mechanical and sometimes lighting systems within a building, allowing customers to reduce energy costs and shift energy load by adjusting usage of equipment. The program is marketed to all business customers. Xcel Energy is proposing to add prescriptive measures, apply a cost-reduction to account for non-energy costs in controls proposals, and add a demand response component

Xcel Energy ("the Company") engaged a team of researchers led by TRC to conduct a process and impact evaluation of the Energy Management Systems controls product. The evaluation team was asked to assess the following:

- Customer satisfaction with the product and motivations to participate in the product
- Xcel Energy's influence on customers' decisions to implement controls projects and the customer journey paths that lead to such projects
- The roles, successes, and challenges faced by participating trade partners and customers
- Opportunities to increase product implementation and delivery
- The impact of customer free ridership on product savings
- The net to gross ratio of the EMS product.

Based on the results of this research, the evaluation team developed key findings and recommendations for Xcel Energy.

Recommendation	Response
1) Nonparticipating trade partners are not well-informed around PCDM and are not successfully communicating it to their customers. Peer utilities highlighted the importance of training in their plans to increase incorporation of Peak Coincident Demand Management (PCDM).	The Company agrees to conduct slides and in-person trainings and provide training materials on the product webpage to help trade partners understand what they can expect in the future in terms of the role of PCDM and prepare them to support their customers in using their EMS to implement PCDM. The Company agrees to create an on-line list of trade partners who go through the aforementioned trainings so that customers are more likely to select trade partners equipped to develop product-eligible projects. The product team already has begun engaging trade partners in discussions about the future of the EMS product and can leverage this engagement and momentum by implementing the new trainings and disseminating information on product changes as soon as possible.
2) Customers and trade partners whose applications were rejected often did not understand the reasons for their rejections, but they would have been interested in adjusting if	The Company agrees to increase communication around reasons for rejections, providing trade partners time to adjust projects and make them cost effective.

they had more information earlier.	
3) High incremental costs contribute to low project cost effectiveness and rejections. A peer utility cut proposed project costs in half to account for costs not related to energy savings.	The Company agrees to more accurately portray the costs related directly to energy savings when assessing project cost effectiveness by applying a flat reduction of 50% of EMS project costs to account for incremental costs not related to energy savings like comfort, fire alarms and security.
4) Customers and trade partners are interested in a more predictable or straightforward rebate. Participants also expressed some desire for the rebate to be bigger and thus more influential.	The company proposes to add three EMS product prescriptive measures. 1. Pneumatic to DDC thermostats 2. Rooftop Economizer Controls with Demand Control Ventilation 3. Guest room Energy Management Thermostats (3 types)
5) Product participation is currently low, but upcoming product development updates are likely to capture more product influence	The Company will apply a prospective of .84 when product design updates are implemented. Once participation increases, the company will conduct research to assess whether product changes increased the product's influence in the market compared to the product's level of influence presented by evaluators.
6) It can be difficult to collect enough data directly from customers to track customers and understand customer experience, particularly for products with low participation.	The Company will ensure best practice documentation policies by building in additional practices for confirming appropriate data is saved after client engagement (like in a project close checklist) as needed. Staff will save or share additional documentation – emails, application forms, contact information – that contains any information on product influence or the customer journey to provide supplemental details and improve the Company's ability to track customers. This information will help increase confidence in NTG estimations during evaluation. For example, account managers will update and share contact information pre-emptively to make recruiting more efficient. The Company will conduct periodic accountability checks to ensure important information is saved – by implementing a QA/QC checklist when a customer engagement is wrapped up.