EMI CONSULTING

Xcel Energy Colorado Data Center Efficiency Product 2017 Evaluation

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FINAL REPORT

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Introduction

Xcel Energy contracted with EMI Consulting to evaluate the 2017 Data Center Efficiency Product in Colorado. The Colorado Data Center Efficiency Product takes a holistic approach to encouraging energy efficiency among new and existing data centers of any size and type. This product assists customers with support services and rebates that address everything from IT equipment to HVAC and power systems. Rebates are offered for airflow improvements, electrical equipment, high-efficiency cooling equipment, humidification, power systems, and high-efficiency lighting equipment. For existing facilities, Xcel Energy offers study funding of up to 75%, not to exceed $25,000, as well as prescriptive equipment rebates and custom rebates, saved for pre-approved projects, up to $400 per kilowatt. The Xcel Energy 2017-2018 Demand-Side Management Evaluation Plan included both a process evaluation and impact evaluation for this product. As part of the evaluation, EMI Consulting assessed participant and trade partner experiences, product influence on customer decisions, similarity to peer programs, and opportunities to improve the product. This summary includes the key findings and recommendations from this evaluation.

Methods

Participant interviews (n=13)

Non-participant interviews (n=5)

Trade partner interviews (n=6)

Peer program benchmarking interviews (n= 5)

Staff interviews (n=6)

Fielding:
Sept 2017 – Nov 2017

Key Findings

The product **is an important product**, but there is room to improve it's influence in an industry that is rapidly evolving. Some customers derive a lot of value from the product, and more targeted engagement can increase influence in the market.

Overall product satisfaction is high for both participants and trade partners. Both groups find determining eligibility and filling out forms the most challenging aspects of participating in the product.

Personal contact, technical assistance, and recommendations of contractors, more than incentives, are what influence customers' decisions to install energy efficient equipment.

Most peer programs have a **similar NTGR**. They also report that personal outreach is best for customer engagement, and product ease-of-use promotes customer participation.

Impact Results

0.65 Prospective NTGR

0.54 Retrospective NTGR

Ways to increase product influence: Higher NTGR values are loosely associated with fewer projects completed through the Product. Product influence can be increased through improved tracking and documentation, targeting outreach, and by leveraging existing relationships.

NTGRs are in line with other utility data center programs: Prospective and retrospective NTGRs are in line with other utility data center programs, which range from 0.41 to 0.61.

Drivers of product influence: In general, customers rated non-product factors (e.g., previous experience with equipment, standard industry practice, etc.) as more important in their decision to install equipment. This is consistent with peer utilities.

NTGR drivers: 10/11 participants were aware of the product before they thought about installing measures, 8/11 would have installed the same measure without the product, and 6/11 would have installed it at the same time.

Executive Summary

2017 Data Center Product (Colorado)

Process Results

Customers

The Xcel Energy-sponsored study did not have a strong influence on participants' decision making.

Incentives were not very influential on participants' decisions. **Technical assistance and the recommendations of contractors have more impact** on decision making.

Participants found out about the product from Xcel Energy staff, and this is also how they prefer to hear about it.

Participants find most **product tasks easy to complete**, but had some difficulty with determining eligibility and completing rebate forms.

Trade Partners

Incentives and third-party validation motivate trade partners to participate.

While all trade partners were aware of incentives, **they sometimes declined to mention them in sales discussions** if they felt doing so could hurt the sale.

Trade partners currently learn about opportunities through in-person communication from Xcel Energy, but prefer to hear about it via email more than they currently are.

Trade partners find **completing most elements of the product relatively easy** but also have trouble determining eligibility. They also sometimes find filling out product forms challenging.

NP/Benchmarking

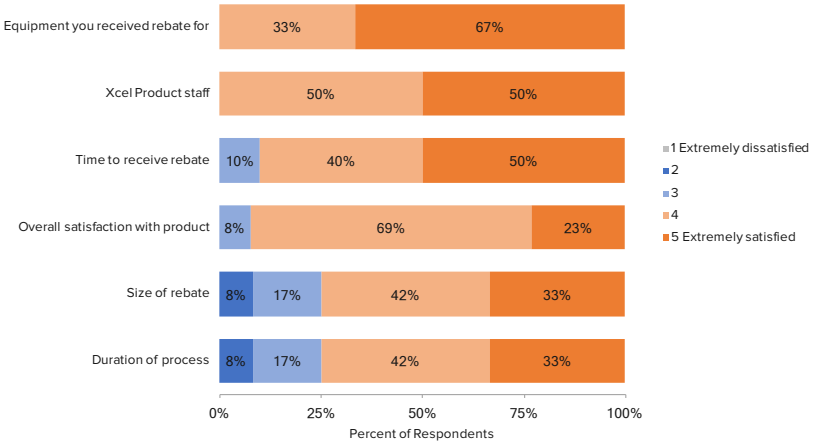
Peer utilities reported that **customers are motivate by programs that are easy to use.**

Non-participants currently hear about the program from bill inserts, online, or through their networks. They prefer to hear about opportunities in-person from Xcel Energy staff.

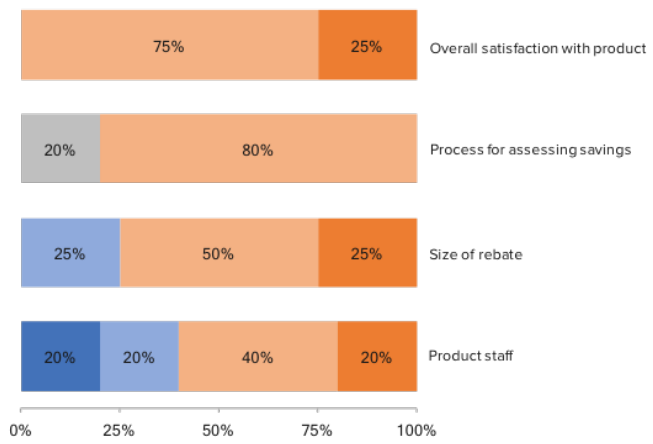
Peer utilities recommended **personal outreach** with participants.

Non-participants reported **payback period and circumstances** (such as moving to a new facility or being acquired) as main barriers to participation.

Product Satisfaction



Participants reported generally **high levels of satisfaction** with the product.



Trade Partners are **less satisfied** with the product than participants, but are still highly satisfied.

Conclusions & Recommendations

There is evidence from this research that product staff need a more detailed characterization or segmentation of the data center market in order to better target engagement activities.

Recommendation 1: Conduct a targeted market characterization study. The goals of this study would be to: (1) identify potential new participants, (2) understand the characteristics of trade partners who influence data center decision-makers, and (3) identify other market actors that may be worth developing relationships with.

While there is evidence that the Data Center Product is impacting parts of the market, the wide range of NTG values indicate that some participants are high free riders.

Recommendation 2: The recommended prospective NTGR is **0.65**. Consider segmenting and incentivizing the market based on how and how many times they participate. Devise a method for documenting the the counterfactual in the customer journey.

Recommendation 3: Target outreach efforts towards customers, trade partners, or other market actors with characteristics that indicate increased barriers to energy efficiency.

Recommendation 4: Consider having a dedicated resource to promote the product to potential new participants.

The influence trade partners have on customer decision-making varies. Engaging data center customers is a high-touch endeavor that relies on trusted relationships and reputation.

Recommendation 5: Incentivize trade partners for recruiting first-time participants and for upselling projects, increasing the value proposition for trade partner participation.

Recommendation 6: Target outreach efforts on trade partners with greater ability to influence customer decision-making.

Recommendation 7: Support trade partners to identify and implement opportunities by developing a trade partner list, holding advisory board meetings or roundtable discussions.

Recommendation 8: Review study content to increase the efficiency of projects or identify additional opportunities not already under consideration.

As the data center market is highly competitive and IT equipment is quickly made obsolete, participants reported that they were highly motivated by standard industry practice.

Recommendation 9: Promote technologies that are not well accepted through implementing a tiered incentive structure.

Implement Recommendation 2: Implement a method for tracking the customer journey to document existing equipment and efficiency levels, what the customers would have installed without the program, and what was actually installed.

Market actors find determining eligibility difficult and had trouble completing rebate forms.

Recommendation 10: Make sure eligibility requirements are explicit, clearly communicated, and easy to find on every communication channel.

Recommendation 11: To make forms easier to complete, consider changing the format to an Excel workbook or online form and review fields and structure of documents to make them more user-friendly.

1. INTRODUCTION

Xcel Energy offers a comprehensive array of demand side management (DSM) and other energy services and products to its customers. For the evaluations of its 2016 products, Xcel Energy sought to improve the customer experience, understand the products' roles in changing the marketplace, analyze product influences on customer choices, and ensure industry-leading program performance. To accomplish this, Xcel Energy contracted with EMI Consulting and its partners: Evergreen Economics, Apex Analytics, and Ridge & Associates (hereafter 'the evaluation team'). This team undertook evaluations of eight products offered in Colorado and Minnesota in 2017, including the Data Center Efficiency Product in Colorado discussed in this report.[1] This introduction includes an overview of the product and the evaluation approach, and describes the organization of this report.

1.1 Product Overview

The Colorado Data Center Efficiency Product takes a holistic approach to encouraging energy efficiency among new and existing data centers of any size and type. This product assists customers with support services and rebates that address everything from IT equipment to HVAC and power systems. Rebates are offered for: airflow improvements, electrical equipment, high-efficiency cooling equipment, humidification, power systems, and high-efficiency lighting equipment. For existing facilities, Xcel Energy offers study funding of up to 75%, not to exceed $25,000, as well as prescriptive equipment rebates and custom rebates, saved for pre-approved projects, up to $400 per kilowatt.

The product is informed by its extensive engagement in relevant industry organizations (e.g., AFCOM). While the complexity and the inherent unique design of each data center requires a custom analysis approach, prescriptive measures are applied where applicable. For new facilities, the product closely aligns with The Energy Design Assistance offering for commercial new construction projects, which offers customers free consulting during site selection and the various design phases, as well as financial incentives to offset the cost of incremental upgrades from the baseline[2]. Due to their large energy consumption, increasing energy intensity, as well as relatively predictable load profile, data centers represent an attractive market for efficiency products[3]. However, based on their intended use and vintage, the design, and systems, the related efficiency opportunities can vary widely and are typically quite custom.

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[1] The programs selected for evaluation in 2017 include: Commercial Refrigeration (CO), Cooling Efficiency (CO), Data Center Efficiency (CO), Insulation/Air Sealing (CO), Residential Heating, (CO), Data Center Efficiency (MN), Heating Efficiency (MN), and Insulation Rebate (MN). The evaluation team prepared a separate report for each of these evaluations.

[2] Note: While the product is designed for new construction projects, neither state has had any participants. Therefore, this study will not include any stratification, interviews, or data associated with new construction projects.

[3] United States Department of Energy (n. d.) *Energy Efficiency in Data Centers*. Retrieved from https://energy.gov/eere/femp/energy-efficiency-data-centers.

1.2 Evaluation Overview

The evaluation team designed an impact and process evaluation of the Data Center Efficiency Product to provide information to:

- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Assess the impact of incentives on customers' decisions to install new equipment.
- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product.
- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market and any market transformation effects which have occurred since 2009.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Use benchmarking results to calibrate research focusing on similar products.

Table 1-1 presents an overview of the research topics and data sources used in this evaluation of the Colorado Data Center Efficiency Product.

Table 1-1. Data Center Efficiency Product Evaluation Framework

Evaluation Objectives	Assess Impacts, Influence on Market	Understand Participant Experiences	Characterize Trade Partner Concerns	Identify Opportunities to Improve	Benchmark Performance
Research Topics	Free ridership Participant spillover Net-to-gross ratio Product impact on overall availability of high efficiency equipment	Sources of awareness Motivations of participants Barriers to participation Influence on customer satisfaction with Xcel Energy	Trade partner business models Challenges faced by trade partners	Opportunities to improve customer engagement Opportunities to improve participation experience Barriers to participation Opportunities to improve trade partner engagement	Savings estimates and estimation methods Net-to-gross ratios Cost of achieved savings Program operations Methods used to engage customers and partners
Data Sources	Xcel Energy staff interviews Participant customer interviews Non-participant interviews Trade partner interviews	Participant customer interviews Trade Partner interviews	Xcel Energy staff interviews Participant customer interviews Trade partner interviews Interviews of peer utility program managers	Xcel Energy staff interviews Participant customer interviews Non-participant interviews Trade partner interviews Interviews of peer utility program managers	Xcel Energy staff interviews Interviews of peer utility program managers

1.3 Report Organization

The following chapters organize the evaluation findings into two components: impact and process evaluation results. As illustrated in Table 1-1, the data collection activities may have contributed to multiple evaluation objectives. Further detail on the evaluation approach is presented in the following chapters. Section 2 reviews the approach used in the evaluation. Section 3 discusses the results of the impact evaluation and the attribution of product impacts using a customized net-to-gross ratio (NTGR) analysis. Section 4 discusses the process evaluation results, which addressed customer and trade partner awareness, satisfaction, and motivations. Conclusions and recommendations are presented in Section 5. Detailed, descriptive methodology information, evaluation plans, and survey instruments can be accessed in this report's appendices.

2. APPROACH

To accomplish the evaluation objectives for the Data Center Efficiency Product, the evaluation team completed a suite of intersecting and complementary research activities in 2017. These activities included a total of 36 interviews with Xcel Energy staff, participating customers, non-participating customers, trade partners, and peer utilities as well as secondary research used to support the information collected from the primary research. Detailed below is the approach used to calculate the net-to-gross ratio in the impact evaluation as well as details about the interview types and quantity.

2.1 Net-to-Gross Ratio

The evaluation team developed the NTGR for the Colorado Data Center Efficiency Product using a self-report approach (SRA) based on participating customer survey results in combination with additional research data inputs. The methodology used in this evaluation was built from the Core Nonresidential Protocol in the *2016 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0*, in "Attachment A" of *Volume 4: Cross-Cutting Measures and Attachments*. This methodology was customized to better match the Data Center Efficiency Product and supplemented with additional qualitative and quantitative data characterizing both the customer's decision-making process and trends in the market.

The data inputs considered in the NTGR analysis included[4]:

- Participant interviews – to assess project-level effects
- Non-Participant interviews – to assess spillover effects
- Trade partner interviews – to assess overall market effects and project-level effects where relevant
- Product benchmarking data – to provide a point of comparison
- Known product changes in upcoming years – to factor in any known implications for future changes in product design

The number and type of interviews conducted are discussed in Section 2.2. A description of each of the components used to calculate the NTGR and how the interviews factor into the NTGR approach are discussed below.

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] Additional descriptive detail on these research activities appears in Chapter 3 and in the appendices.

To estimate free ridership, the evaluation team started with the Core Nonresidential Protocol from the Illinois TRM, and wrote specific questions to assess five free ridership components:

1. A **Product Components Score**, based on the participant's perception of the importance of various product components in their decision to carry out the energy-efficient project;
2. A **Product Influence Score**, based on the participant's perception of the product's influence on their decision to carry out the energy-efficient project versus the influence of non-product factors;
3. A **Product Influence Timing Adjustment**, based on whether the participant learned about the Data Center Efficiency Product before or after deciding to install the equipment.
4. A **No Product Score**, based on the participant's retrospective assessment of their intention to carry out the energy-efficient project in the absence of the product; and
5. A **Timing Adjustment**, based on the participant's perception of when they would have carried out the project in the absence of the product.

Details about these components and the calculation approach are described below.

Product Components Score

Each participant was asked to use a 0 to 10 scale to rate the importance of product factors and non-product factors on their decision to implement the project. The Product Components Score is the highest value the participant gave to the product factors. The product and non-product factors are shown in Table 2-1. The influence of past experience with the product is captured in the product factor "previous experience with the product".

Table 2-1. Data Center Efficiency Product, Product Factors and Non-Product Factors

Product Factors	Non-Product Factors
Availability of the incentive offered by Xcel Energy	Previous experience with this type of equipment
Technical assistance offered by Xcel Energy staff	Standard practice in your business or industry[5]
Technical assistance from the firm that conducted the study sponsored by Xcel Energy	Corporate policy or guidelines
Endorsement or recommendation by your Xcel Energy account manager	Payback on the investment
Recommendation from trade partner	Minimizing operating cost
Information from Xcel Energy marketing or informational materials	Positive marketing or public relations for your company
Previous experience with the product	

The scores given by participants were supplemented by trade partners' responses to questions about the Data Center Efficiency Product's influence on their equipment recommendations. The product attribution scores provided by trade partners replaced participants' Product Components Score when:

- A participant rated the influence of trade partners highly (7 or more)
- A Colorado trade partner reported a higher level of product influence than a participant's rating for trade partner influence.

This data was supplemented with trade ally interviews to assess the overall market effects of the product, such as changes in their sales of energy efficient equipment, their business practices and sales strategies, or the equipment availability due to the influence of the product.

Product Influence Score

The Product Influence score is designed to compare the importance of the Data Center Efficiency Product with other factors in implementing the measure. Thus, participants were asked to distribute 10 points between the influence of the product and non-product factors shown in Table 2-1 above. The Product Influence Score is the number of points the participant assigned to the product factors.

Respondents were also asked whether they learned about the Data Center Efficiency Product before or after they decided to install the incentivized equipment. A participant's Product Influence Score is divided in half if they report that they heard about the product after they decided to install the equipment. This is the Product Influence Timing Adjustment.

[5] Chapter 21 of the Uniform Methods Project by NREL defines standard industry practice (based on the NW Council's guidelines) as "this baseline defines directly the condition that would prevail in the absence of the program (the counterfactual scenario), as dictated by codes and standards or the "current practices of the market." With current practice defined as the "typical choices of eligible end users, as dictated by codes and standard and the current practices of the market". "California's guide defines Industry Standard Pracice (ISP) as "the typical equipment commonly used in current practice absent the program"

No Product Score

The No Product Score asks participants to discuss what action they would have taken if the Xcel Energy Data Center Efficiency Product was not available. Participants are asked, on a 0 to 10 scale, to rate the likelihood they would have installed the exact same equipment in the absence of the product. A timing adjustment is also applied if respondents indicate that any aspect of the product caused them to install the equipment sooner than they otherwise would have[6].

Additional detail on sensitivity analyses and linkages between survey questions and score development for each free ridership component can be found in the full NTG methodology description in Appendix A.4.

Spillover

Spillover is a measure of the amount of energy savings that occur due to the product that are *not* captured in the product's claimed energy savings. The evaluation team looked for evidence of participant and non-participant spillover during interviews:

- *Participant spillover* is the energy use reduction caused by a participant installing additional energy efficiency measures after their product participation.
- *Non-participant spillover* is the reduction caused by a product non-participant installing efficiency measures because of the product's influence.

To attempt to capture spillover, the evaluation team asked participants and non-participants for information about any additional energy efficient equipment installed outside of the product (for which they did not receive a rebate). If found, the evaluation team would record information on equipment characteristics (such as equipment efficiency, control algorithms, number installed, etc.) needed to calculate energy savings.

Determination of Net-to-Gross Ratio

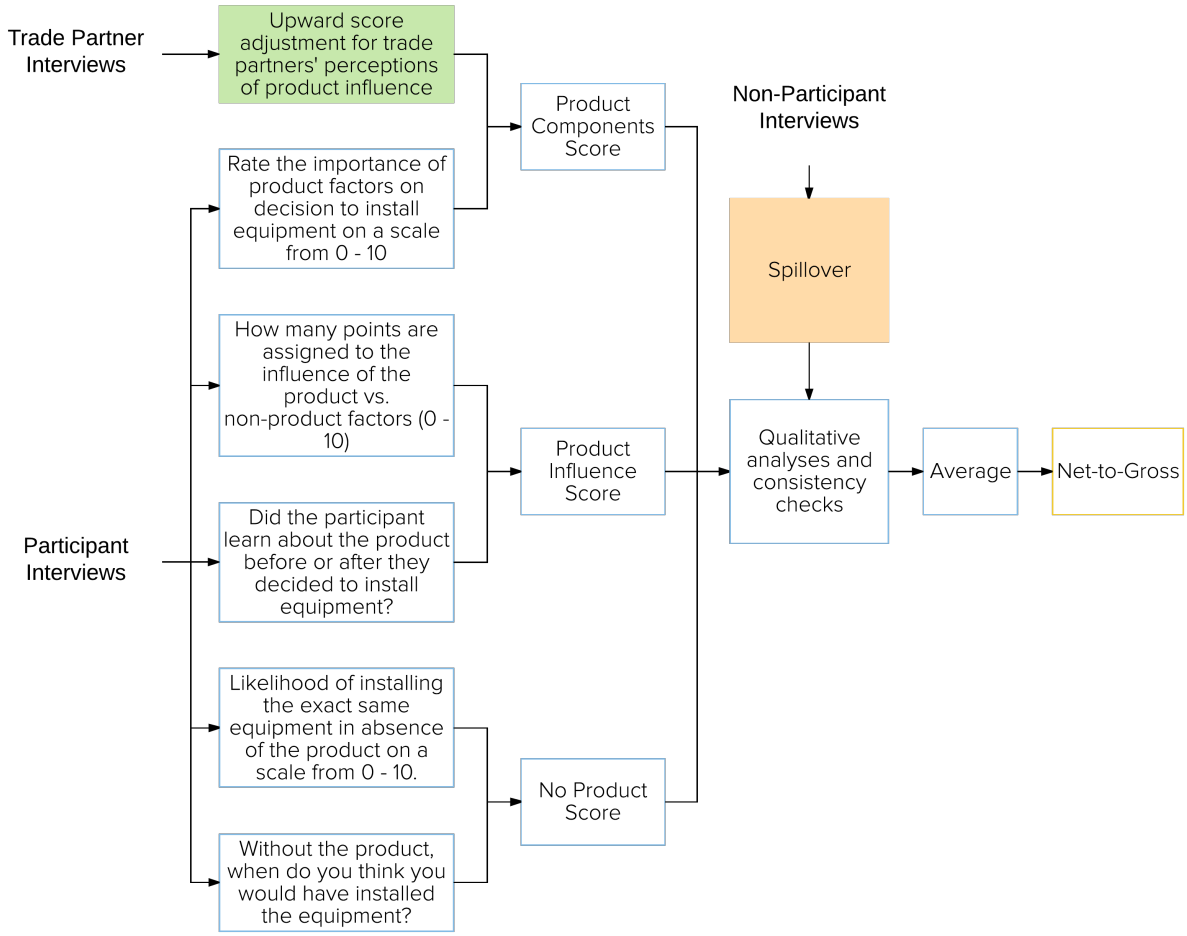
To estimate the NTGR, the product components score, product influence score, no product score, and spillover are calculated. The evaluation team then looks at the quantitative and qualitative data collected from each respondent for consistency across questions and across interviews for any inherent biases. Interviewers asked respondents directly about inconsistencies in their answers if their answers produced a score greater than seven for one or more of the NTGR components (i.e., the Product Components, Product Influence, or No Product score) and also produced a score less than 3 for one or more of the other NTGR components. These consistency check questions reminded participants of their scores to the NTGR questions, asked them to explain their scores in greater detail, and asked whether the respondent would like to change one of the scores. If the respondent requested to have one of their scores changed, or if their answers to the other NTGR questions are inconsistent with their qualitative response to these consistency checks, adjustments may be made to the calculations based on industry best practices. Finally, the product components

[6] Timing-Adjusted No Product Score = $No\ Product\ Score * \left(1 - \frac{Months\ Expedited - 6}{42}\right)$

score, the timing-adjusted product influence score, and the timing-adjusted no product score are averaged to calculate the recommended NTGR, as shown in Figure 2-1.

Figure 2-1. Data Center Efficiency Product Net-to-Gross

Net-to-Gross = (product components score + product influence score + (no product score * timing adjustment 1))/3 + Spillover



Finally, the evaluation team utilized all the information collected about the product—through customer interviews, trade partner interviews, product benchmarking, and known product changes—to construct a logical, internally consistent, and coherent narrative of product attribution that attempts to identify all possible pathways of Xcel Energy influence. Based on these results, a final NTGR value that is consistent with this narrative was recommended.

2.2 Interviews

The following discussion highlights the research topic coverage contributed by each research activity: the staff interviews, participant interviews, non-participant interviews, trade partner

interviews, and benchmarking interviews. Table 2-2 summarizes the number of respondents by data collection task. Results were combined across Minnesota and Colorado in most cases because (1) the number of responses were low, as expected; and (2) no meaningful differences were detected between the two states in most cases. When differences between the two states were meaningful, they are reported separately in this report. Detailed information on the sampling approach used for the research can be accessed in Appendix A.2

Table 2-2. Respondents by Data Collection Task

	CO	MN
13 Participant interviews	5	8
5 Non-participant interviews	4	1
6 Trade partner interviews	3	3
5 Benchmarking interviews	NA	NA

Staff interviews

The evaluation team conducted telephone interviews with the following six key staff managing and implementing the Colorado Data Center Efficiency Product:

- Product Manager
- Key Account Manager
- Account Manager
- Trade Partner Managers (current and past)
- Engineer
- Engineer (new hire formerly with a study provider)

The staff interviews covered the following topics:

- Assess the extent to which the product design supports product objectives and customer service/satisfaction objectives.
- Assess the degree to which product resources are sufficient to conduct product activities with fidelity to the implementation plan.
- Identify themes and issues for possible revisions to the evaluation plan.

Appendix B.1 presents the interview guide used for these discussions.

Participant Interviews

The evaluation team conducted 13 in-depth interviews, 5 in Colorado and 8 in Minnesota, with participating customers drawn from Xcel Energy records of the 40 projects that closed in 2014, 2015, 2016, and Q1 of 2017. The evaluation team attempted to contact all 40 projects and achieved a response rate of 33%.

The participant research was designed to:

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.

The participant survey is presented in Appendix B.2.

Non-Participant Interviews

Originally, the evaluation team wanted to interview near-participants for this evaluation. Near-participants were defined as any company that had expressed interest in participating in a data center project (and is, therefore, in the Xcel Energy system), but who had not received a study or measure rebate. There were 32 customers (16 in each state) who met these criteria and had contact information available. The evaluation team attempted to contact all 32 customers five times, but received no responses.

As a result, the evaluation team modified the sampling approach to include non-participants in order to increase sample size. Non-participants were defined as those who are Xcel Energy customers, who operate at least one data center, and who have not received a study or measure rebate through the Data Center Efficiency Product. Non-participants meeting these criteria were identified via datacentermap.com and other online research. The modified sampling approach generated a sample frame of 20 non-participants, five of whom agreed to be interviewed, for a response rate of 25%. Four of these non-participants were located in Colorado and one was located in Minnesota.

The non-participant research was designed to:

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Develop a net-to-gross ratio documenting the product's influence on customers' decisions.

Appendix B.3 contains the questionnaire used for the non-participating customer research.

Trade Partner Interviews

For these interviews, the evaluation team defined trade partners as those companies that: (1) installed energy efficient data center equipment, (2) specified the energy efficient equipment, (3) conducted a study, or (4) helped make recommendations through a consulting role. A single company may provide multiple of these services as they are not mutually exclusive. The evaluation team also defined trade partners as those businesses that have filled out an Xcel Energy application, have received training on the product from the Xcel Energy Trade Manager, or have been approved by Xcel Energy. The program does allow vendors and contractors that have not applied to be a trade partner to submit project paperwork.

The original trade partner sampling approach was to conduct participant interviews first and then interview the trade partners associated with those projects. The evaluation team attempted to contact these 11 trade partners, but was unable to reach any of them.

Instead, the evaluation team modified the sampling approach and conducted in-depth interviews with six trade partners from a sample of nine trade partners whose contact information was provided by Xcel Energy. This modified sampling approach generated a response rate of 67% and was evenly distributed between Colorado and Minnesota, with three in each state. All had experience in the data center industry, and all but one had completed at least one project through the Data Center Efficiency Product.

The trade partner research was designed to:

- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Assess the impact of incentives on customers' decisions to install new equipment.
- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.

Appendix B.5 presents the interview guides used for the trade partner research.

Benchmarking Interviews

The evaluation team examined five peer utilities to benchmark the Xcel Energy Data Center Efficiency Product against others in the industry, assessing product design, delivery and key

performance indicators (e.g., participation levels, free ridership). The evaluation team conducted in-depth interviews with program managers to address the following topics:

- Savings estimation methodologies
- 2016 savings goals and results by product and for the product portfolio
- Net-to-gross methodology
- Net-to-gross ratio values
- Cost per Mcf saved and TRC values

To provide important contextual information, additional descriptive program information was collected from secondary research, including eligible measures and customers, product implementation strategies and engagement practices, incentive levels, eligible measures, and participation levels.

The evaluation team originally hoped to include research with six peer utilities, but was unable to schedule an interview with the program manager for the sixth utility despite four cold calls, two emails, and numerous attempts to make contact through the evaluation team's professional networks. Reaching five of the six benchmarking targets resulted in a final response rate of 83%.

Appendix B.4 contains the interview guide used for the benchmarking interviews.

3. IMPACT FINDINGS

A central component of this evaluation was the estimation of the net-to-gross ratio (NTGR) for the Colorado Data Center Efficiency Product. For DSM programs, the NTGR is a metric that estimates the influence of the product on the target market. It is used to adjust reported gross energy savings to account for energy efficiency that would occur in absence of the product, and it is also used as a benchmarking indicator of product effectiveness. NTGR results can indicate opportunities for Xcel Energy to adjust the design and implementation of its products to increase the cost-effectiveness of individual products and of the entire portfolio. Note that the evaluation team recommends re-calculate the cost-effectiveness of the product after the determination of the NTGR as it is possible to have a cost-effective program with a low NTGR.

The NTGR estimated by the evaluation team includes several factors that create differences between gross and net savings, such as free ridership and spillover. The evaluation team developed the NTGR based on data provided by customers and participating trade partners. To assess the plausibility of this NTGR, the evaluation team then compared it to the NTGRs of similar programs sponsored by other peer utilities. Note that, while a NTGR of 1.0 is often seen as desirable, it may not be appropriate for all program designs, depending on a variety of factors (including the maturity of the program and the technologies it promotes, program intervention strategies, and cross-program coordination strategies). The evaluation team has taken care to present our NTGR results with this context in mind.

Overall, this chapter presents:

- **Key findings –** The key findings section presents the recommended NTGR based on the evaluation team's synthesis of findings from market actors and peer utilities.
- **Approach –** The approach section presents a brief description of how the actual NTGR calculation varied from the approach discussed in Section 2.
- **Detailed findings –** This section presents qualitative and quantitative data that support the NTGR estimates.

It is important to note that this estimate is subject to multiple sources of uncertainty, including sampling error and measurement error due to problems of respondent recall, the challenge of answering hypothetical questions about actions they might have taken in the absence of the product, and the assumption that a 0-10 influence score is linear and accurately reflects the impact of the product on the customer's decision. The evaluation team has taken multiple steps to mitigate this uncertainty by using consistency checks to supplement the self-report approach in estimating NTGRs, prompting respondents several times to provide responses to key questions and asking key questions in multiple different ways to minimize non-response, and testing NTGR questions to ensure construct validity.

3.1 Key Findings

The evaluation team found no evidence of spillover or market effects in interviews with participants and non-participants. These finding are consistent with previous evaluations of other data center

utility programs reviewed as part of peer utility benchmarking which also did not find evidence of spillover or market effects.

Based on the results from participant and trade partner responses using the methodology described in Section 2.2., the retrospective NTGR for the 2016 Data Center Efficiency Product is 0.54. This value is in line with peer utility NTGR which ranged from 0.43-0.61. The evaluation team recommends a prospective NTGR of 0.65 if the Data Center Efficiency Product follows the recommendations of the report.

Low product influence scores and low no product scores, not low product component scores, are associated with lower NTG scores for each participant. These drivers are consistent with the findings of evaluations of peer data center programs. For example, the Utility A PY7 evaluation found that, "The projects with substantial free ridership had low program influence and low no-program scores,"[7] and that "projects with the lowest no program scores tended to have lower NTG ratios, while those with higher no-program scores had NTG ratios that were among the highest."[8]

3.2 Methodology

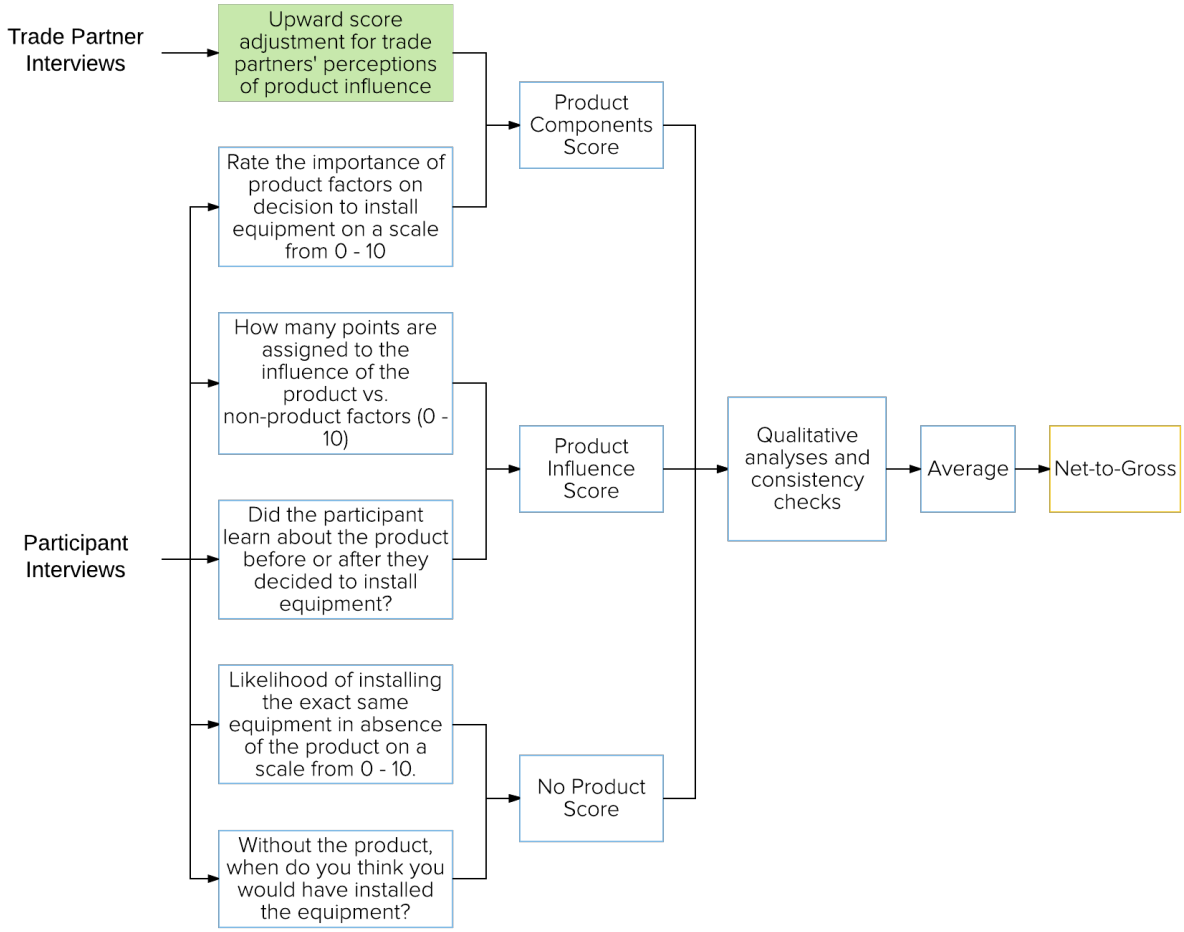
The NTGR was calculated at the project level by calculating product component, product influence, and no product scores for each participant, and averaging these scores together. Additional details about the NTG analysis approach can be found in Section 2.1. While the evaluation team's initial approach for calculating the NTGR called for calculating free ridership at the measure level, respondents were unable to provide distinct responses for specific measures in their responses to the NTG question battery. Respondents consistently reported that their answers would be the same for all NTG questions across measure categories.

Additionally, analyses of the non-participant, trade partner, and participant interviews did not identify any evidence of spillover or market effects. The lack of evidence for spillover or market effects is consistent with the findings of other evaluations of data center programs in peer utilities. For example, for one of the 10 participants interviewed, two said they were planning on installing additional measures. However, both were applying for incentives for those measures. Therefore, the evaluator determined the results did not support any quantification of spillover savings. Figure 3-1 below depicts the evaluation team's final net-to-gross approach.

[7] Smart Ideas for Your Business Data Centers Efficiency Program PY7 Evaluation Report. February 24, 2016. Publically available.

Figure 3-1. Data Center Efficiency Product Net-to-Gross Approach Without Spillover

Net-to-Gross = (product components score + product influence score + (no product score * timing adjustment 1))/3



3.3 Detailed Results

The results of the calculations of each NTGR component for each participant are summarized in Table 3-1 and discussed below. Please note that one interviewee's score (CO – C) is shown, but has been removed from the NTGR calculation due to inconsistencies in their responses.[9] Participant MN – B declined to answer the product influence score, but their scores for the other components

[9] This participant ranked a product factor a 7 out of 10. However, when asked about the influence of the product they assigned all the points to non-product factors. This triggered the interviewer to ask consistency check questions and the interviewer explained the discrepancy with the participant. The participant declined to change their answer.

are consistent with other respondents'. Removing MN – B also does not change the NTGR value. Therefore, the evaluation team decided to keep MN – B in the calculation.

Table 3-1. Net-to-Gross Ratio and Component Scores by Interviewee

Interviewee	Product Components Score	Product Influence Score	Adjusted No Product Score	NTGR
	[PC]	[PI]	[NP]	Avg[PC,PI,NP]
MN - A	1.00	0.60	0.70	0.77
MN - B	0.90	NA	0.31	0.61
MN - C	0.60	0.40	0.50	0.50
MN - D	0.50	0.50	0.20	0.25
MN – E	0.70	0.80	0.80	0.77
MN – F	0.70	0.30	0.80	0.60
MN – G	0.60	0.30	0.00	0.30
MN Overall	**0.71**	**0.41**	**0.47**	**0.54**
CO – A	0.70	0.50	0.30	0.50
CO - B	0.90	0.30	0.60	0.60
CO - C	0.70	0.00	0.00	0.23
CO - D	0.90	0.30	0.40	0.53
CO Overall	**0.83**	**0.28**	**0.33**	**0.54**
Overall	**0.75**	**0.39**	**0.46**	**0.54**

Product Components Score Results

Each participant was asked to use a 0 to 10 scale to rate the importance of product factors and non-product factors on their decision to implement the project. The product components score is the highest value the participant gave to the product factors. The three respondents whose scores were retained provided maximum product scores of 7, 9, and 9, yielding a mean score of 8.3. Dividing by 10 yields a program attribution score of 0.83, and a free ridership score of 0.17.

The product components rated the most highly by these participants included[10]:

- The availability of the incentive offered by Xcel Energy (score = 9)
- The technical assistance offered by Xcel Energy staff (score = 7)
- The technical assistance offered by the firm that conducted the study sponsored by Xcel Energy (score = 9)

[10] Note that each participant may have multiple product components tied for maximum rating.

- Recommendation from a trade partner (score = 9)
- Information from Xcel Energy marketing or informational materials (score = 9)
- Previous experience with the Data Center Efficiency Product (score = 7)

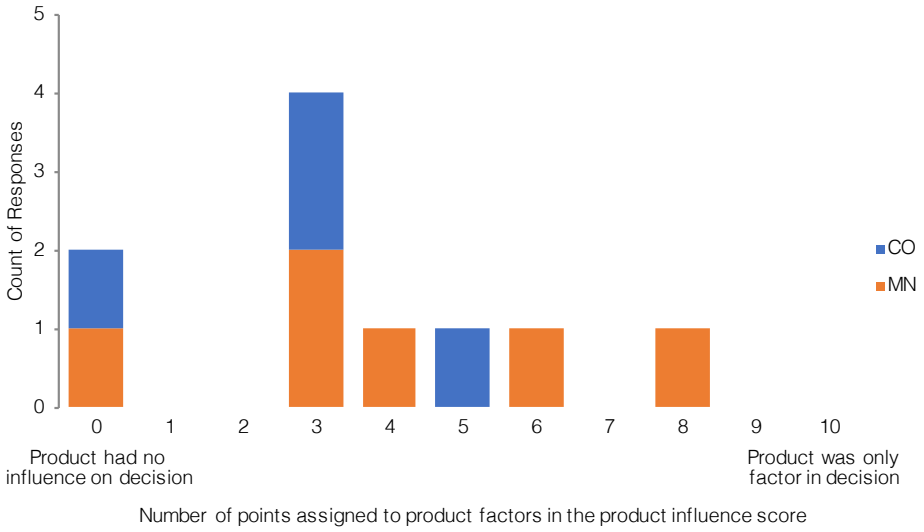
The **non-product components** rated the most highly by these participants included:

- Previous experience with this type of equipment (score = 10)
- Standard practice in your business or industry (2 scores, both 9's)
- Payback on the investment (score = 9)
- Minimizing operating costs (score = 9)

Product Influence Score Results

The product influence score is intended to compare the importance of the Xcel Energy Data Center Efficiency Product with other factors in implementing the measure. Thus, participants were asked to distribute 10 points between the influence of the product and non-product factors. The points that participants attributed to the product ranged from 0 to 5 for this component, with a mean score of 2.8. Dividing by 10 yields a program attribution score of 0.28 in Colorado, and a corresponding free ridership score of 0.72. Figure 3-2 provides a histogram depicting individual participants' Product Influence scores. In general, most participants across both states (7 out of 10) assigned the majority of points to non-product factors.

Figure 3-2. Histogram of Product Influence Scores

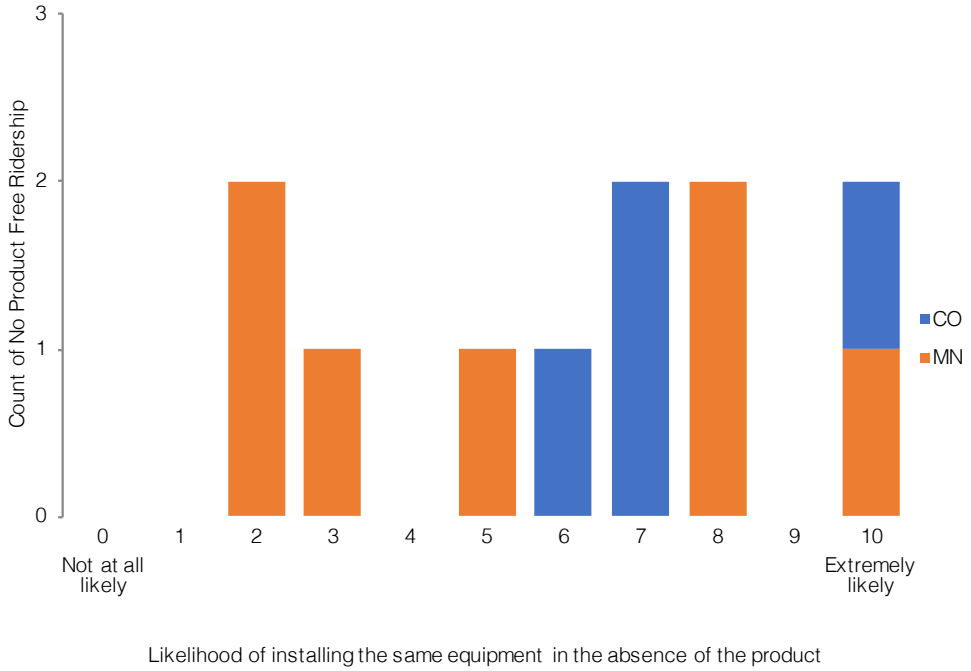


No Product Score Results

The no product score asks participants to discuss what action they would have taken if the Xcel Energy Data Center Efficiency Product was not available. Participants are asked, on a 0 to 10 scale, to rate the likelihood they would have installed the exact same equipment in the absence of the Data Center Efficiency Product. A timing adjustment is also applied if respondents indicate that any aspect of the product caused them to install the equipment sooner than they otherwise would have.

Unadjusted free ridership scores range from 6 to 7, with an average score of 7.5. Adjusted free ridership scores range from 4 to 7, with an average score of Dividing by 10 yields a free ridership score of 6.8[11]. Dividing by 10 yields a free ridership score of 0.68 and a corresponding program attribution score of 0.33. Figure 3-3 provides a histogram depicting individual participants' no product scores.

Figure 3-3. Histogram of No Product Scores



It is important to note a potential caveat to the NTGR results. Responses to any survey or interview can be subject to potential social desirability biases.[11] Social desirability biases occur when respondents wish to portray themselves in a positive light, resulting in deviations from their "true" response. For the Data Center Efficiency Product, it is possible that some respondents, intentionally or unintentionally, inaccurately portrayed themselves as the kind of person or organization who would have installed energy efficient equipment in the absence of the product. If enough participants responded in this way to enough questions, they could meaningfully bias the results and artificially reduce the NTGR.

However, it is also possible for participants to artificially inflate the importance of the product to either (a) please the interviewer or product staff—often referred to in social science as the problem of the "good subject"; or (b) increase the likelihood that the product will stay in place, along with the product incentives from which they benefit. With a large enough sample size these opposing biases could "wash out," with approximately equal levels of the social desirability and good subject biases cancelling each other out. Given the small population of data centers in Colorado, and the even smaller population of product participants, it is not possible to assess the extent to which either of

[11] Ridge, R., Willems, P., Fagan, J., & Randazzo, K. (2009). The origins of the misunderstood and occasionally maligned self-report approach to estimating the net-to-gross ratio. Paper presented at IEPEC, Portland, OR.

these biases influenced the final recommended net-to-gross score without further research. To assess the impact of potential bias in our results, the evaluation team examined the self-reported responses alongside responses from trade allies, non-participants, and our peer utility benchmarking research. When considered holistically, our assessment is that social desirability bias had a negligible impact on our final NTGR estimate, as the self-reported responses align with our data points collected as part of the evaluation.

Identify Customer Motivations to Participate in the Product

Most participants reported that they were initially motivated to participate in the product to replace outdated or failing equipment. Participants also reported being motivated by a desire to reduce the operating costs of their equipment by installing more energy efficient equipment. When prompted to attach quantitative responses to these motivations, most participants reported that they were primarily motivated to participate in the Data Center Efficiency Product because of factors external to product offerings as shown in Figure 3-4 where minimizing operating costs, previous equipment experience, and investment payback were three of the top four responses. However, while not a consistent or dominant motivation for most participants, most participants did report that product factors were influential in their decision to install the incentivized equipment.

Information from the following sources informed the finding related to this research objective.

Table 3-2. Data sources used to identify customer motivations to participate in the product

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Sources of customer motivations to participate	X	X	X	
Opportunities to increase customer participation	X	X	X	X

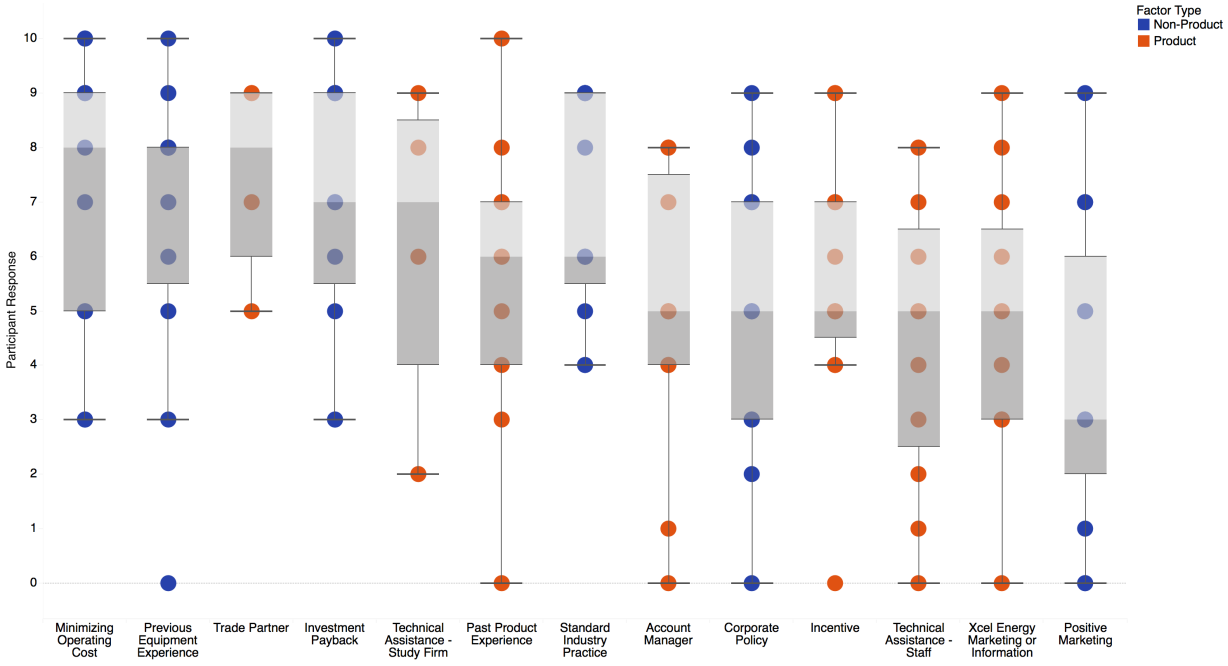
Participants' ratings of the importance of product and non-product factors on their decision to participate in the product are summarized in Figure 3-4. Overall, a mix of both product and non-product factors motivated participants to adopt energy efficient measures, though many of the most highly-rated factors were non-product factors. Among the non-product factors strongly motivating participants were minimizing operating costs (mean of 8.0 in Colorado, 6.9 overall), maximizing investment payback (mean of 8.0 in Colorado, 6.8 overall), keeping up with standard industry practices (mean of 8.0 in Colorado, 6.7 overall) and previous experience with the equipment being installed (mean of 7.0 in Colorado, 6.2 overall).

While only four respondents reported that they had contact with a trade partner while making their decision to participate (two of these from Colorado), these participants tended to report that trade partners were very influential on their decision to participate in the product, providing a mean rating of 9.0 in Colorado (7.7 across Colorado and Minnesota) on a scale of 0 to 10. This indicates that

when trade partners are influential in customer decision-making, they are very influential, but that in most cases trade partners were not rated by participants as being highly influential in their decision-making.

The technical assistance from the firm that conducted the study sponsored by Xcel Energy was rated equally highly with trade partners (average of 9.0 in Colorado, 6.25 overall), although only one respondent in Colorado reported receiving a study sponsored by Xcel Energy. The availability of the incentive offered by Xcel Energy (average of 6.7 in Colorado, 5.8 overall) and previous experience with the Data Center Efficiency Product (average of 6.7 in Colorado, 5.6 overall) were tied for the next-highest rated product factors.

Figure 3-4. Participant Ratings of Importance of Product and Non-Product Factors in Decision to Participate



A product-sponsored study did not have a strong influence on participants' decision-making. Of the 13 participants interviewed, only four reported they had received a study through the Data Center Efficiency Product. Of the four participants who received a study, two reported the study was used to confirm they should proceed with the actions already under consideration. One stated "it reaffirmed what we believed" and a second said "it solidified everything we already knew." The two other study recipients reported that the study helped them to make decisions about future projects, stating that it "provided data for decision making."

When looking at the no product score, 10 of 11 participants were aware of the product before they thought about installing the measures. The large majority (73%) of participants reported they would have installed the same measure without the Data Center Efficiency Product, and 50% of the participants would have installed the same measure at the same time.

Most of the participants (6 of 10) reported that project ideas come from internal sources such as consolidating data centers and needing new equipment, equipment being at the end of its life, or replacing broken equipment. Furthermore, the majority of participants (9 of 11 respondents) reported they seek out trade partners to implement their projects; five did so through a competitive bidding process and four did so through existing relationships with trade partners. Some, but not a majority (two of five), of the trade partners also reported contact was initiated by their customers. One trade partner even said, "we always learn about these types of things through the client; the client usually comes to us."

Assess the Impact of Incentives on the Customer's Decision to Install New Equipment

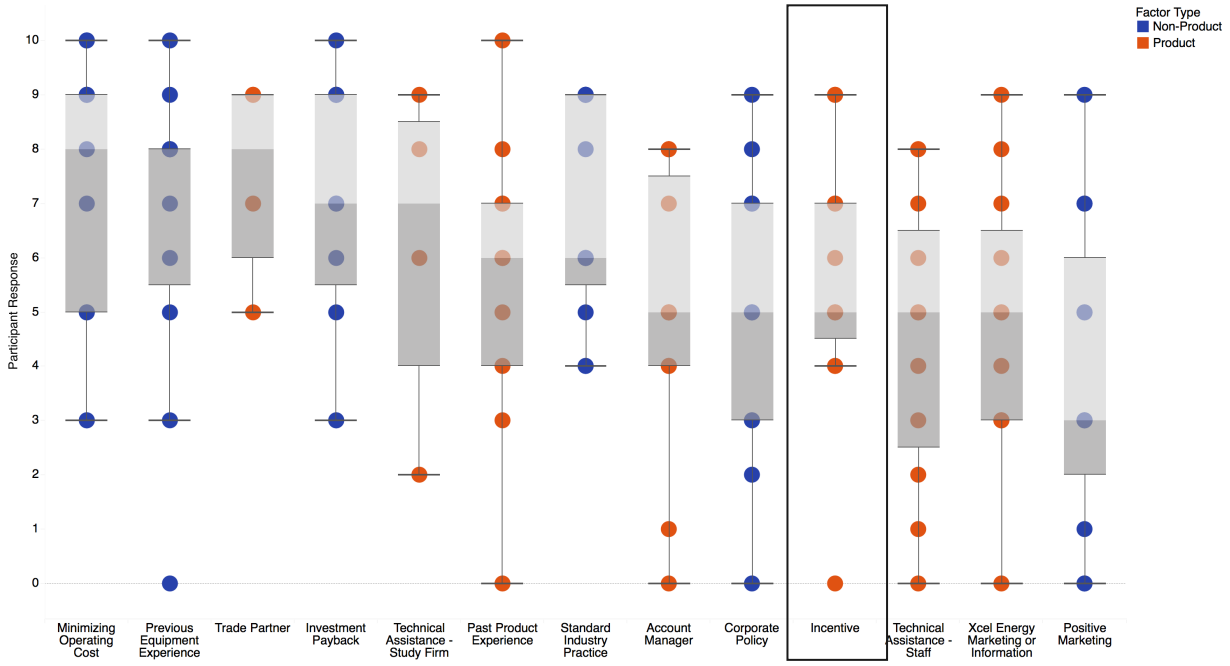
The availability of incentives was of mixed importance to participants' decisions to install the equipment. While no participants rated its importance low, it was not among the most highly-rated factors driving participant decision-making. Additionally, while all trade partners reported they were aware of the incentives, under certain circumstances most trade partners said they refrain from bringing up incentives with data center customers during sales calls, as they believe doing so can hinder the sale.

Table 3-3. Data Sources Used to Assess the Impact of Incentives on the Customer's Decision to Install New Equipment

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Impact of incentives on customers' decision to install new equipment	X		X	X

Participants were mixed in their perceptions of how influential the incentives were in their decision to participate in the Data Center Efficiency Product. Referring again to the importance that participants placed on product and non-product factors in their decision to participate in the product, the average rating for incentives was a 6.7 for just the three participants in Colorado who responded to this question on a scale of 0 to 10 (5.8 overall). Ratings from Colorado respondents ranged from 5 to 9, as seen in Figure 3-5). Thus, while incentives were among the most highly-rated product factors for Colorado participants, it was typically not rated as highly as non-product factors as a motivator for respondents' decisions to participate.

Figure 3-5. Participant Ratings of Importance of Product and Non-Product Factors in Decision to Participate (Note Incentive)



While all the trade partners reported they were aware of the incentives and the incentive amounts, they don't always include incentives in every sales discussion with customers. Four of the five trade partners reported that they may not mention a Data Center Efficiency Product incentive under the following circumstances

- When the savings associated with a project would be small;
- If participation would require extensive M&V;
- If participation would significantly expand the scope or timeline for completing the project; or
- If they feel that the project would be at risk of not being approved by Xcel Energy.

Three of the five trade partners said discussing incentives could hurt the sale, in some cases, because it could increase the project cost and expand the timeline. For example, one trade partner said participation, "can slow down the sale, so you have to be careful to get your paperwork done and submitted soon, which adds an extra step." Another reported that they weigh the risk of telling the customer they are likely to receive an incentive, because they do not want to over-promise to the customer about the probability of receiving one.

The peer utilities each felt that their incentive design was appropriate, although none appeared to have significant insight into how their incentive structure compared with other peer utilities. Of the four utilities who shared their incentive structures with the evaluation team, only Utility A shared their incentive levels for custom projects (the remaining three declined to share their custom project incentive structure, and the evaluation team was unable to find this information available publically). The incentive structure for Utility A's custom projects are paid based on consumption, instead of on demand and incentives range from between $0.06/kWh to $0.07/kWh, approximately 150% the $0.04/kWh offered for Xcel Energy data center design assistance consumption-based incentives.

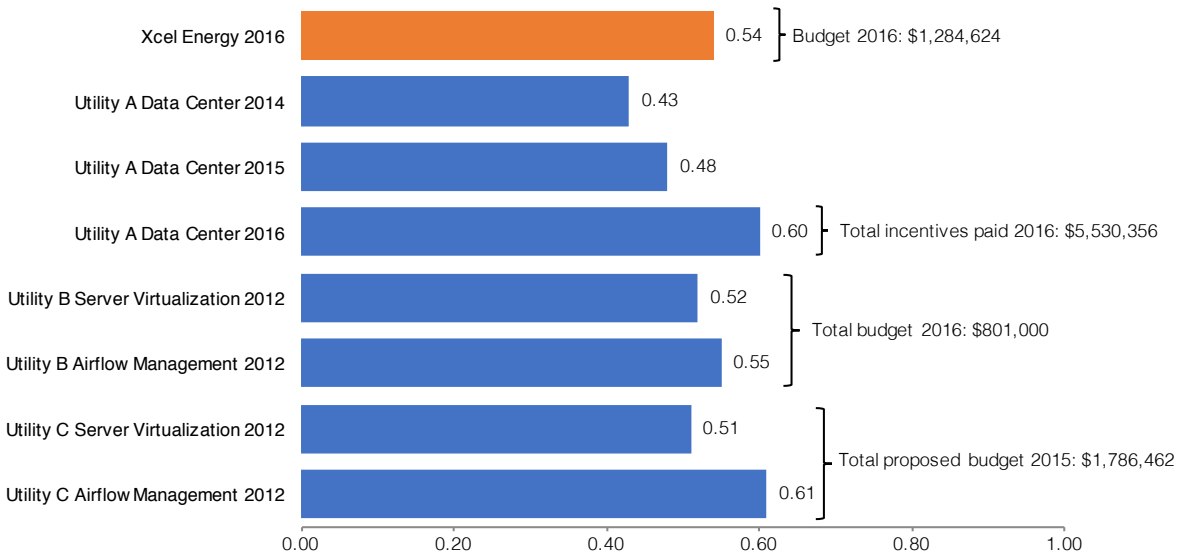
The Xcel Energy prescriptive incentives are approximately on par with other utilities' incentive structures, although the three utilities who shared their prescriptive incentive structures with the evaluation team had many more tiers in their incentive structure than the Xcel Energy Data Center Efficiency Product.

Peer Program Net-to-Gross Ratios

The recommended NTG value for the Colorado Data Center Efficiency Product is relatively close to the NTG values the evaluation team found for several peer programs. Not every program manager the evaluation team interviewed provided NTG values for specific measures offered by their programs, or for the overall programs themselves. So, the evaluation team supplemented the NTG values provided by program managers with values drawn from published evaluations. These results are summarized in Figure 3-6.

It is difficult to make precise "apples-to-apples" comparisons with other data center programs, as each program is unique. However, the available benchmarking data suggests that the Xcel Energy NTGR is higher than Utility A's data center program in 2014 (0.43) or 2015 (0.48). Only in 2016, the seventh year that Utility A offered its data center program and after several years of implementing changes to the program, did the NTGR reach 0.60. The NTGR for measures offered by Utility B and Utility C range from 0.52 to 0.61. While the Xcel Energy Data Center Efficiency Product does not offer server virtualization, these findings suggest that the Utility B and Utility C 2012 NTG ratios were comparable to the Xcel Energy ratio. It should be noted that Utility B has since ended their data center program due to high free ridership.

Figure 3-6. Peer Program Net-to-Gross Values[12]



The range of NTGRs found in this evaluation are also closely aligned with the range of NTGR values found in peer utility evaluations (Table 3-4).

Table 3-4. Range of NTGR Values Found in Data Center Efficiency Programs

Utility	Lowest NTGR	Highest NTGR
Xcel Energy	0.25	0.77
Utility B	0.20	0.77
Utility A	0.10	0.33

NTGR Correlations

Given the wide range in NTGR values, the evaluation team conducted an analysis of available participant characteristics to explore if there were any commonalities between those that have high or low NTGR. Participating data centers were characterized by a range of descriptive factors including:

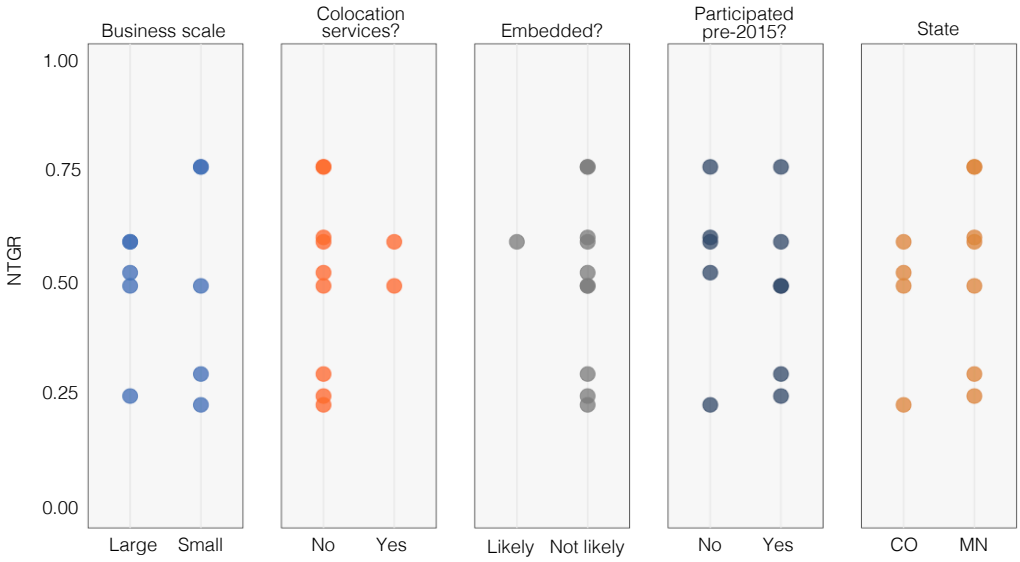
- Business scale (e.g., data centers owned by a large nationally-operating firm, or by a small firm operating fewer data centers more locally)
- Whether or not co-location services are part of their business model

[12] Peer NTGR values were found through publically available sources and, thus, were not anonymized.

- Whether or not the data center is embedded
- Initial participation date (classified as pre- and post-2015)
- Location

Each factor was examined for correlation with the NTGR, but Figure 3-7 shows no business characteristic was found to correlate with the NTGR.

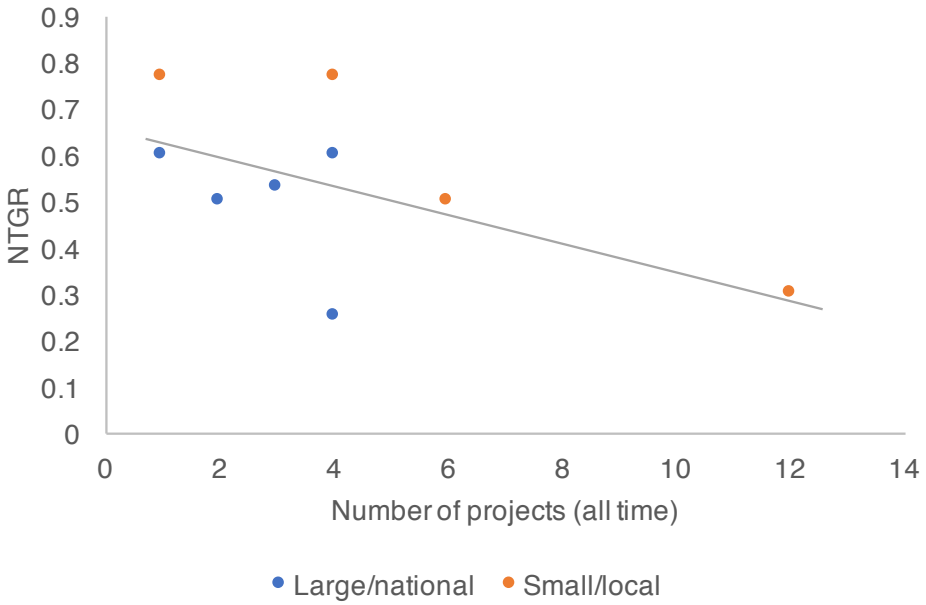
Figure 3-7. Net-to-Gross Ratio Correlation with Business Characteristics



Any given customer's NTGR was somewhat correlated with the number of projects the customer had previously completed through the Data Center Efficiency Product (see Figure 3-8) – the fewer projects a customer has completed through the product, the higher their NTGR. While the degree to which this relationship is causal cannot be known with certainty, it is highly plausible that customers who are newer to the product (i.e., those with fewer completed projects) are influenced by the product to a higher degree. In these cases, the product supports decision-makers to implement their first energy efficiency measures. As these customers gain experience implementing these measures, doing so becomes their standard practice and the degree to which they report the product influencing their decisions potentially wanes.

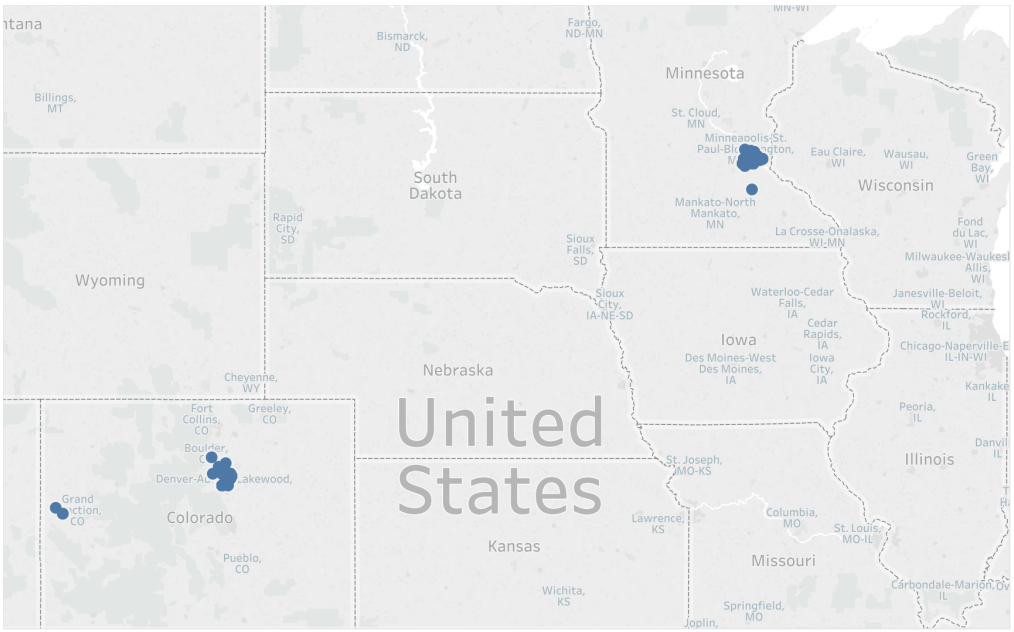
While Figure 3-8 does not show a relationship between data center size, if the screening discussed in the recommendation is implemented and the two projects with the lowest NTGR are screened out, there starts to be a small potential relationship between NTGR and company size.

Figure 3-8. NTGR Correlation with Previous Participation



All participants in the data set provided by Xcel Energy, not just those participants interviewed, were highly clustered around Minneapolis and Denver (Figure 3-9). This may be due to the actual locations of the data centers, or it may be due to the influence of existing account manager relationships or other external factors.

Figure 3-9. Map of Participant Locations



4. PROCESS EVALUATION

In addition to calculating a recommended NTGR, the evaluation team conducted a process evaluation to determine whether Xcel Energy can optimize the design and delivery of the Data Center Efficiency Product to its customers. Optimizing the design and delivery of the product in future years will also support decreasing free ridership and, thus, increasing the NTGR in future evaluations. Specific research objectives of the process evaluation are listed in the bullets below:

- Assess the impact of incentives on customers' decisions to install new equipment.
- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.

To accomplish these objectives, the evaluation team elicited feedback from product staff, participants, non-participants, and trade partners in the Xcel Energy Colorado territory, and program managers of five similar data center programs. This chapter presents the evaluation team's approach to conducting the process evaluation, key findings from the process evaluation, and specific findings relating to each evaluation objective. These findings, along with findings from the impact evaluation, inform the conclusions and recommendations presented in the next chapter. Please note that there are several instances in which one or more respondents declined to respond to a question or replied with some variation of "I do not know." In these cases, the number of total respondents to the question is reported as the number of respondents who answered the question. For example, while the evaluation team interviewed six trade partners, if only five responded to a question, the findings for that question will be written as "X out of five trade partners."

4.1 Key Findings

The evaluation team found the Data Center Efficiency Product is generally working as intended, although there are several opportunities for improvement. Several key themes emerged from the process evaluation including:

- Data center decision-makers prioritize security and downtime concerns above other interests. Additionally, data center operations are highly technical and represent a steep learning curve for newcomers, often making data center stakeholders wary of outside suggestions.
- Data center decision-makers prefer personal contact with account managers to other communication avenues.
- The data center market is built on trusted relationships. The ability to affect data center stakeholders' decision-making processes requires that highly-knowledgeable Xcel Energy

staff or their representatives (i.e. trade partners) build and maintain trusted relationships with data center decision-makers. This process may be easier when the account manager or a member of the Data Center Efficiency Product team has some degree of name recognition within the professional data center community.

- Market actors are generally highly satisfied with the product, but both participants and trade partners found determining facility and equipment eligibility challenging.
- Participants and non-participants had difficulties understanding the product processes (e.g., M&V processes) and the timelines for these processes.
- Trade partners reported difficulty identifying rebate amounts and savings potential associated with various product-eligible measures.

More detailed findings on process evaluation topics are presented below. The synthesis of findings places an emphasis on helping Xcel Energy interpret customer and trade partner perspectives, and on identifying actionable opportunities for improving product operations and marketing.

4.2 Detailed Findings

Identify Sources of Awareness that Drive Customer Participation and Strategies to Improve Customer Engagement

Both participants and non-participants expressed a distinct preference for learning about energy efficiency opportunities via direct personal communication with their Xcel Energy account manager. This preference is congruent with recommendations from peer utilities who universally identified personal outreach as an important facet of promoting participation in data center efficiency programs. This consistent message about the importance of personal contact between utility representatives and data center decision-makers is all the more noteworthy when contrasted with the very low rates of personal contact reported by non-participants in this study.

Information from the following sources informed the findings related to this research objective.

Table 4-1. Data Sources Used to Assess Sources of Awareness and Strategies to Improve Customer Engagement

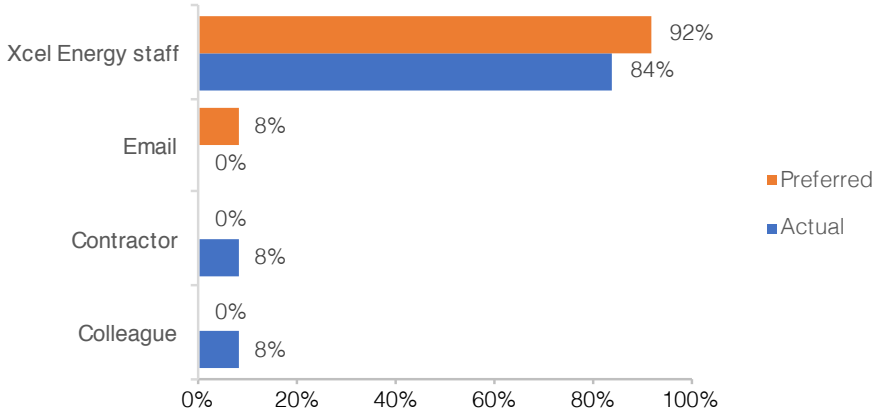
Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Sources of awareness	X	X	X	
Strategies to improve customer engagement	X	X	X	X

Preferred and actual sources of awareness about the Xcel Energy Data Center Efficiency Product were closely matched among the participants interviewed (see Figure 4-1.). The vast majority (92%) of interviewed participants identified direct contact with their Xcel Energy account manager (which included phone calls and in-person visits) as their preferred method of learning about energy efficiency opportunities for their data center. This matched the way most (84%) of participants

learned about the product. In reporting this preference, participants' emphasis tended to be less on the specific mode of communication than it did on having an ongoing communicative relationship with their account manager: "Whenever we're redoing anything as far as electrical, or lights or anything… [my account manager and I] get to talking to one another…"

Another participant made clear that this ongoing relationship is appreciated, not only for solidifying details for projects under current consideration, but also for identifying future opportunities: "[I] sit down with them and [discuss] the potential for the future, what we might be considering doing."

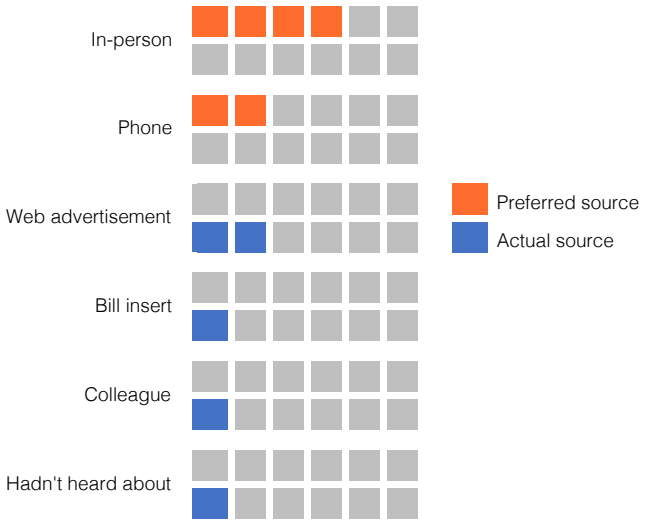
Figure 4-1. Participant Sources of Awareness



The alignment of participants' preferred and actual sources of awareness is sharply contrasted by the data from non-participants. All five non-participants identified contact from Xcel Energy staff as their preferred source of awareness (four identified "in-person" contact, two identified "phone" contact), but no respondents reported contact from an Xcel Energy representative about energy efficiency opportunities[13]. Among those who knew about the Data Center Efficiency Product before being contacted for an interview (one did not know about the product before the evaluation team contacted them), their sources of awareness were an online advertisement, a bill insert, and a colleague (see Figure 4-2.).

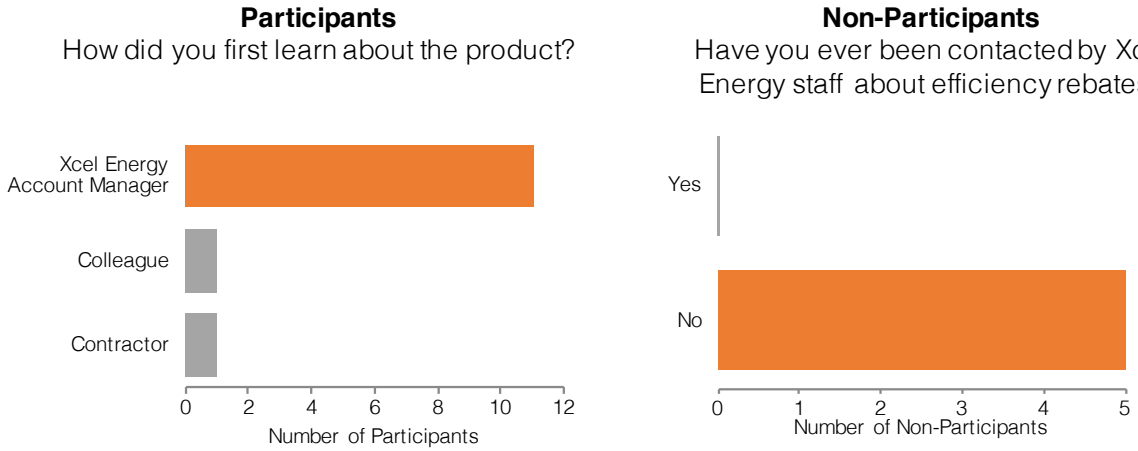
[13] It is possible that Xcel Energy representatives are in contact with other employees at non-participant locations.

Figure 4-2. Non-Participant Sources of Awareness



There appears to be a correlation between participating in the Data Center Efficiency Product and having personal contact with an Xcel Energy account manager (see Figure 4-3.). Although both participants and non-participants cited other factors as the primary influence on decisions related to their participation (e.g., installing measures to replace of aging equipment, not installing measures because of lengthy payback periods), the correlation between participation and outreach is strong. It is possible that personal conversations with Xcel Energy account managers support non-participants in identifying benefits and opportunities that they might otherwise not notice and, in doing so, could help to recruit these customers to participate in the product.

Figure 4-3. Correlation Between Participation and Personal Outreach



Participants' and non-participants' preferences for personal outreach is congruent with recommendations by peer utilities. Five of five peer utilities interviewed spoke highly of various forms of personal outreach as means to promote data center efficiency measures. Specific approaches mentioned included:

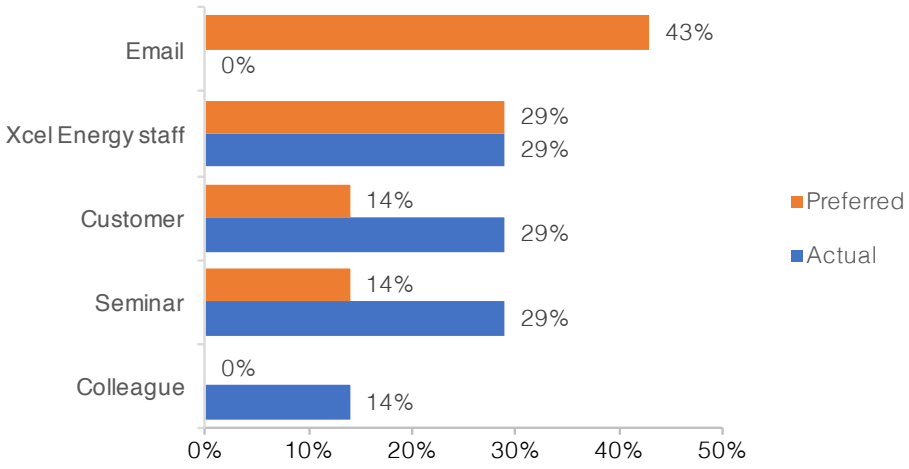
- Business account managers promoting the program to customers

- Sending outreach teams to industry events
- Supporting customers with paperwork and calculating initial savings estimates
- Leveraging existing relationships via an implementer or a key hire to expand program participation

There is some indication among participants that email may be a particularly sub-optimal mode of communication. When asked about their preferred method of outreach, two participants spontaneously discussed that email was an ineffective way to communicate with them: "I get tons of spam emails per day…A personal conversation with [my account manager] is the best."

Trade partners' preferences for learning about data center efficiency opportunities were more diverse. Currently, trade partners learn about data center efficiency opportunities primarily from in-person communications through Xcel Energy staff, seminars, or through their customers. However, interviewed trade partners stated a preference to learn about data center efficiency opportunities more by email (see Figure 4-4.).

Figure 4-4. Trade Partner Sources of Awareness



The information participants and non-participants want in communications from Xcel Energy about efficiency opportunities was fairly uniform. They want:

- Information about the product in general
- Information about incentive details
- Eligibility criteria for their facilities and equipment

Trade partners reported having tools that make it easier to estimate project savings and rebate potential and that modifying the study approval process to reduce duration, cost, and complexity would likely increase their participation with the product.

Assess Barriers to Customer Participation

The evaluation team interviewed all segments of market actors to determine what barriers to participation customers experience. Across participants and non-participants, financial factors were identified as a barrier, although more strongly by non-participants. Participants tended to identify challenges related to product activities (e.g., completing rebate forms).

Market actors who have direct experience using the Data Center Efficiency Product (participants and trade partners) rated the majority of tasks associated with the product (e.g. submitting rebate forms) as easy to complete. The median score given by both participants and trade partners across all tasks was four out of five. Determining organizational and measure eligibility, completing rebate forms, and—for trade partners—being able to contact an Xcel Energy representative were the tasks participating market actors found more challenging. Market actors who do not have direct experience using the Data Center Efficiency Product (non-participants) reported that their barriers to participating were largely non-product related, and included the payback period of installing energy efficiency measures and circumstances such as an upcoming move.

Information from the following sources informed the findings related to this research objective.

Table 4-2. Data Sources Used to Assess Barriers to Customer Participation

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Challenges when using the product	X		X	
Barriers to participating in the product		X	X	X

At least 50%, and in several cases 100%, of participants and trade partners gave ratings of four or five on a five-point scale (where one means extremely difficult and five means extremely easy) to all product tasks, indicating a generally high level of ease to complete tasks associated with the product.

For participants, the most challenging task was determining their organization's eligibility, which 13% of respondents rated as hard. While non-participants don't have experience with the product, they also reported having information about their eligibility as a barrier (discussed previously). Responses from participants who rated determining their organization's eligibility as relatively challenging varied. One commented that the age of his building makes it difficult to determine what offerings he might realistically be eligible for without having to "redo [the] whole infrastructure." Another discussed his difficulty meeting a minimum cost threshold for measures his company implemented.

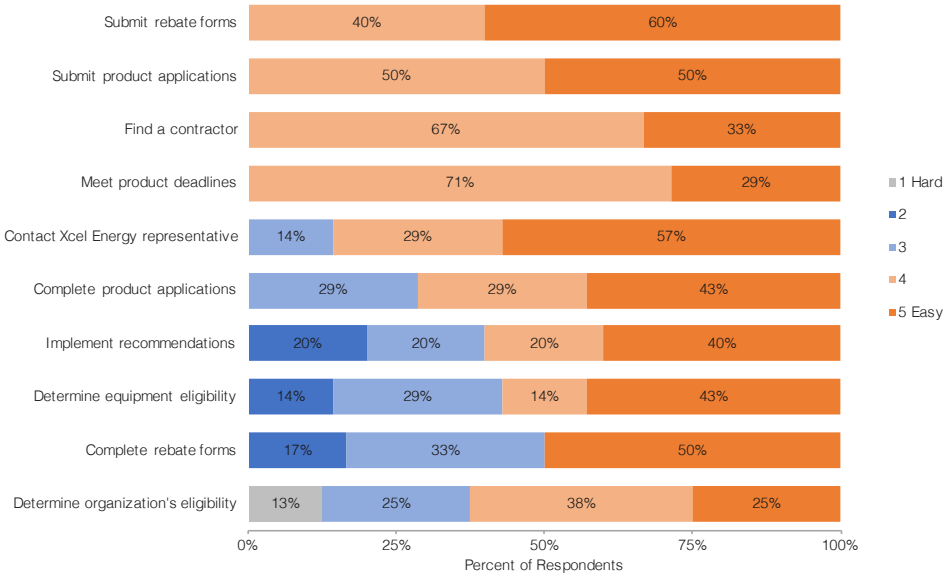
Completing incentive forms, determining eligibility of equipment, and implementing recommendations were other challenging areas for participants (see Figure 4-5). The participant who gave the lowest score (two out of five) for ease of determining measure eligibility elaborated that he

is unsure what equipment might be available and relevant to them: "No one's ever really stopped out or just sent us information [saying], hey, this is what we got going on."

This statement relates to the previous discussion that indicates participants highly value personal outreach and relationships with their Xcel Energy account managers. Another participant reported that it was not identifying the eligible equipment itself that was challenging, rather it was identifying equipment that was both eligible for an incentive and would fit in within his data center's specific space requirements.

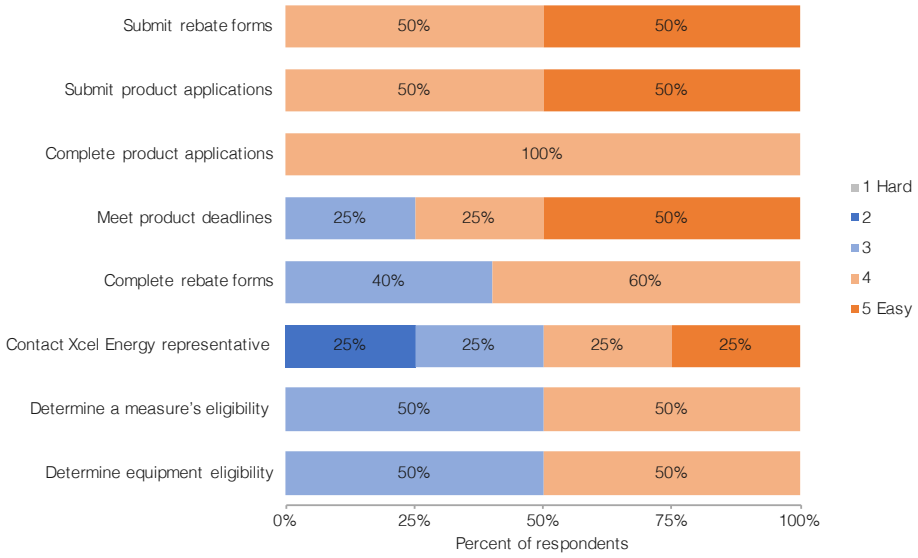
Participants had various reasons for reporting difficult experiences implementing recommendations. One discussed the challenge of implementing measures that might cause downstream interruptions—concerns about efficiency projects impacting data center reliability are well known and documented in the industry. Another participant received a recommendation to replace new equipment that was still working and reported that, to save costs, this was something they wouldn't do until the equipment failed or required an upgrade.

Figure 4-5. Participant Ratings of Difficulty to Complete Product Tasks



Some trade partners also noted challenges getting in touch with an Xcel Energy representative (see Figure 4-6.). One of the trade partners who gave a lower score for ease of determining measure eligibility said he didn't want to have to search for eligible measures, he wanted a drop-down menu to select eligible measures online.

Figure 4-6. Trade Partner Ratings of Difficulty to Complete Product Tasks



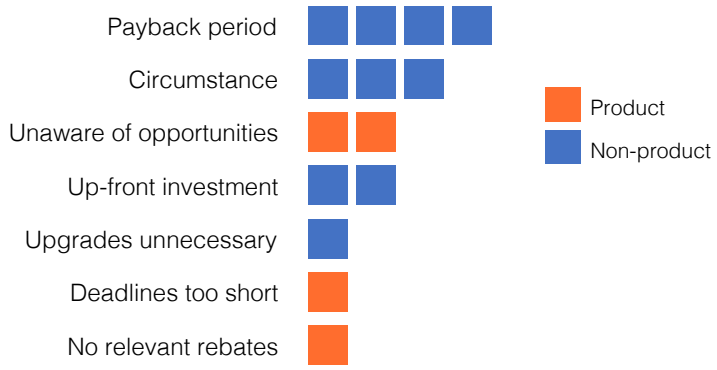
Among participants and trade partners who reported difficulty completing rebate forms (which is distinct from submitting rebate forms, for which ratings were uniformly positive), the challenge was in obtaining the required energy data. One trade partner mentioned having difficulty fitting energy data into the fields and metrics the rebate form requires. Similarly, one participant said, "[We] had problems getting the metrics in a way that Xcel wanted to see them."

Non-participants, who did not have direct experience with the Data Center Efficiency Product, reported different barriers to participation. There was little correlation between the challenges identified by market actors who have no experience with the product (non-participants) and market actors who do have experience with the product (participants and trade partners). The existence of such a dissimilarity should not be surprising. Participants engage with the product as a specific entity with which they have a direct and often detailed experience. Non-participants engage with the product from more of a distance as they consider whether it is something they would participate in. As such, participating market actors have access to different facets of the product than do non-participating actors. This difference in perspective may be the primary driver of the difference in challenges experienced by these groups.

The two most commonly cited barriers to participation by non-participants, the payback period and circumstance, were non-product factors over which Xcel Energy does not have direct influence. Although payback period can be influenced by product factors such as incentive size and perhaps financing mechanisms, it exists primarily as a non-product factor because of its susceptibility to external influences (e.g. contractor pricing) and contextual variability (e.g. usable life of an incentivized measure). Data center technology advances quickly, so it is possible these non-participants find it difficult to recoup their investments in efficient measures before these measures must be replaced to keep their facilities competitive.

Circumstances, the second-most commonly discussed category of barrier to participation, included an impending move to a new facility (mentioned by two non-participants) and an upcoming acquisition (mentioned by one non-participant).

Figure 4-7. Non-participant Barriers to Participation



Trade Partner Characteristics and Opportunities to Increase Engagement

The trade partners reported that their role in the Data Center Efficiency Product projects is primarily measure installation and support of incentive applications, although their firms offer more holistic consulting services. Trade partners have limited influence on customers' decisions about measure implementation and only sometimes use Xcel Energy incentives as a sales tool. While interviewed trade allies did provide suggestions for how to revise the product to increase their engagement, doing so may not be the most efficient way to increase data center measure implementation; peer utilities indicate that resources are better spent on direct customer engagement than on trade ally recruitment.

Trade partners' businesses are built on trusted relationships. While they use these relationships and referrals to obtain work, trade partners reported they do not have significant influence on data center decision-makers' choices regarding measure implementation, as they are generally engaged by the data center customer to implement projects conceived by the customer. Trade partners primarily install measures and support the completion of Data Center Efficiency Product applications. Both roles appear to be important for product success and uptake. Trade partners identify limited demand for third-party contractors (some data centers rely on in-house staff) and the effort required to submit incentive applications for low-value rebates to be among the primary reasons they do not participate in the product more than they do. The evaluation team does not recommend significantly increasing direct engagement with trade partners as peer utilities do not use trade partners to drive participation, participants reported they prefer to hear of opportunities from their Xcel Energy account managers, and trade partners reported they don't have influence over their customers' decision-making.

Information from the following sources informed the findings related to this research objective.

Table 4-3. Trade Partner Data Sources

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Characterize trade partner business models	X		X	X
Characterize challenges trade partners experience			X	
Identify opportunities to increase trade partner engagement				X

The evaluation team received additional data from Xcel Energy about three of the trade partners interviewed. The Xcel Energy team reported talking to these three trade partners at least twice per year via Xcel Energy program management, a trade relations manager, and energy efficiency engineers. The three trade partners highlighted by Xcel Energy initially participated in the product between 2012 and 2014, with one participating in 0 projects between 2015 and Q1 2017 (with 4 projects prior to 2015), another participating in 2 projects between 2015 and Q1 2017 (with 1 project prior to 2015), and the third trade partner participating 15 times between 2015 and Q1 2017 (with 12 projects prior to 2015).

Business Models

Relationships and reputation are critical to trade partners' success in the data center industry. It is through existing relationships and referrals that trade partners find work in what one trade partner referred to as "a closed group." Another trade partner describes the data center industry as "relationship-based business," and says his work is obtained mostly through "existing clients and… referrals." Based on these interviews, the relationships appear to be primarily driven by the participants. Nine of eleven participants (82%) reported they chose contractors for projects through either a competitive bidding process or through existing relationships and two out of six (33%) trade partners reported contact was initiated by participants. Some trade partners even reported they have little input into participants' decisions to participate in the product or to implement measures. Xcel Energy staff believe some trade partners do have influence over their customers' decision-making process and do upsell projects—especially consultant firms. Trade partners expressed concerns about the risks associated with upselling projects, particularly custom projects, and when asked to rate the likelihood that they would have made the same equipment recommendations in the absence of the product, they provided a mean rating of 6, on a scale from 0 to 10. They did, however, provide a high rating when asked whether the product had an influence on their equipment recommendations (mean rating of 8.5 on a scale from 0 to 10).

The trade partner role in Data Center Efficiency Product projects is primarily installing measures and supporting the completion of incentive applications. They occasionally conduct studies but rarely "upsell" projects. While all trade partners were aware of Xcel Energy incentives, they do not

include incentives in every sales discussion with their customers as 60% of trade partners said discussing incentives could hurt the sale because of increased cost and timeline. Additionally, 80% of trade partners reported they will not mention a potential incentive when the savings would be small, if it would require a challenging study, if it would increase the project timeline, or until they have high confidence it would be approved by Xcel Energy.

Despite trade partners' selective use of Xcel Energy incentives as a sales tool, interviewed trade partners still identified the cost savings offered by the Data Center Efficiency Product as a primary reason they participate. The other motivation trade partners identified for their participation was the effect the product had as a third-party validation of the measures offered by the trade partners. Both of these motivations describe trade partners perception that, despite specific situations under which they may strategically avoid discussing the product, that they do view the Data Center Efficiency Product as a tool that helps them to sell their services. One trade partner said, "Xcel Energy is well-respected and, if I'm getting a rebate for the project, that means Xcel stands behind it."

Challenges Experienced by Trade Partners

In addition to the barriers discussed above and in Figure 4-6., other challenges trade partners experience vary. Individual trade partners mentioned the following difficulties that may be preventing them from participating more actively in the product.

- Limited demand for third-party contractors: "Some data centers do their work with in-house staff."
- Measures below ROI threshold: "ROI is sometimes not attractive enough for clients," and "Some qualified upgrades are too much work to get the incentive for, like custom measures requiring metering."

Opportunities to Increase Trade Partner Engagement

There may be opportunities for Xcel Energy to address the challenges identified above. One trade partner suggested that Xcel Energy could increase trade partners' engagement in the program if they offered, "more tools or a spreadsheet to plug in the data and get savings estimates." Another suggested that their engagement could be increased if they had "better communication from Xcel Energy staff" and a "single point of contact." This trade partner also suggested that Xcel Energy could provide a "kicker" for trade partners who "combine measures into a package that results in more energy savings." One other trade partner suggested efforts to "make studies easier," though they declined to provide follow-up comments.

However, the opportunity to increase participation in the Data Center Efficiency Product via trade partners may offer less value to Xcel Energy than leveraging resources to increase participation in other ways. No peer utility placed significant emphasis on trade partner engagement as a means to promote their data center efficiency program. One said simply that they "don't actively engage trade partners in this program." This is consistent with the Xcel Energy approach, which one Data Center Efficiency Product staff member characterized as transitioning away from a trade partner-driven approach, stating, "I think once upon a time when I started we had trade partners and they were just not cutting the mustard. They would do a study and make recommendations that were not very rigorous and nonsensical." Another utility reported that their primary method of integrating trade partners with the program is to list approved trade partners on the utility website. One peer utility

explained their focus on trade partner engagement relative to other outreach efforts: "We do network with trade partners at events, but place more emphasis on relationships directly with customers."

This limited effort by peer utilities to utilize trade partners to drive product participation matches participants' sources of product awareness, which was overwhelmingly Xcel Energy staff (see Figure 4-1.). It is also aligned with trade partners reporting they have little influence on participants' decision-making process. That said, trade partners do appear to play an important role in helping participants to complete incentive applications, install measures and, in limited cases, conduct studies. Completing incentive forms and implementing recommendations were two areas rated as more difficult by participants, so helping trade partners grow their proficiency with these documents, or even simplifying the documents, would be beneficial to the program

Assess the Impact of the Product on the Overall Availability of and Interest in High-Efficiency Data Center Equipment in the Market

This research indicates the Data Center Efficiency Product does not have strong effects on the availability of or interest in high-efficiency data center equipment in the market, otherwise known as "market effects." Data from participants in both Colorado and Minnesota suggest that the measures they implemented are fairly standard practice in the data center industry, and that participants would have likely implemented these measures in the absence of the Data Center Efficiency Product. No trade partners reported that the product changed their work over time.[14]

Information from the following sources informed the findings related to this research objective.

Table 4-4. Data Sources Used to Assess the Product's Impact on High-Efficiency Equipment in the Market

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Impact on high-efficiency data center equipment in the market	X		X	

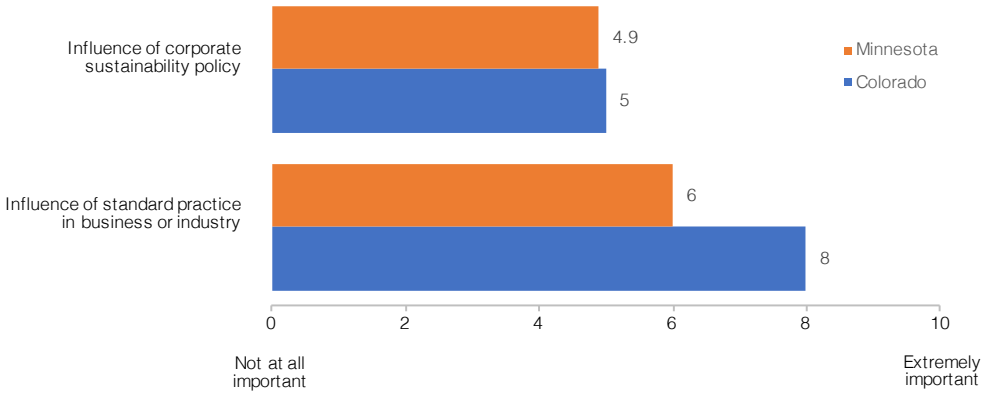
The evaluation team used four metrics to assess potential market effect: (1) corporate sustainability or environmental policies; (2) the influence standard industry practice had on motivating participants; (3) the likelihood participants would have installed the same equipment in the absence of the product; and (4) trade partners' responses on how the Data Center Efficiency Product has changed their work over time. Participants' scores describing the influence of corporate

[14]One trade partner reported that the increased complexity of doing studies through the product has decreased his willingness to conduct studies.

sustainability policies and standard business practices in their industry indicate the degree to which the Data Center Efficiency Product is driving change in market behaviors. The existence and influence of corporate sustainability policies and standard practices that promote energy efficiency measures would indicate that these measures are relatively mainstream. Conversely, an absence of policies and practices promoting energy efficiency measures would indicate that the measures are relatively novel, and that their implementation is not a mainstream behavior. It is the latter case in which programs like the Data Center Efficiency Product have the potential to drive change in the market; once measures are standard practice, the influence of the product on market behavior is reduced.

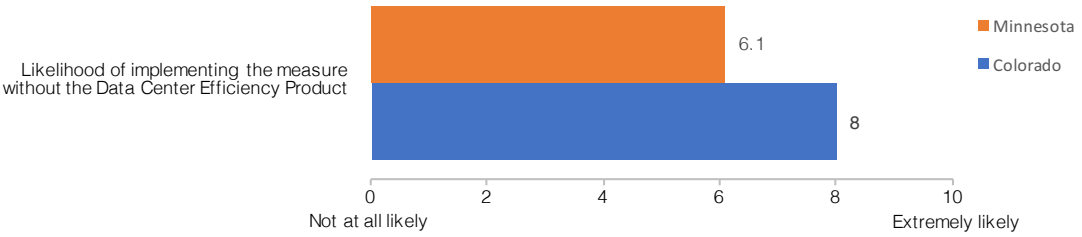
Interview data from participants (see Figure 4-8.) indicates that corporate sustainability policies did not strongly influence measure implementation in both Minnesota and Colorado (means of 4.9 and 5, respectively, on a 10-point scale), while standard practices in participants' business or industry had a relatively strong influence on measure implementation (means of 6.1 for MN and 8.0 for CO on a 10-point scale). These values indicate that the data center efficiency measures implemented through the product are likely standard practice in the data center industry (perhaps more so in Colorado than Minnesota). This standard practice appears to be only moderately influenced by corporate sustainability policies. One Minnesota participant who rated the influence of standard practices as a nine out of ten on his decision to implement measures said: "[The standard practice is] saving money on expenses and recovering capacity and reducing wasted overhead. That's industry practice and [it] is all about becoming more efficient." This respondent indicated that this has been standard practice in the data center industry "forever."

Figure 4-8. Mean Influence of Policies and Standard Practices on Measure Implementation



Participants also reported their likelihood of implementing the same measure without the support of the Data Center Efficiency Product (see Figure 4-9.). Low reported likelihoods would indicate that the product is having a relatively high impact on market behavior. High reported likelihoods would indicate that the product is having a relatively low impact on market behavior. Participants' average likelihood of implementing the measure(s) was 6.1 in Minnesota and 8.0 in Colorado on a scale of 0 to 10. These averages indicate that participants would be likely to implement the measures that they did in the absence of the product and, therefore, that the product did not have a significant impact on their interest in high-efficiency data center equipment.

Figure 4-9. Mean Likelihood of Measure Implementation Without Data Center Efficiency Product



Interviews with trade partners indicated similar findings. When asked if the Data Center Efficiency Product has caused their work to change over time, five out of six interviewed trade partners said that the product has not changed their work over time. The one trade partner who said the product has influenced his work reported that he is now less willing to conduct studies because changes to the product have made study requirements "more challenging to fulfill," which is essentially a negative impact to the product.

Assess Customer Satisfaction

All market actors reported high levels of satisfaction with Xcel Energy and with the Data Center Efficiency Product. Satisfaction with the product elements showed more variance between the market actors. Participants generally reported being highly satisfied with most product elements while some trade partners reported somewhat lower levels of satisfaction with some product elements.

Information from the following sources informed the findings related to this research objective.

Table 4-5. Data Sources Used to Assess Customer Satisfaction

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Satisfaction with Xcel Energy	X	X	X	
Satisfaction with Data Center Efficiency Product	X		X	

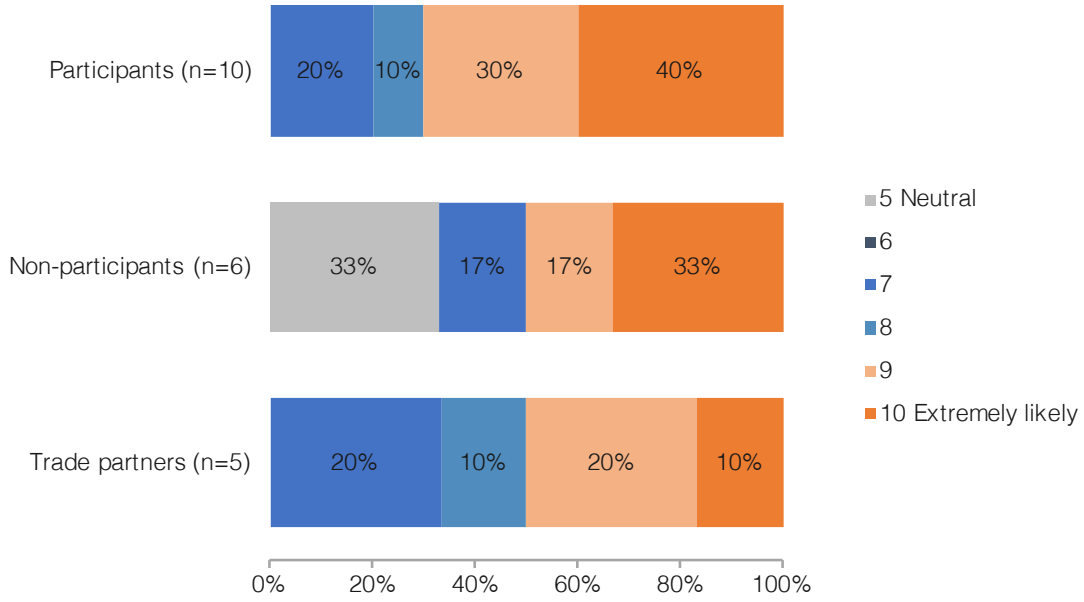
Satisfaction with Xcel Energy

All market actors reported high satisfaction with Xcel Energy. No respondents reported their likelihood of recommending the utility to a colleague at lower than a five on a ten-point scale (see

Figure 4-10.). One participant with experience with multiple utilities stated that he prefers Xcel Energy: "Compared to Pacific Gas and Electric, there's no comparison. Xcel Energy is the top banana."

Non-participants had the lowest likelihoods of recommending Xcel Energy to a colleague. When discussing these scores, they mentioned some power quality events that required the temporary use of generators to maintain data center operation. One trade partner also brought up power quality events as an undesirable experience he has had with Xcel Energy. Even the lowest of these scores, however, were no lower than a neutral score of five on the ten-point scale.

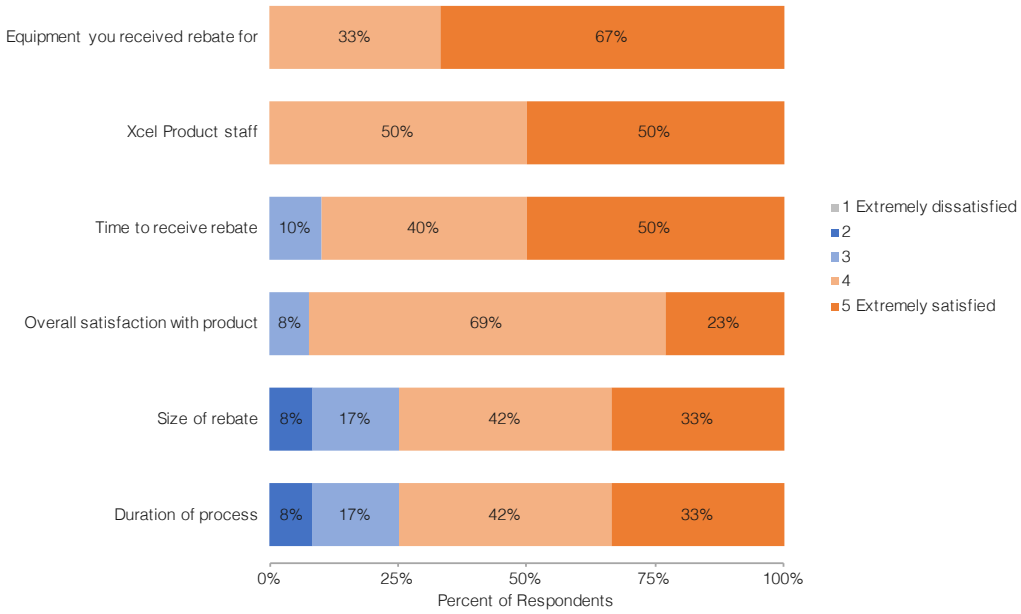
Figure 4-10. Likelihood of Recommending Xcel Energy to a Colleague



Satisfaction with the Data Center Efficiency Product

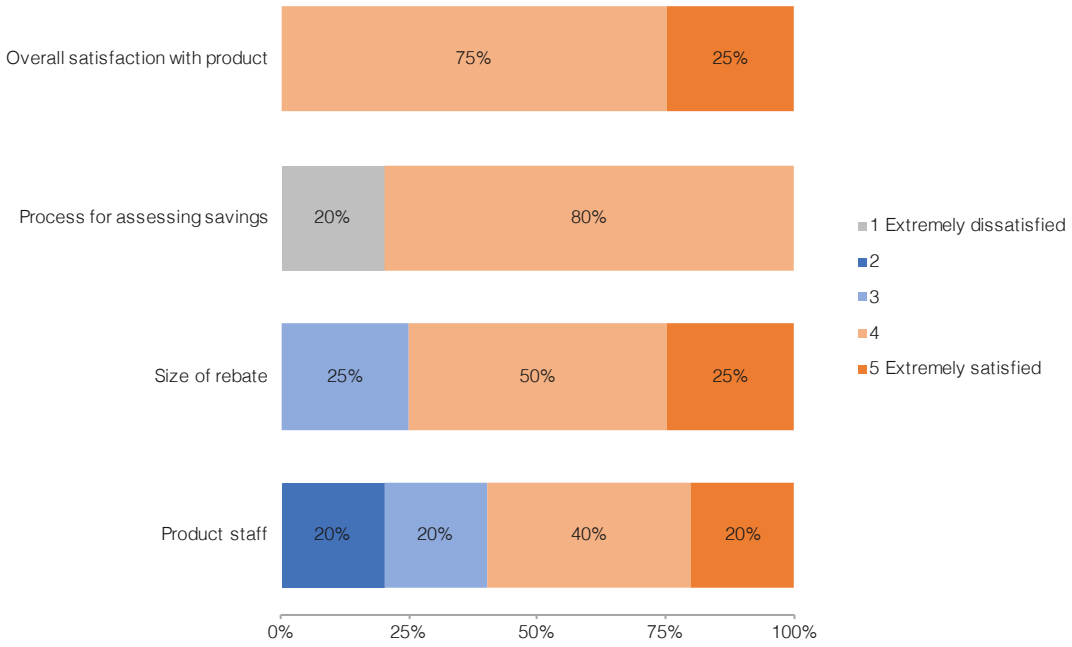
Participants reported high overall levels of satisfaction with different elements of the Data Center Efficiency Product (see Figure 4-11.). The vast majority of participants' scores were fours or fives on a five-point scale. The only scores below the midpoint were given by a single participant when asked for his satisfaction with the size of the rebate he received and the duration of the entire measure implementation and rebate process. This participant said he received a lower incentive than he believed was originally estimated, that the project took longer than he would have liked due to internal factors, and that this was "not necessarily an Xcel thing."

Figure 4-11. Participant Satisfaction with the Data Center Efficiency Product



Trade partners reported slightly lower overall levels of satisfaction with the Data Center Efficiency Product than participants (see Figure 4-12.). While most trade partners were satisfied with the process for assessing savings, it was the only product element to receive a satisfaction rating of one, or "extremely dissatisfied." One trade partner explained that this process could be improved by allowing for easier ways to combine measures into a single rebate package. Interactions with product staff, while receiving a higher minimum satisfaction rating (two out of five) nonetheless had more neutral or negative satisfaction ratings than other product elements. Critiques of this element of the product focused on wanting more communication with, and access to, Xcel Energy Data Center Efficiency staff.

Figure 4-12. Trade Partner Satisfaction with the Data Center Efficiency Product



Identify Opportunities to Improve Product Implementation and Delivery

Opportunities for improvement identified by participants, non-participants, and trade partners focused on the ease of product use and communication with Xcel Energy representatives. These suggested improvements align with the experiences discussed by peer utilities.

Information from the following sources informed the findings related to this research objective.

Table 4-6. Data Sources Used to Identify Opportunities to Improve Product Implementation

Research Topics	Data Source			
	Participant Interviews	Non-Participant Interviews	Trade Partner Interviews	Peer Program Interviews
Opportunities to improve	X	X	X	X

All market actor segments identified opportunities for improving the Data Center Efficiency Product's ease of use and increasing communication with Xcel Energy staff. Participants, non-participants, and trade partners identified these opportunities as explicitly related to the product. Peer utilities spoke in terms related more to their own programs and the data center market at large. Selected statements from each market actor segment that exemplify these opportunities for improvement are listed in Table 4-7.

Table 4-7. Selected Statements Identifying Opportunities for Improvement

Opportunity	Participant	Trade Partner	Non-participant	Peer utility
Make the product easier to use.	Make the whole process easier to understand.	Provide tools that make it easier to estimate savings and rebate potential.	I'd like more information about equipment and eligibility.	Consistent standards help customers estimate savings. This avoids frustration.
Increase communication.	Connect with IT professionals in planning phase to influence equipment purchases.	Better communication from Xcel Energy staff.	Come over and knock on the door.	Leveraging relationships and conducting outreach activities opens a lot of doors.

These suggestions are congruent with the elements of the program market actors found more challenging, as discussed above. In particular, participants and trade partners gave relatively low scores (which indicate difficulty) to tasks related to determining eligibility and completing rebate forms (see Figure 4-5 and Figure 4-6.). This suggests that there is an opportunity to make these experiences easier for these market actors. Although participants generally reported high levels of ease contacting an Xcel Energy representative, some trade partners reported challenges doing so and reported here that this could be an improvement to the program. The suggestion from non-participants to "come over and knock on the door" and from trade partners to have "better communication from Xcel Energy," paired with the strong correlation between personal outreach and product participation (see Figure 4-1. and Figure 4-2.) indicate that there is an opportunity to increase product impact by increasing communication between Xcel Energy staff and market actors.

Data from peer utilities reinforce the importance of making data center efficiency programs easy to use and ensuring utility staff are actively engaged with marker actors. One peer utility discussed the important role that their outreach team plays in driving participation by proactively engaging potential participants, then helping them to estimate savings and complete applications. Another discussed how they improved customer experiences by standardizing processes to assess savings and calculate incentive payments, thereby making their program easier to understand and use.

5. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the research team's key findings and associated recommendations regarding the Xcel Energy Data Center Efficiency Product in Colorado. All recommendations are based on key findings from our evaluation research and are designed to reflect the context of future program years, acknowledging expected changes in the market and planned product changes.

The research team focused the key findings and recommendations on describing multiple ways Xcel Energy could tweak the product design and implementation to decrease free ridership and improve the NTGR in future years. The recommendations are comprehensive and represent industry best practices. Many of them are intertwined with each other and some overlap with others, which is called out in the discussion of each recommendation. As such, if one recommendation is implemented it may supplant other recommendations. Therefore, evaluation team does not anticipate every recommendation is implemented.

If the recommendations aimed at decreasing free ridership are implemented (i.e. targeting customers that face barriers Xcel Energy can support, increasing product awareness with new customers, additional technical support, etc.), the evaluation team believes the NTGR in future evaluations could increase to 0.65.

Specific findings and recommendations follow.

- **Key Finding 1: Xcel Energy doesn't have a strong characterization of the CO data center market**. Staff interviews indicated Xcel Energy product managers do not have access to a detailed characterization of data center customers. Product staff were uncertain how many data centers exist in their territory, who they are, and where they are located. As a result, they do not have complete information regarding market size or potential. Product staff also do not have a market map of the key market actors to understand who is involved in what type of projects, who influences decision-makers, where customers go for information, and who their potential partners, trade partners, and customers are. Product staff reported that the network of trade partners for the product did not expand beyond study providers and that they are not placing focus on other contractors or influencers in the data center space. The focus on only study providers may miss trade partners who have influential relationships with data center customers, but who don't participate in the formal Xcel Energy studies. Additionally, Xcel Energy does not have an accurate picture of how or if barriers expressed by some customers are representative of all customers. Understanding these factors would help Xcel Energy create an approach for targeting those customers that may have lower free ridership.

  During the evaluation, there was some confusion in data tracking around company and contact names and who was a participant, near participant, and non-participant. The data center market is tumultuous, with frequent mergers, acquisitions, and name changes. While it can be challenging, better tracking of customers is needed, especially when considering embarking on more targeted engagement strategies.

- **Recommendation 1: Conduct a targeted market characterization study.** The goal of this task would be to identify potential new participants, understand the characteristics of trade partners who would influence data center decision-makers or upsell projects, and identify other market actors that may be worth developing relationships with. The characterization should provide a decision map to understand how the data center market in Colorado is organized, who are the key customers (participants, near participants, and non-participants), influential trade partners, other types of contractors, and any other potentially influential data groups such as AFCOM, 24x7, and ASHRAE. This market characterization should also typify key market actors by identifiable elements such as size, type, ownership structure, and level of participation to allow for analysis and targeted engagement. For example, most of the participants interviewed were located in Denver (see Figure 3-9), but there are likely data centers in other parts of the state. Our limited analysis showed high free ridership is loosely tied to the number of projects customers have implemented and when they first participated. The analysis also showed there's potentially a relationship between the size of the facilities and free ridership (see discussion in Section 3.3). This may be an avenue to explore, as it is well-known in this market that large data centers are more likely to undertake efficiency projects without utility incentives in order to remain competitive. In fact, large data centers are very focused on driving their power usage effectiveness (PUE) numbers as close to one as possible, and some of the companies that own large data centers compete with one another to see how little energy they consume.

  Xcel Energy staff reported these evaluation findings do not align with their previous research that found project cost is the biggest barrier for participants. This is, however, what non-participants indicated is their largest barrier in this evaluation. As previously stated, the data center market is fast moving, and this perceived discrepancy between research findings points to the need for this characterization. What motivates and influences data centers who are actively engaged and doing multiple projects is likely different than what will motivate and engage those customers who are not participating in the product. Stratifying customers based on their motivations and preferences will help Xcel Energy target incentive dollars and staff resources in a way that can mutually benefit the customers and the products.

- **Key Finding 2: The NTGR indicates significant levels of free ridership**. As evidenced by the wide range of participant-level NTG ratios, some participants are high free riders while other participants are influenced by the product. Therefore, the Data Center Efficiency Product is having an impact on parts of the market and should target future engagements to those customers not already considering these types of projects.

  - **Recommendation 2: Increase Product Influence.** There are multiple ways Xcel Energy can achieve this and staff will need to balance programmatic desires to decrease free ridership with market needs (such as budgeting cycles, project phases, and gradually achieving full load). The goal is to more clearly demonstrate to customers how the program is in fact influencing their decisions in a way participants may not currently realize.

One method to increase product influence is to segment and incentivize customers based on how they participate and how many times they participate. The evaluation found high free ridership was associated with those facilities that have participated many times. Based on customer segmentation, Xcel Energy could re-evaluate how they engage with each customer segment and provide different rebates and/or messages based on each customer segment, such as certain customer types and/or levels of participation. This would allow product staff to have a greater influence on customers because they will be better positioned to influence different types of customer needs.

Another option is to implement a method for tracking project details to document influence. Xcel Energy believes they've had a greater influence on facilities that have participated multiple times than what this evaluation approach shows. Participants may also find it hard to answer questions about what they would have done in the absence of the program (the no program score). To resolve these discrepancies, Xcel Energy could implement a method for tracking the customer journey by tracking project details to document influence. On a project by project basis, the evaluation team recommends Xcel Energy clearly document the project, equipment, and efficiency level the customer was planning on installing (i.e. the "base case") and then also clearly document how interaction with the product caused them to change the project's specifications and install equipment of a higher efficiency. This tracking should document the existing equipment and efficiency levels when customers first participate in the product, the equipment and efficiency levels customers would have installed without the program, and the equipment and efficiency levels they actually installed in projects. Standard practice and how it has evolved over time should also be clearly documented, so that the Product can demonstrate how projects went above standard practice and also show a record of influence through multiple engagements. This type of tracking could be done in an application, such as excel or potentially SalesForce[15], where there is a column for each field collected and a row for each measure implemented. Each participation with the product could be documented in a separate sheet or a new row. This would allow for easy analysis through pivot tables or other such tools. This would also align product delivery with the desired intent of the assistance provided by Xcel Energy. In addition, it would improve future evaluation efforts by mitigating any bias associated with recall and social desirability.

- **Recommendation 3: Target outreach efforts to potential participants based on the market characterization.** If the market characterization or additional analysis on existing data reveals customer characteristics that indicate increased barriers to energy efficiency (e.g., limited capital, limited technical expertise, lower awareness of opportunities) the product should target outreach efforts towards customers, trade partners, or other market actors with these characteristics.

[15] The evaluation team does not have experience with SalesForce and can not provide guidance specific to the SalesForce application

- **Recommendation 4: Engage potential new participants.** Participants, trade partners, and industry literature all report the data center market is highly relationship driven. Due to their competitive nature, as well as concerns around security and reliability, engaging this market is a high-touch endeavor that relies heavily on developing trusted one-on-one relationships. Building these relationships takes time but is integral to identifying opportunities, creating custom projects, and moving projects through the Xcel Energy data center product. Therefore, Xcel Energy should consider having a dedicated resource to promote the product to potential new participants. Xcel Energy will want this resource to build a trusted relationship with new participants and then leverage that relationship to promote the product. Product staff can measure the success of this role by tracking metrics such as the number of leads vs. energy savings, the average savings per lead, or the types of measures identified per project should be tracked.

- **Key Finding 3: Trade partners influence on customer decision-making varies.** Two participants reported trade partners were very influential in their decision (9/10), two ranked the influence of the trade partner more in the middle (7 and 5/10), while seven didn't rank the influence of the trade partner. Xcel Energy staff discussed how some trade partners are very active in the program and how some customers tell Xcel Energy they only do what their trade partners recommend. This is consistent with our findings that when trade partners are influential, they're very influential, but that not all trade partners in the market can influence customer decision-making. Xcel Energy product staff believe consulting firms can have more influence with customers than equipment vendors. Trade partners discussed how the data center market is a closed relationship-based business where getting work is based on existing relationships and reputation, and this is supported in industry literature. Therefore, it is important that Xcel Energy identifies which trade partners are highly influential with customers (see Recommendation 1) and targets trade partner interactions to those partners who have influence with customers, per the below recommendations.

  - **Recommendation 5: Offer trade partner incentives.** Data centers, especially large ones, are sophisticated and insular in their own planning. Some are likely making decisions before Xcel Energy or trade partners are involved. The challenge is influencing customers' decisions before they've decided on a project, especially as market actors reported customers generally engage trade partners with ideas. Xcel Energy could incentivize trade partners for recruiting first-time participants and for "upselling" projects so they include measures customers were not already considering. This would also increase the value proposition for trade partners to participate in the program.

  - **Recommendation 6: Target influential trade partner firms**. Based on the results from the recommended market characterization, Xcel Energy could target outreach efforts to those trade partners with the favorable characteristics (such as those companies with a higher ability to influence customer decision-making) found in market characterization.

- **Recommendation 7: Support Trade Partners to identify and implement opportunities.** To help reduce free ridership, Xcel Energy can provide greater support to trade partners so that trade partners are better positioned to influence their customers to install more or higher energy efficiency equipment beyond what the customer was planning. Xcel Energy could provide greater support to trade partners in a variety of ways, including additional communication throughout the year, developing a qualified trade partner list, holding advisory board meetings or roundtable discussions to discuss new technologies and/or Xcel Energy product offerings. As Xcel Energy products are highly interactive with each other, product staff will need to consider other product needs when considering changes to its trade partner engagement strategies. A portfolio-wide trade partner engagement strategy could help inform these types of issues and develop cross-product training opportunities for trade partners. Changes should also be tested with trade partners to ensure their and their customer needs are met.

- **Recommendation 8: Change the study design.** Xcel Energy staff perceive the studies as a high-value offering as they help customers make internal business cases for capital expenditure investments. While not used often, staff view these studies as effective in identifying and motivating energy efficiency improvements. The data from the interviews conducted for this evaluation, however, showed the studies are not used to support business cases for decision-making. Of the four participants out of 12 (33%) who received a study, two (50%) reported they used it used to confirm they should proceed with the actions already under consideration. Only two (16%) of the 12 participants found the study provided data for decision making. Xcel Energy should consider doing a participant needs assessment to identify the how the studies could be used to increase the efficiency of projects or identify additional opportunities and to provide information on the process and data they need for including efficiency actions not already under consideration.

  Finally, the trade partners interviewed reported the study is too costly and time consuming to complete. The study work scope should be reviewed to ensure all elements are critical for Xcel Energy approval of a project and where possible, to eliminate or simplify requirements that aren't as critical. For example, current requirements include an executive summary, introduction, study summary, project description, energy estimate, measurement of energy, non-energy impact, project costs/vendor quotations, financial analysis, implementation, and other cost savings[16] – which reads more like a formal project plan or paper. Options include turning in the required information through an excel or online form that trade partners could easily fill in while conducting the study.

- **Key Finding 4: Participants reported standard industry practice highly motivated their decisions**. The data center market is highly competitive and fast paced where IT equipment is quickly made obsolete. Other evaluations reported nearly half of the data

[16] Requirements found in the "Minnesota Business Study Rebate Application" form supplied by Xcel Energy

center sites stated that they replace their IT equipment every three years due to market forces while certain facilities and customers replace equipment as frequently as every 18 months[17]. This is reflected in our findings where participants rate standard industry practice an eight out of ten in motivating their decisions.

- **Recommendation 9: Make changes to the incentive design.** Xcel Energy should consider changing the incentive design to promote those technologies that are not well-accepted, as opposed to those that are already well-established in the data center market. This could be done through a tiered incentive structure such as those outlined for other products by the Consortium for Energy Efficiency (CEE). For example, one peer utility offers $0.07/kWh for custom measures, $0.05/kWh for virtualization/IT measures, and $0.05/kWh for closet to colocation. Another option would be to offer lower rebates to repeat participants or offer incentives for the installation of multiple measures, with the goal of increasing per-project savings. Last, as IT technology advances so rapidly, Xcel Energy should consider making the baseline currently available equipment as opposed to existing installed equipment (if not already done).

- **Implement Recommendation #2.** Xcel Energy staff believes there is bias in participants' responses to the standard industry practice questions, which may be true. Participants may also find it hard to answer questions about what they would have done in the absence of the program (the no program score). To resolve these discrepancies, Xcel Energy could implement a method for tracking the customer journey as discussed in Recommendation #2. With this type of tracking, the product could then show a record of influence through multiple engagements as well as document how each engagement went above standard industry practice.

The following recommendations should be implemented with caution as they are actions designed to remove barriers to participation. While removing barriers would make it easier for customers to participate, doing so may increase free ridership if these actions are not combined with previous recommendations designed to lower free ridership (implementing eligibility criteria, targeted engagement, incenting first-time participants, etc.). The evaluation team suggests implementing the recommendations to reduce free ridership first, and then implement the below recommendations to make it easier for those customers who would not be free riders to participate.

- **Key Finding 5: Market actors have difficulty determining facility and measure eligibility and with completing rebate forms.** Market actors were fairly consistent with these observations, mentioning eligibility and rebate forms when discussing how difficult or easy product tasks were to complete and when discussing potential improvements to the program.

  - **Recommendation 10: Review facility and equipment eligibility criteria and communications.** Wherever possible, eligibility requirements should be explicit,

[17] Industrial and Process Efficiency Program Impact Evaluation for NYSERDA, 2012. Retrieved from: http://tinyurl.com/y8b8zypw

clearly communicated, and easy to find. For example, one requirement listed in the Business Program Summary is "Mini-split air conditioning unit = ($50 + 2/0.1 SEER above minimum qualification) x tons". The underlined text does not clearly state the minimum acceptable SEER level, and it is not found elsewhere in the same document. When read, market actors would not know if their specific equipment under consideration was eligible. So, market actors may go to the Xcel Energy website, click on a link to see a list of qualifying equipment, and are directed to an application form where at the bottom the minimum requirement of SEER 16 is found. While it may require more frequent updates as minimum requirements change, the evaluation team recommends placing minimum qualifications on all forms so customers don't have to search for the information in multiple places. Additionally, market actors discussed wanting the eligibility requirements listed on the Xcel Energy website, in a data drop down in excel, or in a searchable menu of eligible equipment. This information, however, is already available on the website. This indicates it is not easy for customers to find and that the current web page layout does not work for customers. Last, care should be taken to ensure the list of eligible equipment and minimum qualifications are beyond those technologies or equipment levels that are standard in the data center industry, as discussed in the previous key finding.

- **Recommendation 11: Make rebate forms easier to complete.** Making rebate forms more simple and easier to complete will increase trade partner satisfaction and potentially increase participation. Some ideas on how to make the forms easier to complete include but are not limited to:

  - **Change the format of rebate forms to an excel workbook or even an online form.** Both of these forms make it easier for users to copy and paste required information.
  - **Clearly mark fields Xcel Energy completes.** Xcel Energy should review the fields in the forms with an eye towards what trade partners need to provide versus what Xcel Energy staff could fill in. For example, on the "Data Center Efficiency Project Pre-approval Application" fields like "premise number" and "rate code" are likely filled out by Account Managers, but instructions do not state that and Trade Partners may not know the information. Consider moving fields that can be filled out by Xcel Energy staff to the end in a table clearly marked as fields Xcel Energy will fill in, like the current box marked "Internal use only. Do not write in this section".
  - **Separate pre-project and post-project documentation.** Peer utility application forms are one page long, whereas Xcel Energy's application forms are 4 pages long. Xcel Energy could consider separating pre-project approval information from post-project information, like verification and final project changes, and capture that information on separate forms. This would allow trade partners to focus only on the information needed for applications during the sales process, while they are still trying to win a bid. This may reduce the amount of time needed to fill in the forms, as well as reduce confusion from trade partners on what information is needed when.

The above recommendations were constructed with the assumption that the current product design would remain going forward. As such, the evaluation team did not recommend other more holistic changes that could also affect the NTGR such as making the product a market transformation program or switching to a common practice baseline.

APPENDIX A: EVALUATION PLANNING DOCUMENTS

A.1 Evaluation Plan

To support the process and impact evaluation of the 2016 Xcel Energy efficiency products, members of the EMI Consulting evaluation team are conducting a process and impact evaluation of the Xcel Energy CO Data Center product. This memo provides an updated plan for the 2016 Xcel Energy CO Data Center evaluation based on the original scope of work, staff feedback during the evaluation kick-off meetings, and staff interview findings.[1] This evaluation plan includes the following sections:

- Product overview
- Study objectives
- Approach
- Next steps

Product Overview

Designed to take a holistic approach to encouraging energy efficiency among new and existing data centers of any size and type, the Data Center Efficiency Product assists customers with right fit support services and rebates that address everything from computing to HVAC and power systems. Rebates are offered for: airflow improvements, electrical equipment, high-efficiency cooling equipment, humidification, power systems, and high-efficiency lighting equipment. For existing facilities, Xcel Energy offers study funding of up to 75% as well as prescriptive equipment rebates and custom rebates up to $400 per kilowatt saved for preapproved projects. The product is informed by its extensive engagement in relevant industry organizations. While the complexity and the inherent unique design of each data center requires a custom analysis approach, prescriptive measures are applied where applicable. For new facilities, the product closely aligns with The Energy Design Assistance offering for commercial new construction projects, which offers customers free consulting during site selection and the various design phases as well as financial incentives to offset the cost of incremental upgrades from the baseline[2]. Due to their large energy consumption, increasing energy intensity, as well as relatively predictable load profile, data centers represent an attractive market for efficiency products. However, based on their intended use and vintage, the design, systems and related efficiency opportunities can vary widely.

Study objectives

The evaluation team designed its evaluation plan to reflect the different interventions and product processes for the existing projects and to assess the barriers to participation. The objectives of the Data Center Efficiency evaluation are to:

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.

[1] The original scope of work is included in the evaluation team's contract with Xcel Energy for the 2017-2018 DSM evaluations.
[2] Note: While the program is designed for new construction projects, neither state has had any participants. Therefore, this study will not include any stratification, interviews, or data associated with new construction projects.

- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Use benchmarking results to calibrate research focusing on similar products.

Approach

To further support past and current efforts by Xcel Energy to address some of the key barriers by means of dedicated Account Managers or highly-targeted marketing collateral, the evaluation team's **process evaluation** will include a targeted focus on gathering feedback from key decision makers and market actors. For data centers, these decision makers include both IT and facilities staff. This includes in-depth interviews with 10 product participants in each state. Note that as the evaluation team expects to need to speak to both facility and IT staff, the evaluation team plans to conduct two interviews per participating facility. These interviews will explore product awareness and motivations for participation, focusing on identifying best practices for overcoming barriers to participation (e.g., no central decision-makers, competing priorities, administrative burdens). In addition, the evaluation team will benchmark the Data Center Efficiency product against at least six other products across the country.

The **impact evaluation** will focus on estimating product influence on customers' decisions to participate using self-reported responses from participants and trade partners. During in-depth interviews, the evaluation team will collect feedback on the assistance from Xcel Energy and its impact on the timing, scope, and scale of the project. Similarly, the evaluation team will talk to trade partners about how data center projects vary outside of Xcel Energy service territory. In addition, Xcel Energy will assess any potential market transformation as reported by trade partners (e.g., long term changes in data center practices in the service territories because of product activity since 2009).

Table 1 below summarizes the data collection and research associated with the Data Center Efficiency Evaluation. Unlike other 2017 evaluation plans, the evaluation team is not planning to conduct any additional tasks that has not already been approved within the evaluation team's current scope of work.

Table 1. CO Data Center Research Summary

Research Task	Sample Size[a]	Objectives
Staff Interviews	Up to 8 Xcel Energy staff	Understand product delivery, product history, and staff evaluation needs.
Participant Surveys	Up to 15 data centers or census of data center projects (if fewer than 15 projects).	Identify sources of product awareness; identify motivations to participate in the product and assess the impact of incentives on decision to install new equipment; identify opportunities to improve product delivery; identify opportunities to improve strategies for engaging customers; assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment; develop a net-to-gross ratio documenting the product's influence on customer's decisions
Non-participant Surveys	5 non-participant interviews	Identify barriers to customer participation; identify sources of awareness that drive customer participation
Trade Partner Research	5 interviews with participating trade partners	Assess the impact of the product on the overall availability of an interest in high-efficiency data center equipment; characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product; develop a net-to-gross ratio documenting the product's influence on customer's decisions.
Utility Benchmarking	6 peer utilities	Compare product to peer utility programs.

a. Final sample sizes will be determined following an analysis of program data and relevant peer utilities.

Next Steps

The evaluation team plans to conduct the following next steps:

- Finalize this evaluation plan.
- Develop the NTG approach, including a flow chart that shows how the evaluation team will calculate the NTG ratio.
- Develop customer and trade partner data collection instruments, sampling plans, and analysis plan. These documents will present the evaluation team's methods to conducting the tasks identified in Table 1.
- Finalize peer utility interviewees and develop the benchmarking KPIs.

Following approval of all data collection instruments, the evaluation team will conduct all approved research and provide Xcel Energy with interim findings from each data collection effort. The evaluation team will synthesize findings from each data collection effort and present all findings within a summative report. The evaluation team expects to present the draft report to Xcel Energy on November 1st, 2017.

A.2 Sampling Plan

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency products, the EMI Consulting evaluation team will be conducting a process and impact evaluation of the Xcel Energy Data Center Efficiency Product in Colorado. The evaluation objectives are to:

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Use benchmarking results to calibrate research focusing on similar products.

To conduct the evaluation, the evaluation team will be interviewing participating customers, non-participating customers, and relevant trade partners. This memorandum presents our sampling approach to conducting the data collection. It first presents the participating customer sampling plan, followed by the non-participating customer sampling plan, and then the trade partner sampling plan.

Participating Customer Characteristics and Sample Design

The evaluation team defined a participating customer as any customer with a closed project in 2015, 2016, or the first quarter of 2017 (final decision on which date to use is pending). Using an extract from the Xcel Energy product database, the evaluation team identified 21 customers who participated during this timeframe, out of 25 participating customers in the entire population. As shown in Table 1, all 20 of these customers had contact information that could be used to conduct interviews, although 1 of these of these 20 customers had a "do not contact" flag. To ensure that customers are not contacted twice during the evaluation period, the evaluation team will also identify any customers who are present in multiple datasets across the entire portfolio evaluation, and will prioritize their inclusion in the sample with the fewest available records. Given its small number of participants, samples within the Data Center Efficiency product evaluation are likely to be prioritized first.

Table 2. Population Totals and Target Number of Completes, Heating Efficiency Participant Survey

Total Participating Customers in Population File	Total Participating Customers with Project Close Dates in 2015, 2016, or Q1 2017	Total Participating Customers with Contact Information	Total Participating Customers without "Do Not Contact" Flag	Target Number of Completes
25	21	20	19	15

As there are relatively few Data Center Efficiency Product participants during the timeframe, and because most data center projects are highly customized, the evaluation team is striving to conduct in-depth phone interviews with up to 15 participants, rather than attempt to collect data through online surveys. This approach will maximize the depth and richness of the data collected from the relatively few participants with whom the evaluation team is able to speak

The evaluation team does not plan to stratify the sample, as the team will likely need to exhaust the entire sampling frame to collect data from the targeted 15 participants. Even without stratification, achieving 15 responses from a pool of 19 customers represents an ambitious target – a 79% response rate. As the evaluation team's data collection efforts progress, this target may need to be adjusted depending upon the responsiveness the participant population to the evaluation team's recruitment efforts. Participating customers with projects that closed in 2015 or 2016 will be prioritized, followed by those with projects that closed in the first quarter of 2017. Once this sample frame has been exhausted the evaluation team will coordinate with the Xcel Energy team to determine whether it would be worthwhile to contact customers with projects that closed before 2015.

Non-Participant Characteristics and Survey Sample Design

The evaluation team defined Non-Participants for these interviews as any company that has expressed interest in participating in a data center project (and is, therefore, in the Xcel Energy system), but who has not received a study or measure rebate. Using an extract from the Xcel Energy product database, the evaluation team identified 16 customer who met this criteria, all of whom had contact information available, and none of whom had a "do not contact" flag. To ensure that customers are not contacted twice during the evaluation period, the evaluation team will also identify any customers who are present in multiple datasets across the entire portfolio evaluation, and will prioritize their inclusion in the sample with the fewest available records. Given its small number of participants, samples within the Data Center Efficiency product evaluation will be prioritized first.

As there are relatively few Data Center Efficiency Product near-participants, the evaluation team is striving to conduct in-depth phone interviews with 5 near-participants, rather than attempt to collect data through online surveys. This approach will maximize the depth and richness of the data collected from the relatively few near-participants with whom the evaluation team is able to speak. More recent near-participants will be prioritized. If the evaluation team is unable to reach 5 near-participants for an interview, the remaining interviewees will be recruited from a list of non-participating colocation data centers identified using the Data Center Map website[3].

Trade partner Sampling Approach

[3] http://www.datacentermap.com/usa/colorado/

As part of the process evaluation, the evaluation team plans to conduct interviews with 5 trade partners. The trade partner interview results will be used for the process evaluation and to provide qualitative information on market effects. The results will not be used for the calculation of net-to-gross ratios. During participant interviews, the evaluation team will attempt to identify and interview the trade partners who supported those participants' projects.

Risks to Sample Plan

With any purposive sample, interview or survey results are subject to biases, some of which may be proactively addressed. For those that cannot be addressed, EMI Consulting will exercise caution in correctly interpreting the results with these potential sources of bias in mind.

Respondents that choose to participate in the interviews or surveys may be systematically different than those that do not participate. We may miss gathering information due to these "unknown" differences in experiences between participants in the study and those who decline. If there is a high response rate, the likelihood of non-response bias is smaller. To reduce non-response bias, the evaluation team will provide $25 incentives to participant, non-participant, and trade partner respondents. The evaluation team will also use available data to compare non-respondents and respondents. Any meaningful differences between these groups will be considered in interpreting the final results.

A.3 Benchmark Scope and Peer Utility List

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency products, the EMI Consulting evaluation team will benchmark the Xcel Energy products against peer utilities. The objective of the benchmarking is to identify opportunities to improve the Xcel Energy products based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the product in the context of the performance of other utilities. To conduct the benchmarking analysis, the evaluation team will conduct secondary research on the peer utilities identified and perform in-depth interviews with product managers at the peer utilities. The intent of this memo is to identify the primary benchmarking data points and the list of recommended peer utilities that the evaluation team will contact for the Data Center Efficiency product.

Benchmarking Data

To understand how Xcel Energy compares with its peers, the evaluation team will collect data on the following key indicators of program performance and supporting context that product staff can use to better understand key indicators results.

- **Key Indicators**
  - **Program energy savings goals –** The evaluation team will determine peer program energy savings goals (e.g. MWh and Mcf) and the program's savings as a percentage of the total energy efficiency portfolio goal. This data can inform the size of the program and its relative importance to the peer utilities' portfolio.
  - **Program budget cost of acquisition –** This metric will include the program budget divided by the total gross energy savings for each peer program (e.g. $/MWh, $/Mcf). Cost of acquisition is a common industry metric that provides insight into the cost-effectiveness of efforts implemented by peers.
- **Supporting Context**

- **Net-to-gross (NTG) savings approach –** We will describe the NTG approach of peer utility programs, including the NTG ratio applied (if any), and any relevant details about how this ratio is calculated. This will facilitate a more nuanced interpretation of the savings results in our research.
- **Program description –** We will provide a summary of peer programs identified, including their objectives, relevant features of their implementation strategy, the measure types and incentives offered, and characteristics of their target customers. These findings will provide a useful point of comparison for identifying the ways in which Xcel Energy's Data Center Efficiency Product is similar to other data center programs and where it differs from these programs. We will also use these findings to identify potential alternative approaches to Xcel Energy's product.
- **Program processes –** We will examine peer programs' custom measure process including how they set baselines and what documentation is needed. This will help the evaluation team more detailed information in which to make recommendations to Xcel Energy on how the Data Center Efficiency Product could be modified to increase engagement and participation.
- **Customer engagement practices –** We will identify peer programs' approaches to customer engagement, including their methods for identifying target customers, increasing customer awareness of the program, building customer interest in the program, making initial contact with customers, converting interested customers to participants, and supporting customers throughout their participation in the program. Several of the staff members associated with Xcel Energy's Data Center Efficiency Product discussed the challenge of identifying target customers and converting them into program participants. We will use these findings to identify potential alternative approaches to Xcel Energy's product.
- **Trade ally engagement practices –** We will identify peer programs' approaches to trade ally engagement, including their methods for identifying potential trade allies, building potential trade allies' interest in becoming trade allies, converting potential trade allies to trade allies, communicating with existing trade allies, and using trade allies to fill their project pipeline and convert leads into participants. To the degree possible we will also explore the business value participating in peer utility programs bring to the trade allies as well as the typical services offered by trade allies. Several of the staff members associated with Xcel Energy's Data Center Efficiency Product discussed the challenge of identifying high quality trade allies and maximizing the value of these relationships. We will use these findings to identify potential alternative approaches to Xcel Energy's product.

To conduct this research, the evaluation team will initiate the research by performing a review of publically available documents available from utility websites, regulatory filings, and data available from the U.S. Energy Information Administration (EIA). The evaluation team will then conduct 30- to 60-minute telephone interviews with product managers from specified peer utilities to collect any missing information and contextual data to support the analysis. We will rely on Xcel Energy staff as well as industry networking channels to identify product manager contact information for each peer product.

Peer Utilities

The evaluation team worked with Xcel Energy product managers to identify the following peer products to include in the benchmarking research. These utilities were included based on the recommendations of product staff followed by a high-level review of program documentation available online. Only utilities with distinct data center programs are considered for benchmarking analyses.

Utility	Program Name	Reason for Inclusion
ComEd	Data Center Efficiency, Energy Efficiency Program	Recommended by Xcel Energy product staff, similar measure offerings
PG&E	DC Plus	Recommended by Xcel Energy product staff, similar measure offerings
NYSERDA	Industrial and Process Efficiency Program for Data Centers	Recommended by Xcel Energy product staff, similar measure offerings
FirstEnergy Pennsylvania utilities (Met-Ed, Penelec, Penn Power, and West Penn Power)	Custom Equipment Incentive Business Program	Recommended by Xcel Energy product staff, similar measure offerings, facilitate comparison between Xcel Energy's standalone Data Center product and a custom equipment program that includes a data center component
Duke Energy	Smart $aver Program	Multi-state program with prescriptive and custom data center offerings; early adopters of data center incentives
Austin Energy	Commercial Energy Efficiency Program	Recommended by Xcel Energy product staff, Provides a small utility for comparison purposes, located in a high tech hub

A.4 Net-to-Gross Approach

To support the process and impact evaluations of the 2016 Xcel Energy energy efficiency products, the EMI Consulting evaluation team will be calculating a net-to-gross ratio (NTGR) for the Data Center Efficiency product. The objective for calculating a NTGR is to document the product's influence on the customer's decision to purchase energy efficient equipment.

To estimate the NTGR[4] for the Data Center Efficiency Product, the evaluation team will use a self-report approach (SRA) based on survey results with participants, nonparticipants, and trade partners. The remainder of this document presents a short description of the product to help frame the context of the NTGR

[4] The NTGR is a factor representing the portion of gross savings that are attributable to the product. The product of the gross savings and the NTGR equal the net savings of the product. The NTGR may be composed of a variety of factors that create differences between gross and net savings, commonly including free riders, participant spillover and nonparticipant spillover (NTGR = (1-Free Ridership) + Participant Spillover + Nonparticipant Spillover)). The factor can be estimated and applied separately to either gross energy or demand savings.

discussion. It then presents an overview of the SRA, followed by the specific NTGR method for the Data Center Efficiency Product.

Product Description

Designed to take a holistic approach to encouraging energy efficiency among new and existing data centers of any size and type, the Data Center Efficiency Product assists customers with right fit support services and rebates that address everything from computing to HVAC and power systems. Rebates are offered for: airflow improvements, electrical equipment, high-efficiency cooling equipment, humidification, power systems, and high-efficiency lighting equipment. For existing facilities, Xcel Energy offers study funding of up to 75%, not to exceed $25,000, as well as prescriptive equipment rebates and custom rebates up to $400 per kilowatt saved for preapproved projects. The product is informed by its extensive engagement in relevant industry organizations. While the complexity and the inherent unique design of each data center requires a custom analysis approach, prescriptive measures are applied where applicable. For new facilities, the product closely aligns with The Energy Design Assistance offering for commercial new construction projects, which offers customers free consulting during site selection and the various design phases as well as financial incentives to offset the cost of incremental upgrades from the baseline[5]. Due to their large energy consumption, increasing energy intensity, as well as relatively predictable load profile, data centers represent an attractive market for efficiency products. However, based on their intended use and vintage, the design, systems and related efficiency opportunities can vary widely.

Self-Report Approach

To develop the SRA for estimating the NTGR for the Data Center Efficiency Product, the evaluation team began with the 2016 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 6.0: Volume 4: Cross-Cutting Measures and Attachments: Attachment A. Attachment A contains the Illinois Statewide Net-to-Gross Methods (the Illinois-NTG) developed by experienced evaluators working in Illinois, in collaboration with the Illinois Stakeholder Advisory Group. These methods focus on the estimation of the NTGR for a wide variety of products using the SRA. The SRA involves contacting one or more key participant decision-makers and asking them a series of closed- and open-ended questions about their motivations for installing the efficiency equipment, about whether they would have installed the same energy efficient equipment in the absence of the product, and questions that attempt to rule out rival explanations for the installation (Weiss 1998; Scriven 1976; Shadish 1991; Wholey et al. 1994; Yin 1994; Mohr 1995; Rogers et al. 2000; Donaldson, Christie, & Mark 2008). The SRA is based primarily on quantitative data and is strengthened by a review of customer and product records. Many evaluators believe that additional qualitative data regarding the economics of the customer's decision and the decision process itself can be very useful in supporting or modifying quantitatively-based results (Britan, 1978; Weiss and Rein, 1972; Patton, 1987; Tashakkori and Teddlie, 1998). The output of the SRA is an index (the NTGR), which is a single number representing product influence (i.e., that portion of the gross savings that are attributable to the product).

The evaluation team chose the Illinois NTG protocols to base its SRA because it was informed by a number of best practices guidelines including Ridge et al. (2007), Winch et al. (2008), and Ridge et al. (2013). These best practice documents contain recommendations for enhancing the validity and reliability of the SRA. Included are such topics as:

- Timing of the Interview

[5] Note: While the product is designed for new construction projects, neither state has had any participants. Therefore, this study will not include any stratification, interviews, or data associated with new construction projects.

- Identifying the Correct Respondent
- Use of Multiple Questions
- Consistency Checks
- Making the Questions Measure-Specific
- Scoring Algorithms
- Weighting the NTGR
- Ruling Out Rival Hypotheses
- Precision of the Estimated NTGR
- Pre-Testing Questionnaire

After the initial NTGR is calculated, the evaluation team will utilize the quantitative and qualitative data from the mixed methods research approach to construct a logical and coherent narrative of product attribution that attempts to identify all possible pathways of Xcel Energy influence. The evaluation team will rely on the following data sources to construct the initial NTGR:

- Participant surveys – focuses on project-level effects
- Trade partner interviews – focuses on overall market effects (project-level effects if relevant)
- Product benchmarking data – provides point of comparison
- Known product changes in upcoming years – factors any known implications for future changes in product design

The final NTGR recommendation will be based on the professional judgement of the evaluation team after considering all available quantitative and qualitative data. When data provides a conflicting or unclear causal narrative, the evaluation team will favor the product, giving Xcel Energy the benefit of the doubt.

Selected Net-to-Gross Ratio Method

To select the NTGR method, the evaluation team reviewed the Illinois Technical Reference Manual to determine the applicability of its protocols to the Xcel Energy Data Center Efficiency Product. We determined the "Core Non-Residential Protocol" to be the most applicable protocol and customized the questions and algorithms used to convert responses into the NTGR.

The NTGR can be calculated at the project level or at the measure level. While calculating it at the project level is more straightforward, it does not provide any detailed information to the evaluation team. If the free ridership (discussed below) is high, calculating the NTGR at the measure level would provide Xcel Energy information about which measures have higher or lower free ridership, allowing for targeted progam design modifications. Therefore, as discussed with Xcel Energy staff, EMI Consulting will calculate NTGR at the measure level for each project. The NTGR will be rolled up to a project level NTGR using weighting based on contribution to total savings.

However, as data center projects are highly customized, we may not receive enough data about a single measure to formulate reasonable or accurate recommendations across measures (for example, lighitng measures have higher free ridership than HVAC so the product should promote more HVAC measures"). In this case, EMI Consulting can provide raw data for Xcel Energy to utilize for their own internal decision making.

We will also conduct sensitivity analyses (e.g., changing weights, changing the probabilities assigned to different response categories, etc.) to assess the stability and possible bias of the estimated NTGR.

This section describes the evaluation team's recommended method for calculating NTGR for the Data Center Efficiency Product and is organized as follows:

- Overarching NTG Ratio
- Free ridership
    - Product components score
    - Product influence score
    - No product score
    - Timing adjustment for deferred free ridership
    - Consistency checks
- Spillover – participant and nonparticipant
- Sensitivity analysis

Overarching Net-to-Gross Ratio

The equation to calculate NTGR is shown in Equation 1 and is composed of three main components; Free Ridership, Participant Spillover and Nonparticipant Spillover. Each of these components are discussed below.

Equation 1. $\mathbf{Net - To - Gross\ Ratio}$

$$\boldsymbol{Net - To - Gross\ Ratio} = ((\mathbf{1} - \boldsymbol{Free\ Ridership}) + \boldsymbol{Participant\ Spillover} + \boldsymbol{Nonparticipant\ Spillover})$$

Free Ridership

A free rider is a product participant who would have implemented the product's measures in the absence of the product. Free riders can be a:

- Total free rider - where the participant would have implemented the exact same measure at the same time,
- Partial free rider - where they would have implemented a similar measure at the same time, or
- Deferred free rider – where the participant would have implemented the same or similar measure at a future date.

The free ridership calculation will be composed of three main components:

- Product components score – based on the participant's perception of the importance of various product factors and non-product factors on the decision to carry out the energy-efficient project;
- Product influence score – based on the participant's perception of the product's influence on the decision to carry out the energy-efficient project; and
- No-product score – based on the participant's intention to carry out the energy-efficient project without product funds.

When scored, each component assesses the likelihood of free ridership on a scale of 0 to 10, with the three scores averaged for a combined total free ridership score. As different and opposing biases potentially affect

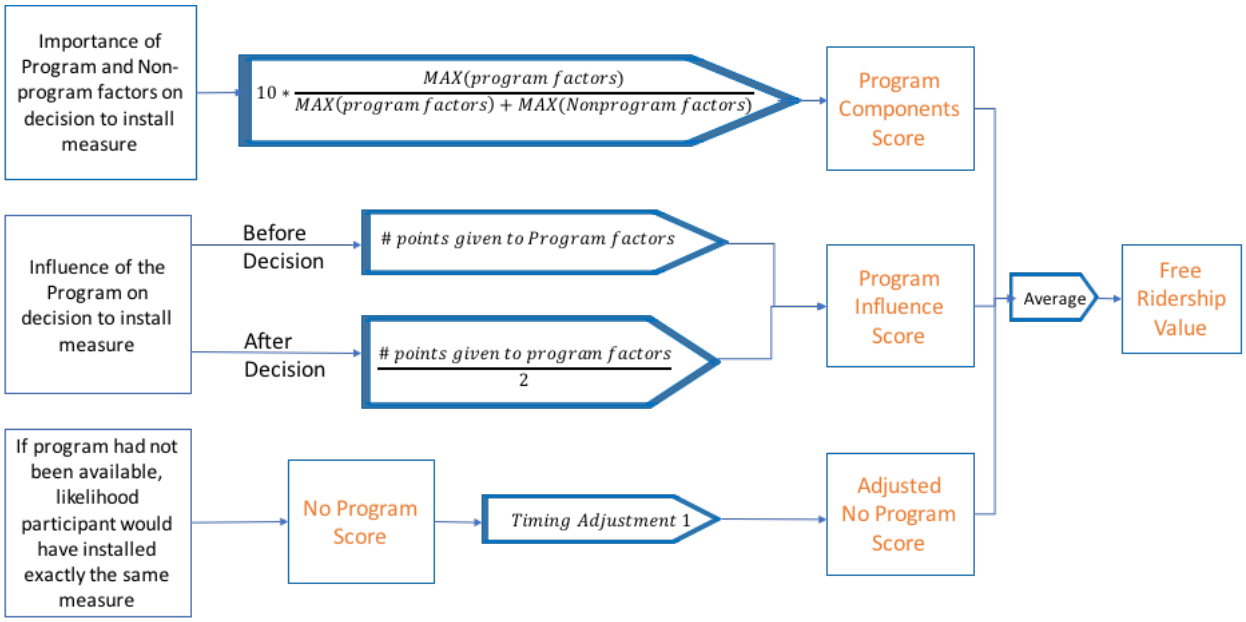
the two main components, the No-product score typically indicates higher free ridership than the Product Influence score. Therefore, combining these decreases these biases.

To determine deferred free ridership, a timing adjustment (discussed in the no product score section) will be included. There are two ways to include this timing adjustment; one directly to the no product score and the second to the average of the three component scores. The choice of which to use will be based on the sensitivity analysis (discussed at the end of this memo). Figure 1 illustrates the two potential scoring algorithms.

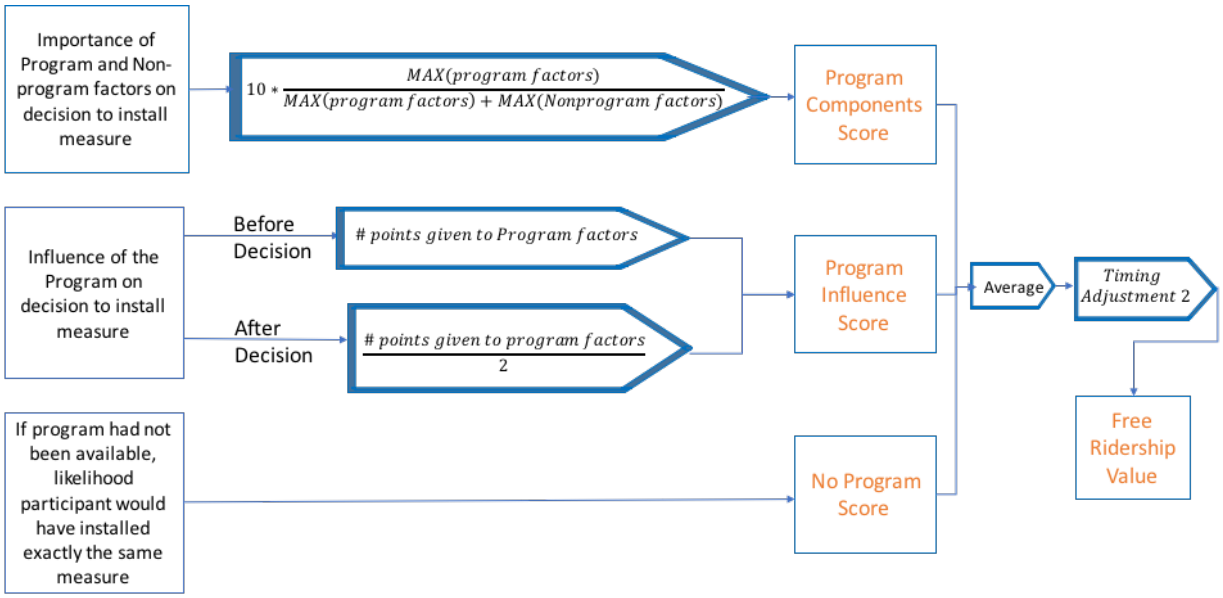
Each of the components illustrated in Figure 1 are discussed in more detail below.

Figure 1: Data Center Efficiency Product Free Ridership,

Free ridership = (product components score + product influence score + (no product score * timing adjustment 1))/3



Free ridership = ((product components score + product influence score + no product score)/3) * timing adjustment 2



Product Components Score

The product components score assesses the influence of various product and non-product factors on the participant's decision to implement the energy efficiency project. For the Data Center Efficiency Product, the following factors will be used as product and non-product factors:

- Product Factors:
  - The availability of the incentive offered by the Data Center Efficiency Product
  - The technical assistance offered by Xcel Energy staff to participants
  - The technical assistance from a third party that conducted the Xcel Energy sponsored study (If applicable).[6]
  - Endorsement or recommendation by a participant's Xcel Energy account manager
  - Recommendation from an equipment vendor or contractor that helped a participant with the choice of the equipment[7]
  - Information from Xcel Energy marketing or informational materials
  - Past experience with the product

- Non-product factors
  - Previous experience with this type of equipment
  - Standard practice in the data center business/industry
  - Corporate policy or guidelines
  - Corporate sustainability or efficiency goals

[6] According to section 3.1.1.3 and conversations with Xcel Energy Product Managers, Trade partners will not be automatically considered a product factor. All participants will be asked about the influence of the trade partner on their decision to implement the efficiency upgrade. We expect their influence to be ranked high. As such, a series of questions is included in the Trade partner guide to judge whether the trade partner influence is due to the product or due to outside factors such as equipment availability or standard practice in the trade partner business.

[7] ibid

- Payback on the investment
- Minimizing operating cost
- Maximizing facility reliability
- Positive marketing or public relations for your company
- Recommendation from a design or consulting engineer or vendor not affiliated with Xcel Energy

Participants will rate each factor on a 0-10 basis, where 0 is not at all influential and 10 is extremely influential. The product components score will be calculated according to Equation 2.

Equation 2. Product Components Score

$$Product\ Components\ Score = 10 * \left(\frac{MAX\ (Product\ Factors)}{MAX\ (Product\ Factors)+MAX(Nonproduct\ Factors)}\right)$$

In consultation with Xcel Energy staff, it was decided Trade Partners do not meet the qualifications[8] to be considered an automatic product factor. Therefore, as indicated above, the influence of Trade Partners' recommendations will be asked in all participant interviews. If the participant considers the trade partner to be highly influential, we will assess the influence of Xcel Energy on trade partners during the Trade Partner interviews. As such, the Trade Partner Guide will include a brief series of questions to determine what influenced their decision (for example, the product incentives or the availability of equipment) to recommend the measures to participants. When data from both assessments are available, they will be combined in estimating the NTGR. For participants that do not find the trade partners to be highly influential, the NTGR will not include an estimate of the influence of Xcel Energy on that trade partner. We will also use trade ally interviews to assess the overall market effects of the product, such as changes in their sales of energy efficient equipment, their business practices and sales strategies, or the equipment availability due to the influenct o the product.

Product Influence Score

The product influence score assesses the importance of the product on the participants' decision to implement energy efficiency measures (i.e. end uses) relative to the impact of non-product influences. Participants will be asked to allocate a total of 10 points to product and non-product factors. The surveyor will read back the highest ranked product factors and identify them thusly and do the same for nonproduct factors. The product influence score will be calculated according to Equation 3.

Equation 3. Product Influence Score

$$If\ partcipant\ learned\ about\ the\ prodict\ BEFORE\ they\ DECIDED\ to\ implement\ the\ measures = \#\ of\ points\ given\ to\ the\ product$$

$$If\ participant\ learned\ about\ the\ product\ AFTER\ they\ DECIDED\ to\ implement\ the\ measures = \frac{\#\ of\ points\ given\ to\ product\ factors}{2}$$

[8] According to section 3.1.1.3.1 of the IL TRM

No Product Score

The no product score assesses the likelihood of the participant installing the exact same energy efficiency end uses at the same time if the product had not existed. Participants will rate each end use on a 0-10 basis, where 0 is not at all likely and 10 is extremely likely.

Equation 4. No Product Score

$$No\ Product\ Score = 0 - 10\ rating$$

Timing Adjustment

A timing adjustment will be used that quantifies deferred free ridership. This section of the interview explores when the participant would have installed the measures in the absence of the product. Participants will be asked the likelihood, on the same 0-10 scale, of them installing the same measures within one year as well as given specific date ranges to choose when they would have installed the measures. The timing adjustments will be calculated one of two ways, according to Equation 5 and represented in Figure 1. We will select the final option for calculating annual incremental energy savings after conducting the sensitivity analysis discussed below.

Equation 5. No Product Score

$$Timing\ Adjustment\ 1: \frac{\#\ months\ expedited - 6}{42}$$

$$Timing\ Adjustment\ 2: \frac{\#\ months\ expedited - 6}{42} * liklihood\ of\ implementing\ within\ one\ year$$

Consistency checks

EMI Consulting will use consistency checks throughout the survey of participants. These consistency checks are not used directly in the NTGR calculations, but are used to clarify responses when they are contractitory. For example, if a participant rates the availability of incentives and the technical assistance received from a trade partner as important (7,8,9, or 10) but then only assigns 3 points to the influence of the product on their decision to implement the project, we will seek to clarify their answer by asking participants to explain their answer or perhaps change their original score. We include consistency checks within and between each of the components of the free ridership scores.

Spillover

The second component of calculating the NTGR expressed in Equation 1 is spillover. Spillover is a reduction in energy consumption caused by the prescence of an energy efficiency product. We will include participant and nonparticipant spillover:

- *Participant spillover* is the reduction caused by a participant installing additional energy efficiency measures after their product participation.
- *Nonparticipant spillover* is the reduction caused by a product nonparticipant installing efficiency measues as a result of the product's influence.

If any participant or nonparticipant spillover is detected, a series of questions will be asked to capture the measure characteristics (such as equipment efficiency, control algorithms, number installed, etc.) needed to calculate energy savings. As data center projects are highly custom, a follow up conversation may be needed for an engineer to collect additional information needed to calculate savings.

Determination of Final Net-to-Gross Ratio

Finally, the evaluation team will utilize all the information collected about the product – through customer interviews, trade partner interviews, product benchmarking, and known product changes – to construct a logical, internally consistent, and coherent narrative of product attribution that attempts to identify all possible pathways of Xcel Energy influence. Based on these results, we then may adjust the NTGR to create a final recommended NTGR that is consistent with this narrative. When we incorporate other, non-participant data, we will rely on the following principles:

1. The method chosen should be balanced. That is, the method should allow for the possibility that other influences can either increase or decrease the initial NTGR calculated from the participant survey responses.

2. The plan for capturing other influences should be based on a well-conceived causal framework. As evaluators, we will need to build a compelling case using a variety of quantitative and / or qualitative data for estimating a customers NTGR. In these more complex situations, in order to maximize the reliability of the NTGR estimate, at least two members of our team will be involved in analyzing the data. Each person will analyze the data separately and then compare and discuss the results.

The final NTGR recommendation is based on the professional judgement of the evaluation team after considering all available quantitative and qualitative data. When data provides a conflicting or unclear causal narrative, our team will favor the product, giving Xcel Energy the benefit of the doubt.

APPENDIX B: DATA COLLECTION DOCUMENTS

B.1 Staff Interview Guide

Introduction

This guide is to be used to interview staff associated with Xcel Energy's DSM programs as part of EMI Consulting's evaluation of Xcel Energy's 2017-2018 DSM programs. The interviews will be semi-structured, with these questions serving as a basic guide for experienced EMI Consulting staff during one-on-one phone interviews. As a guide for semi-structured interviews, these questions will not necessarily be asked verbatim, but will serve as a roadmap during conversation.

Research Questions or Objectives

- Assess the extent to which the program design supports program objectives
- Assess the degree to which program resources are sufficient to conduct program activities with fidelity to the implementation plan
- Identify themes and issues for possible revisions to the evaluation plan

Interview

Section A: Introduction

[If needed:] First we would like to give you some background about who we are and why we want to talk withe you today. EMI Consulting is an independent consulting firm that works with electric and gas utilities to review and improve program operations and delivery.

We are leading a team hired to evaluate Xcel Energy's energy efficiency programs, and we're currently in the process of conducting interviews with program managers and key staff in order to improve our understanding of Xcel Energy's DSM programs. We are interested in asking you some questions about <PROGRAM NAME> so we can benefit from your knowledge and experience to improve our understanding of the program.

Is this a good time to talk with you about the program? I have a set of questions that should take approximately 30 minutes, depending upon your experiences and involvement with the program. All information you provide is anonymous.

A1. [If needed] Before we get started, can you take a moment and explain your role and scope of responsibilities with respect to <PROGRAM NAME>?

A1a. [How long have you held this position?

Section B: Program Goals

B1. Can you briefly take me through the key goals for <PROGRAM NAME>?

B1a. Can you describe any savings goals?

B1b. Any other, non-energy goals?

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

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

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

B2a. What was the rationale for changing them?

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

B3. Do you think the program might have any unanticipated consequences outside of the formal goals? What kinds of consequences?

Section C: Program Activities

C1. What does the program do to achieve these goals?

C1a. What incentives and market signals does the program use to achieve its goals?

C1b. What activities do program and implementer staff engage in to achieve program goals?

C2. Are these program activities modeled on another program or set of programs?

C3. Have any of these incentives changed in the last few years? What was the rationale for chaning them?

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 program's operations or its outcomes?

Section D: Resources

D1. Can you characterize the resources that the program has to work with?

D1a. Financial resources?

D1b. Program and implementer staff?

D1c. Management and program direction?

D1d. IT tools and data tracking tools?

D1e. Other resources?

D2. Have any of these program resources changed in the last few years?

D2a. What was the rationale for changing them?

D2b. In your opinion, how have these changes affected the program's operations or its outcomes?

Section E: Program Tracking and Reporting

E1. What kind of data is collected for <PROGRAM>?

E2. Is there any data that you would like to collect for <PROGRAM> but haven't been able to?

E3. Are there any procedures for getting access to program data that we should be aware of?

Section F: Issues and Concerns

F1. In your opinion, what are the strengths of <PROGRAM> as it is currently being run?

F1a. What would you say is working well in terms of program design or implementation?

F2. What are the most significant challenges for this program at this point?

F3. What do you believe are the biggest barriers to getting customers to participate in this program?

F4. Are there any specific opportunities for improvement in the design or implementation of the program? Please describe.

F5. What would you like to see changed in how the program is designed or run, if anything?

F5a. Do you think there are any roadblocks preventing these changes from happening?

Section G: Utility Benchmarking

G1. As part of this evaluation, we are going to be doing benchmarking analyses against other utilities. Are there utilities that you think would be good comparisons for a benchmarking analysis?

G1a. Utilities that are very similar to Xcel Energy?

G2a. Utilities that would make for an interesting comparison to Xcel Energy?

G3a. Utilities that you would consider to be at the cutting-edge of what Xcel Energy is trying to achieve?

G4a. Utilities that are underperforming compared to Xcel Energy?

G2. What are some of the key indicators that you think would be important to look at when comparing Xcel Energy to other utilities?

Section H: Closing

H1. Based on the kickoff meeting, we are planning to prioritize <RESEARCH PRIORITIES>, does align with your understanding? Do you have anything you would like to add to these priorities, remove from this set of priorities, or change about these priorities?

H2. Do you have particular questions that you would like to see answered by the evaluation? Why are these questions important?

H3. Do you have any other comments, concerns or suggestions about the program that we didn't discuss that you would like to make sure I know about?

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 Participant Survey Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency products, the EMI Consulting evaluation team will conduct telephone surveys with up to 15 participants (please see the sampling plan for additional details). This guide presents the questions to be covered in the in-depth interviews for the Xcel Energy Data Center Efficiency Product.

Due to their large energy consumption, high energy intensity, and relatively predictable load profile, data centers represent an attractive market for efficiency products. The design, systems, and related efficiency opportunities can vary widely between data centers depending upon their intended use and vintage. This guide is designed to facilitate interviews with key decision makers within companies who have participated in Xcel Energy's Data Center Efficiency Product. The interviews will assess the impact of incentives on customers' decision to install equipment, identify barriers to participation, assess customer satisfaction, identify opportunities to improve the product, and document the product's influence on customers' decisions.

The remainder of the introduction provides the research questions which this guide is designed to address and fielding instructions for the interviewers. The following list of objectives are also presented in Table 7, alongside the survey questions intended to address them.

Research Questions or Objectives

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.

- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Use benchmarking results to calibrate research focusing on similar products.

Table 3: Mapping of interview questions to indicators and contextual themes

Evaluation Objective	Survey Question Number(s)
Identify sources of awareness that drive customer participation and strategies to improve customer engagement.	B1, B2, C1-C4, D1-D3, F7
Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.	D1-D36
Assess barriers to customer participation.	C1-C6, E1
Assess customer satisfaction.	F1-F9
Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.	B2, C1-C6, E1, F1-F8, G2
Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.	D1-D36
Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.	C1-C4 (Assessed more directly in the Trade Partner Interview Guide)
Develop a net-to-gross ratio documenting the product's influence on customer's decisions.	D1-D36
Use benchmarking results to calibrate research focusing on similar products.	N/A

Fielding Instructions

The following fielding guidelines should be used for participant recruiting and interviews:

- Attempt to reach each participant 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.

- Commercial customer calling hours are 9 AM to 5 PM UTC.
- Record interviews

Recruiting Dialog/Message Script

WHEN LEAVING A VOICE MESSAGE: Hi, this is **NAME** from EMI Consulting, calling on behalf of Xcel Energy. We're contacting customers who participated in the Xcel Energy Data Center Efficiency Product to better understand how Xcel Energy can improve the product. I'd appreciate the opportunity to schedule a quick half-hour interview with you to discuss your experience. Please give me a call back to schedule a time to talk. My name is **NAME** and my phone number is **PHONE NUMBER**. If I don't hear back in a few days, I will give you a try back. Thank you! Goodbye.

Interview Guide

Section A: Screener/Background Information

Thank you for agreeing to talk with me today. EMI Consulting is an independent third-party contractor hired by Xcel Energy to evaluate their Data Center Efficiency Product. I expect this conversation to take about 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. To protect your anonymity in this study, information that you provide will only be used for an evaluation of the Data Center Efficiency Product, and we will not share your information outside of this effort. We will only report information in aggregate, so your specific responses will not be tied to your name nor will they be reported on their own.

Do you have any questions before I start? First, I want to take 5 minutes to better understand your role and set the stage for the rest of the questions.

A1. I see COMPANY NAME participated in the Xcel Energy Data Center Efficiency Product, is this correct?

IF NO: DESCRIBE PRODUCT, PROBE FOR WHETHER ANOTHER PERSON MAY BE MORE FAMILIAR WITH THE PRODUCT. IF ALL LEADS HAVE BEEN EXHAUSTED AND RESPONDENT IS FAMILIAR WITH THE PRODUCT BUT DID NOT PARTICIPATE, USE NON-PARTICIPANT GUIDE.

IF YES:

A1a. Have you been involved in the Xcel Energy Data Center Efficiency Product?

IF YES:

A1b. Are you the person at your firm who is most familiar with the Xcel Energy Data Center Efficiency Product?

IF NO: ASK TO SPEAK TO PERSON MOST FAMILIAR AND END CALL
IF YES: MARK AT PARTICIPANT AND CONTINUE

A2. Can you briefly describe your company's work?

PROBE FOR WHETHER COLOCATION FACILITY

A3. What is your title or role at your company?

A4. Does your organization have multiple data centers?

A4a. **IF YES:** How many and where are they located?

A4b. How many of these locations have participated in an Xcel Energy efficiency product?

PROBE: All, most, some, a few, none

A4c. How many of these locations have participated in a rebate product offered by another utility?

PROBE: All, most, some, a few, none

A5d. [IF A4b = all, most, some, a few AND A4c = some, a few, or none] why do you participate in the Xcel Energy data center efficiency product?

Section B: Awareness

B1. How did you first hear about the Xcel Energy Data Center Efficiency Product?

B1a. Is this your preferred method for hearing about opportunities?

B1b. What are other ways that you would like to hear about Xcel Energy efficiency product opportunities?

B2. When you first heard about Xcel Energy's Data Center Efficiency product, was there any information that was particularly useful to you?

PROBE: incentive levels, materials, application process

B2a. What additional information about the product would have been useful to help you determine whether to participate in the Data Center Efficiency Product?

Section C: Application and Product Implementation

C1. Were you the primary contact between your facility and the Xcel Energy product staff, or between your facility and your Xcel Energy Account Manager?

PROBE if needed: do you have an account manager?

C1a. **[If C1=Yes]** How did you communicate with the Xcel Energy representative and/or your account manager?

Probe: email, phone, in-person, mail, web chat

C1b. [IF more than 1 method mentioned in C1a] Which of these methods was most effective for communicating with product staff and/or account manager?

C1c. What is your preferred method for reaching Xcel Energy staff and/or your account manager?

C1d. [**IF C1=NO]** Who was the primary contact for the product staff or your account manager?

PROBE: Trade Partner/Contractor, someone else at their firm

C2. [IF NO CONTRACTOR ASSOCIATED WITH PROJECT(S) IN DATA]
Did you work with contractors on this/any Data Center Efficiency project?

C2a. [IF C2=YES] who?

C2b. Can you please provide their contact information?

C3. [IF CONTRACTOR ASSOCIATED WITH PROJECT(S) IN DATA]

Our records indicate that you worked with [PROJECT FIRM/CONTRACTORS]. Is that accurate?

C3a. Are there other contractors that we didn't mention who worked on your data center project?

C2b. What did the contractors do?

PROBE: conduct a study? Installed equipment? Made recommendations of what you could do? Estimate energy savings?

C2c. [IF contractors DID NOT do a study] Did (any of) the contractors handle the application process for you, including the submission and review of technical information to Xcel Energy?

C4. Do you prefer to work directly with Xcel Energy or through your contractor?

C5. How did you decide to work with the contractor?

PROBE: Who contacted who? Were you referred to contractor by anyone?

C6. How difficult or easy would you say it was to complete the following tasks associated with the Xcel Energy Data Center Efficiency Product on a scale from 1 to 5 where 1 is extremely difficult and 5 is extremely easy.

1. Complete product applications
2. Submit product applications
3. Complete rebate forms
4. Submit rebate forms
5. Determine organization's product eligibility
6. Implement recommendations
7. Meet product deadlines

8. Get in touch with an Xcel Energy representative
9. Determine equipment / models that are eligible
10. Find a contractor to (*install measures*) (*conduct studies)*

C6a. Ask for any C6 responses LESS THAN 4: Please provide a sentence or two describing why it was not easy.

C7. About how long did it take to receive your rebate after completing and submitting the necessary paperwork?

C8. From the time work started to project completion, did the project take less or more time than you expected to complete?

Section D: Free-ridership and spillover

The purpose of this section is to learn the role of the product in your company's decision to install energy efficient equipment versus other factors that you had to consider.

D1. In deciding to do a project of this type, there are usually a number of reasons why it may be undertaken. In your own words, can you tell me why you decided to implement the Project?

(LOOP THROUGH D2THROUGH D24 UP TO 3 TIMES, ONCE FOR EACH MEASURE)

MEASURE = Insert measure #1, measure #2, measure #3 each loop through

D2. When did you first learn about the Data Center Efficiency Product? Was it BEFORE or AFTER you first began to THINK about implementing the MEASURE?

1 before
2 after
3 other – **Answer:**

D3. Where did the idea for the MEASURE come from? [IF NEEDED: Did your company develop the idea, was it suggested by a vendor or consultant or your key account manager, was it the result of a study, was it part of a larger expansion or remodeling effort?]

D4. Did you learn about the availability of incentives through the Data Center Efficiency Product BEFORE or AFTER you DECIDED to implement the MEASURE?

1 before
2 after
3 other – **Answer:**

D5. Did you receive a study from the Xcel Energy Data Center Efficiency Product?

1 yes
2 no

[If D5 = yes ask D5a-D5c. Else D6]

D5a. What role did the firm that conducted the study play in the decision to implement the MEASURE?

D5b. Did the Xcel Energy sponsored study influence the energy efficiency of the MEASURE you ultimately selected?

1 yes
2 no

[If yes] how?

D5c. If the Xcel Energy Data Center Efficiency Product hadn't been available, what is the likelihood that you would have performed the study on your own, using a 0-to-10 scale where 0 is "not at all likely" and 10 is "extremely likely"?

D6. Were there any other firms or individuals involved in the decision to implement the MEASURE? If so, who were they?

D7. Next, I'm going to ask you to rate the importance of the Data Center Efficiency Product as well as other factors that might have influenced your decision to implement the MEASURE. Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means "not at all important" and 10 means "extremely important". Now using this scale please rate the importance of each of the following factors in your decision to implement the measure at the time that you did. (If needed: How important in your DECISION to implement the MEASURE was the…)

Product Factors

D7a. The availability of the incentive offered by Xcel Energy **0 to 10 rating:**

D7b. The technical assistance offered by Xcel Energy staff **0 to 10 rating:**

D7c. [If received a study] Technical assistance from the firm that conducted the Xcel Energy sponsored study **0 to 10 rating:**

D7d. Endorsement or recommendation by your Xcel Energy account manager **0 to 10 rating:**

D7e. [If vendor is a trade partner] Recommendation from a vendor or contractor that helped you with the project (see answer to C2 for vendor or contractor used) **0 to 10 rating:**

D7f. Information from Xcel Energy marketing or informational materials **0 to 10 rating:**

D7g. Past experience with the product **0 to 10 rating:**

Non-product factors

D7h. Previous experience with this type of equipment **0 to 10 rating:**

D7i. Standard practice in your business/industry **0 to 10 rating:**

D7j. Corporate policy or guidelines **0 to 10 rating:**

D7k. Payback on the investment **0 to 10 rating:**

D7l. Minimizing operating cost **0 to 10 rating:**

D7m. Positive marketing or public relations for your company **0 to 10 rating:**

D7n. [If vendor is not a trade partner] Recommendation from a vendor or contractor that helped you with the project (see answer to C2 for vendor or contractor used) **0 to 10 rating**

D7o. Were there any other factors we haven't discussed that were influential in your decision to implement the MEASURE?

Thinking about this differently, I would like you to compare the importance of Xcel Energy's Data Center Efficiency Product with the importance of other factors in implementing the MEASURE.

You just told me that the following factors were important:
[Read only the items where they gave a rating of 8 or higher in D7a-D7o]

D8. If you were given a TOTAL of 10 points to divide between the importance of the product and the importance of non-product factors, in your decision to implement the <DATA CENTER MEASURE> how many points would you give to the importance of the Xcel Energy Data Center Efficiency Product?

Answer:

D9. And how many points would you give to other non-product factors? [NOTE: the total of D8 and D9 should total 10 points.]

Answer:

****

Consistency check on product importance score
[Ask If (D8> 7 AND no product factors in D7a-D7g >3) else skip to D11]

D10. You just gave <D8 RESPONSE> points to the importance of the product, I would interpret that to mean that the product was quite important to your decision to install this equipment. Earlier, when I asked about the importance of individual elements of the product I recorded some answers that would imply that they were not that important to you. Just to make sure I understand, would you explain why the product was very important in your decision to install the MEASURE? [IF NEEDED, ask about specific product elements rated highly in D7]

[Ask If (D8<3 AND any product factors in D7a-D7g >7) else skip to D12]

D11. You just gave <D8 RESPONSE> points to the importance of the product. I would interpret that to mean that the product was not very important to your decision to install this equipment. Earlier,

when I asked about the importance of individual elements of the product I recorded some answers that would imply that they were very important to you. Just to make sure I understand, would you explain why the product was not very important in your decision to install this equipment?

Now I would like you to think about the action you would have taken with regard to installing this measure if the Xcel Energy Data Center Efficiency Product had not been available.

D12. 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 exactly the same MEASURE if the Xcel Energy Data Center Efficiency Product had not been available.

[ASK IF D12>0, ELSE SKIP TO D14]

D13. Without the product, when do you think you would have installed this equipment? [READ LIST]

1 At the same time
2 Earlier
3 Later
4 (Never)

[ASK IF D13=3 (later)]

D13a. How much later would you have implemented the <DATA CENTER MEASURE>? Would you say…

1 Within 6 months
2 more than 6 months and up to 1 year later
3 more than 1 year and up to 2 years later
4 more than 2 years and up to 3 years later
5 more than 3 years and up to 4 years later
6 more than 4 or more years later

****

CONSISTENCY CHECKS

[ASK D14a-c IF D7a=8,9,10 AND D12=7,8,9,10]

D14. When you answered ...<D7a RESPONSE> ... for the question about the influence of the incentive, I would interpret that to mean that the incentive was quite important to your decision to implement the <DATA CENTER MEASURE>. Then, when you answered <D12 RESPONSE> for how likely you would be to install the same equipment without the incentive, it sounds like the incentive was not very important in your installation decision.

I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain the role the incentive played in your decision to install this efficient equipment?

Answer:

D14a. Would you like for me to change your score on the importance of the incentive that you gave a rating of <D7a RESPONSE> or change your rating on the likelihood you would implement the <DATA CENTER MEASURE> without the incentive which you gave a rating of <D12 RESPONSE> and/or we can change both if you wish?

1 (Change importance of incentive rating)
2 (Change likelihood to install the same equipment rating)
3 (Change both)
4 (No, don't change)

[ASK IF D14a=1,3]

D14b. How important was… availability of the PRODUCT incentive? (IF NEEDED: in your DECISION to implement the <DATA CENTER MEASURE>)

0 to 10 rating:

[ASK IF D14a=2,3]

D14c. If the utility product had not been available, what is the likelihood that you would have implemented the <DATA CENTER MEASURE>?

0 to 10 rating:

****

Corporate Policy Questions

[ASK IF D7j > 6 ELSE D20]

D15. Does your organization have a corporate environmental policy to reduce environmental emissions or energy use? Some examples would be to "buy green" or to reduce the spend on utility costs by a certain amount ($ or %). i

[ASK D16-D18 IF D15=YES ELSE D20]

D16. What specific corporate policy, if any, influenced your decision to implement the <DATA CENTER MEASURE> through Xcel Energy's Data Center Efficiency Product?

D17. Did that policy cause you to adopt energy efficient measures at this facility before participating in Xcel Energy's Data Center Efficiency Product?

D17a. Did you receive an incentive for installing that previous measure?

D18. Does <COMPANY> ever deviate from the corporate policy when installing equipment in their data centers?

[ASK IF D17=YES ELSE D23]

D19. If I understand you correctly, you said that <COMPANY>'s corporate policy has caused you to install energy efficient measures previously at this facility. I want to make sure I fully understand how this corporate policy influenced your decision versus the Xcel Energy Data Center Efficiency Product. Can you please clarify that?

Standard Practice Questions

[ASK IF D7i >7 ELSE D]

D20. In an earlier question, you rated the importance of standard practice in your business or industry very highly in your decision making. Could you please rate the importance of the Data Center Efficiency Product, relative to this standard practice, in influencing your decision to implement the <DATA CENTER MEASURE>. Would you say the product was much more important, somewhat more important, equally important, somewhat less important, or much less important than the standard practice or policy?

1 (Much more important)
2 (Somewhat more important)
3 (Equally important)
4 (Somewhat less important)
5 (Much less important)

D21. Approximately, how long has use of <DATA CENTER MEAURE> been standard practice in your business or industry?

D22. Does <COMPANY> ever deviate from the standard practice for energy efficient measures in their data centers?

D23. How did this standard practice influence your decision to implement the <DATA CENTER MEASURE> through Xcel Energy's Data Center Efficiency Product?

D24. Could you please rate the importance of Xcel Energy's Data Center Efficiency Product, versus this standard business or industry practice in influencing your decision to implement the <DATA CENTER MEASURE>? Would you say Xcel Energy's Data Center Efficiency Product was…

1 Much more important
2 Somewhat more important
3 Equally important
4 Somewhat less important
5 Much less important

END FREE RIDERSHIP MEASURE LOOP. GO BACK to D2 if needed.

SPILLOVER QUESTIONS

Thank you for discussing the new <DATA CENTER MEASURE>s that you installed through the Data Center Efficiency Product. Next, I would like to discuss any energy efficient equipment you might have installed OUTSIDE of the product.

D25. Since receiving a rebate for the project(s) we just discussed, did you implement any ADDITIONAL energy efficiency improvements at this facility or at your other facilities within Xcel Energy's service territory that you did NOT receive incentives for?

1 yes
2 no

[ASK IF D25. = yes ELSE E1]

D25a. Do you plan to apply for incentives for these energy efficiency measure(s) through Xcel Energy's Data Center Efficiency product in the future?

1 yes
2 no

D25b. Approximately when do you plan to apply for incentives through the product?

[Ask IF D25 = yes, else E1]

D26. What measures did you implement without an incentive?

[Repeat D27-D30 for each end use]

D27. I have a few questions about the [first, second, third] measure that you installed. (If needed, read back measure.]

a. Can you briefly explain why you decided to install this energy efficiency measure(s) on your own, rather than going through a utility or government incentive product?
b. Why did you not install this measure through the Xcel Energy Product?
c. How many of this measure did you install?
d. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
e. Please describe the EFFICIENCY of this measure.
ee. When did you install this measure?

D28. Was this measure recommended by a product-related study, report, third party consultant or vendor or your key account manager?

D29. How important was your experience in Xcel Energy's Data Center Efficiency Product in your decision to implement this <MEASUREX>? Please use a scale of 0 to 10, where 0 is not at all important and 10 is extremely important.

D29a. Can you explain how your experience with the Xcel Energy's Data Center Efficiency Product influenced your decision to install this additional high-efficiency measure?

D30. If you had not participated in the Xcel Energy's Data Center Efficiency Product, how likely is it that your organization would still have implemented <MEASURE>? Please use a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure.

[end loop for each measure]

[If D25=yes] Thank you for sharing this information. As we assess the information we've collected from these surveys we may want to contact you further to learn more about these measures you've installed at your facility.

Section E: Barriers to Participation

E1. Have you considered installing additional efficiency measures beyond what was already installed through the Xcel Energy Data Center Efficiency Product?

E1a. **IF YES:** What else did you consider having done?

E1b. Which of the following best describes your reason for not pursuing these additional upgrades / services?

PROBE:

1. Lack of knowledge about Xcel Energy energy efficiency products
2. Lack of knowledge regarding equipment cost
3. Lack of knowledge regarding eligibility for Xcel Energy energy efficiency products
4. Lack of knowledge regarding rebate amounts
5. Amount of time it takes to install equipment
6. Amount of time it takes to get audit
7. Upgrades are not relevant to my facility
8. Getting upgrades approved
9. Finding a trustworthy contractor/trade partner to perform the measure installation or engineering study
10. Amount of paperwork
11. Product requirements
12. Other ____

Section F: Satisfaction (Products and Components)

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:

F1. Your **overall satisfaction** with the Data Center Efficiency Product?

F1a. IF F1<5: What could Xcel Energy do to increase your satisfaction with the Data Center Efficiency Product?

F2. The **Xcel Energy Data Center Efficiency Product staff**?

F3. The **equipment you received a rebate for as part of the** Data Center Efficiency Product?

F4. The size of the Data Center Efficiency Product **rebate**?

F5. **The amount of time it took to receive your rebate**?

F6. The amount of time it took to go through the whole process?

F7. Is there anything the Xcel Energy Data Center Efficiency Product is doing especially well and should keep doing?

F8. How likely are you to recommend the Xcel Energy Data Center Efficiency Product to a business colleague on a 1 to 10 scale, where 1 means you would be "extremely unlikely" to recommend the Xcel Energy Data Center Efficiency Product and 10 means you would be "extremely likely" to recommend the Xcel Energy Data Center Efficiency Product?

F9. How likely are you to recommend Xcel Energy to a business colleague on a 1 to 10 scale, where 1 means you would be "extremely unlikely" to recommend Xcel Energy and 10 means you would be "extremely likely" to recommend Xcel Energy?

Section G: Closing

G1. Do you have any recommendations for improving the Data Center Efficiency Product?

G2. We're also interested in keeping up with any trends or emerging market factors relevant to data centers. Do you see any big developments happening now or on the horizon?

G3. Is there anything we didn't cover that you'd like to mention or discuss about your experiences as a participant in the Xcel Energy Data Center Efficiency Product?

G4. We are going to send you a $50 Tango gift card as a small thank you for your time. Can I verify your email address so we can get it to the right place?

Thank you. Those are all the questions I have today.

THANK AND TERMINATE

B.3 Non-Participant Interview Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy efficiency products, members of the EMI Consulting evaluation team are conducting in-depth telephone interviews with 5 Near and/or Non Participants (see sampling plan for additional details). This guide presents the questions to be covered in the in-depth interviews for the Xcel Energy Data Center Efficiency Product.

Due to their large energy consumption, high energy intensity, and relatively predictable load profile, data centers represent an attractive market for efficiency products. The design, systems, and related efficiency opportunities can vary widely between data centers depending upon their intended use and vintage. This guide is designed to facilitate interviews with key decision makers within companies who are aware of Xcel Energy's Data Center Product but are not participants or with those who are not participating and perhaps not aware of Xcel Energy's Data Center Efficiency Product. The interviews will identify sources of awareness that drive customer participation, uncover motivations for participation, identify barriers to participation, and explore opportunities to increase participation.

The evaluation team defines Near-Participants for these interviews as any company that has expressed interest in participating in a data center project (and is, therefore, in the Xcel Energy system), but who has not received a study or measure rebate.

EMI Consulting is concurrently working on developing these guides as well as receiving data from Xcel Energy. We anticipate there may not be enough near-participants for these interviews, thus we've included the possibility in this guide to interview non-participants. This approach may change as additional conversations occur between EMI Consulting and Xcel Energy.

The remainder of the introduction provides the research questions which this guide is designed to address and fielding instructions for the interviewees. The following list of objectives are also presented in Table 7, alongside the survey questions intended to address them.

Objectives

- Identify sources of awareness that drive customer participation and strategies to improve customer engagement.
- Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.
- Assess barriers to customer participation.
- Assess customer satisfaction.
- Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.
- Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.
- Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.

- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.
- Use benchmarking results to calibrate research focusing on similar products.

Table 4: Mapping of interview questions to indicators and contextual themes

Evaluation Objective	Survey Question Number(s)
Identify sources of awareness that drive customer participation and strategies to improve customer engagement.	A10, C1, C2, C3, D1, E1
Identify customer motivations to participate in the product and assess the impact of incentives on customers' decision to install new equipment.	E1
Assess barriers to customer participation.	C3C, C4B, D1, D2
Assess customer satisfaction.	A12
Identify opportunities to improve product implementation (e.g., custom measure review process) and delivery.	D1, E4
Assess the impact of the product on the overall availability of and interest in high-efficiency data center equipment in the market.	N/A
Characterize trade partners' business models, the challenges they experience, and identify opportunities to increase their engagement with the product.	N/A
Develop a net-to-gross ratio documenting the product's influence on customer's decisions.	F1-F3
Use benchmarking results to calibrate research focusing on similar products.	N/A

Fielding Instructions

The following fielding guidelines should be used for participant recruiting and interviews:

- Attempt to reach each participant 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.
- Commercial customer calling hours are 9 AM to 5 PM UTC.

- Record interviews

Recruiting Dialog/Message Script

WHEN LEAVING A VOICE MESSAGE: Hi, this is **NAME** from EMI Consulting, calling on behalf of Xcel Energy. We're contacting electric and gas customers with data centers to better understand how Xcel Energy can improve their Data Center Efficiency Product. I'd appreciate the opportunity to schedule a quick half-hour interview with you to discuss your experience. Please give me a call back to schedule a time to talk. My name is **NAME** and my phone number is **PHONE NUMBER**. If I don't hear back in a few days, I will give you a try back. Thank you! Goodbye.

Interview Guide

Section A: Screener/Background Information

Thank you for agreeing to talk with me today. EMI Consulting is an independent third-party contractor hired by Xcel Energy to evaluate their Data Center Efficiency Product. 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 5 minutes to better understand your role and set the stage for the rest of the questions.

SC1. Just to verify that we've reached the right site, have I reached [BUSINESS NAME] at [ADDRESS]?

IF NO: REQUEST AND RECORD CORRECT INFORMATION

[IF NON-PARTICIPANT WITH NO AVAILABLE DATA]
SC2. Is there a data center on-site there?

IF NO: PROBE FOR DATA CENTER AT ALTERNATE LOCATION. REQUEST AND RECORD CONTACT INFORMATION FOR ALTERNATE LOCATION. THANK AND END CALL.

IF YES:
SC2a. Have you received a study or any rebates from Xcel Energy for installing equipment at your data center?

IF NO: MARK AS NON-PARTICIPANT

IF YES:
SC2b. What equipment did you install to receive the rebate(s) from Xcel Energy?
SC2c. When did you receive the rebate(s)?

IF SC2b = Related to data centers AND SC2c = 2012-2017:
THANK FOR TIME AND END CALL

ELSE: MARK AS NON-PARTICIPANT

[IF NEAR-PARTICIPANT WITH AVAILABLE DATA]

A1. According to our records, your company has a data center on-site, is this correct?

IF NO: PROBE FOR DATA CENTER AT ALTERNATE LOCATION. REQUEST AND RECORD CONTACT INFORMATION FOR ALTERNATE LOCATION. THANK AND END CALL.

IF YES:

A1a. Have you received a study or any rebates from Xcel Energy for installing equipment at your data center?

IF NO: MARK AS NON-PARTICIPANT
IF YES: THANK FOR TIME AND END CALL

A2. Can you briefly describe your company's work?

PROBE FOLLOWING:

1. Financial services
2. Insurance
3. Health care
4. Local government
5. Schools
6. Higher education
7. Institutional
8. Manufacturing
9. Prefer not to answer

A3. What is your title or role at your company?

PROBE FOLLOWING:

1. Facilities Manager
2. Energy Manager
3. Other facilities management / maintenance position
4. Chief Financial Officer
5. Other financial / administrative position
6. Proprietor / Owner
7. President / CEO
8. Manager
9. Engineer
10. Other ____
11. * Prefer not to answer

A4. What services do you receive from Xcel Energy?
PROBE: Electric, gas, electric and gas

A5. About how many full-time employees does your company have?

A6. About how many of your company's full-time employees work on a data center?

A7. Does your organization have multiple data center locations)?

A7a. **IF YES:** Where and how many?

A7b. For these other locations do you participate in data center rebate products offered by other utilities? Why or why not? (Is Xcel Energy the only one they don't participate in or do they generally not participate in utility products?)

A8. Does your organization own or lease your facility/facilities?

A9. Does the data center comprise the whole building, or do you have an embedded data center?

A9a. [If whole building] About what size is this data center, in square feet?

A9b. [If embedded data center] About what size is the building that houses the data center in square feet?

A9c. About what size is the data center in square feet? (Ratio of data center to building size).

A10. How often do you speak with an Xcel Energy account manager or business solution representative about energy efficiency opportunities at your data center facilities?

PROBE THE FOLLOWING:

1. Never
2. About once a month
3. About once every 3 months
4. About once every 6 months
5. About once every 9 months
6. About once a year

A11. At your business, do you regularly:

1. Read your organization's gas / electric bill?
2. Pay your organization's gas / electric bill?
3. Influence or manage your organization's energy use?

A12. How would you rate your overall satisfaction with Xcel Energy as an energy provider on a scale from 1-5 where 1 is very dissatisfied and 5 is very satisfied?

A13. How likely are you to recommend Xcel Energy to a business colleague on a 1 to 10 scale, where 1 means you would be "extremely unlikely" to recommend Xcel Energy and 10 means you would be "extremely likely" to recommend Xcel Energy?

Section B: Equipment Upgrades

B1. Have you installed any new equipment or major IT upgrades in your data center over the past 3 years?

PROBE: HVAC controls, airflow work, power supplies, cooling equipment, motors, lighting, plate and frame heat exchangers, servers, virtualization software,

B2. Have any of the equipment installations you have done contributed to making your data center(s) more energy efficient or use less energy?

IF YES: What efficient updates did you make?

PROBE: Airflow improvements, efficient electrical equipment, high-efficiency cooling equipment, EC motor plug fans, humidification improvements (evaporative and ultrasonic mechanisms), transformer to UPS power systems, efficient lighting, plate and frame heat exchanges, efficient servers, server virtualization/consolidation.

B3. Have you ever received a rebate for making your data center(s) more energy efficient or use less energy from any utility?

B3a. **IF YES:** Was the rebate from Xcel Energy, or someone else?

IF SOMEONE ELSE: Who?

B3b. What did you receive a rebate for?

PROBE: Data Center: airflow improvements, efficient electrical equipment, high-efficiency cooling equipment, EC motor plug fans, humidification improvements (evaporative and ultrasonic mechanisms), transformer to UPS power systems, efficient lighting, plate and frame heat exchanges, efficient servers, server virtualization/consolidation.

B4. **IF MULTIPLE LOCATIONS:** Do you know if any of your businesses' other locations in CO or MN have participated in an Xcel Energy efficiency project?

B.4 Peer Program Benchmarking Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency programs, the EMI Consulting evaluation team will benchmark the Xcel Energy programs against peer utilities. The objective of the benchmarking is to identify opportunities to improve the Xcel Energy programs based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the program in context with the performance of other utilities. To conduct the benchmarking, the evaluation team will conduct secondary research on the peer utilities identified and perform in-depth interviews with program managers at the peer utilities.

This document presents the in-depth interview guide for peer utility Data Center Energy Efficiency Programs. Table 7 identifies the interview questions related to each key performance indicator. Table 8 identifies the interview questions related to each contextual theme.

This interview is being conducted with a set of approximately 6 of Xcel Energy's peer utilities:

- ComEd
- PG&E
- NYSERDA
- FirstEnergy Pennsylvania utilities (Met-Ed, Penelec, Penn Power, and West Penn Power)
- Duke Energy
- Austin Energy

Target respondents are managers of Data Center energy efficiency programs.

Table 5: Mapping of interview questions to indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings goals	• 2016 program energy savings goals (MWh and Mcf) • 2016 program's savings (MWh and Mcf) • 2016 total energy efficiency portfolio goal (MWh and Mcf)	B2, B4, B5
Program budget cost of acquisition (e.g. $/MWh, $/Mcf)	• 2016 program budget • 2016 total gross energy savings for each peer program	B4, B6

Table 6: Mapping of interview questions to contextual themes

Contextual themes	Data Needed	Interview Question
Net-to-gross (NTG) savings approach	• NTG approach, ratio applied, and calculation details.	B3
Program description	• Overall program objectives, implementation strategies, the measure types and incentives offered, characteristics of customer types targeted for participation • Program staffing, the length of time of program operation, any recent changes that have been made to the program, and future outlook.	A1, A2, A3
Program processes	• Custom measure process including how they set baselines and what documentation is needed	A4
Customer engagement practices	• Methods used to engage customers including methods for identifying target customers, increasing customer awareness of the program, building customer interest, making initial contact with customers, converting interested customers to participants, and supporting customers throughout their participation.	C1- C5
Trade ally engagement practices	• Methods used to engage trade allies including methods for identifying trade allies, building potential trade ally interest in becoming trade partners, converting interested trade allies to trade partners, communicating with existing trade partners, and using trade allies to fill the pipeline.	C2, C6-C12

Recruiting Instructions

The research team plans to send advance emails to any program managers with available emails. The email will contain an explanation of the research, as well as both an Xcel Energy and EMI Consulting contact person the utility can reach out to if they have additional questions or would like to schedule an interview at their convenience.

Potential respondents will be recruited by consultants on the research team who will be conducting interviews and have been trained on the purpose and goals of the Data Center qualitative research. The research team will be as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews when possible to accommodate busy utility schedules. The research team will leave a voicemail or receptionist message on the first attempt whenever possible, and then use discretion to determine any additional messages left on subsequent attempts. The research team will strive to attempt to contact each peer utility a minimum of 4 times before giving up on that particular contact, but depending on each unique situation, the research team may need to attempt some contacts more times to ultimately reach the correct person.

Interview

Introduction/Recruitment

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

INTRO 2 We are working with Xcel Energy on a benchmarking and best practices study for Data Center energy efficiency programs. As part of this study, we are reaching out to leaders of Data Center programs to learn about innovative programs and best practices in the field.

We would like to include UTILITY in this study, as your Data Center Program has been identified as an [innovative/peer] program. We would like to spend some time [add estimated time once final/tested] talking with you about your Data Center Program's design and implementation, as well as your successes and challenges with the Data Center Program.

[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]**

Section A: KPIs/Program Design

A1. First, we'd like to talk through the basic design and organization of your program. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

Can you describe your program at a high level?

a. What are the program's overall objectives?

b. Is your program run by utility staff or a third-party implementer?

c. How many PROGRAM STAFF OR IMPLEMENTER STAFF members support the program?

A2. Can you describe the implementation strategies used by STAFF OR IMPLEMENTER?

a. What is the typical length of a project?

A3. Next, I'd like to talk about your program's efficiency incentives. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

a. What types of measures do you offer? [**PROBE:** Prescriptive, Custom, Design]

b. What specific measures are offered?

c. How do you estimate savings?

d. What are the incentive levels?

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

a. What documentation is needed?

Section B: Savings goals/cost

Next, I'd like to talk about the participation and energy savings achieved through the program in 2016. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

B1. What were the program's energy savings goals in 2016? (MWh and Mcf)?

B2. 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, project level, or measure level?

B3. How much net/gross energy savings did the program report in 2016?

B4. What was the total energy efficiency portfolio goal in 2016?

B5. 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?

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. How do you identify target customers?

a. Do you target certain customer types? What are the characteristics of your target customers?

C2. What methods do you use to raise awareness of your program within your tartget market?

a. What has been the most effective?

C3. What steps does the utility take to initially engage potential program particpants?

a. What has been the most effective?

C4. What works best to convert potential customers into participants?

C5. What support do you offer to participants throughout the duration of the Program?

Next, I'd like to talk about the program's trade allies.

C6. How do you identify potential trade allies?

C7. What methods do you use to raise awareness of your program with trade allies?

C8. What activities do program staff conduct to engage trade allies? Approximately how many trade allies are active in the program?

C9. How do you communicate with trade allies?

a. How often?

C10. What roles do trade allies play in driving participation in the program?

C11. What have you found to be the most effective ways of engaging trade allies to drive participation in the program?

C12. What business value does participating in the utility bring to trade allies?

Section D: Closing

D1. Great! Thank you so much for your time. Those are all the questions we have for you today. Before we finish, do you have any questions for me, or anything else you would like to add?

B.5 Trade Partner Interview Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency programs, the EMI Consulting evaluation team will benchmark the Xcel Energy programs against peer utilities. The objective of the benchmarking is to identify opportunities to improve the Xcel Energy programs based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the program in context with the performance of other utilities. To conduct the benchmarking, the evaluation team will conduct secondary research on the peer utilities identified and perform in-depth interviews with program managers at the peer utilities.

This document presents the in-depth interview guide for peer utility Data Center Energy Efficiency Programs. Table 7 identifies the interview questions related to each key performance indicator. Table 8 identifies the interview questions related to each contextual theme.

This interview is being conducted with a set of approximately 6 of Xcel Energy's peer utilities:

- ComEd
- PG&E
- NYSERDA
- FirstEnergy Pennsylvania utilities (Met-Ed, Penelec, Penn Power, and West Penn Power)
- Duke Energy
- Austin Energy

Target respondents are managers of Data Center energy efficiency programs.

Table 7: Mapping of interview questions to indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings goals	• 2016 program energy savings goals (MWh and Mcf) • 2016 program's savings (MWh and Mcf) • 2016 total energy efficiency portfolio goal (MWh and Mcf)	B2, B4, B5
Program budget cost of acquisition (e.g. $/MWh, $/Mcf)	• 2016 program budget • 2016 total gross energy savings for each peer program	B4, B6

Table 8: Mapping of interview questions to contextual themes

Contextual themes	Data Needed	Interview Question
Net-to-gross (NTG) savings approach	• NTG approach, ratio applied, and calculation details.	B3
Program description	• Overall program objectives, implementation strategies, the measure types and incentives offered, characteristics of customer types targeted for participation • Program staffing, the length of time of program operation, any recent changes that have been made to the program, and future outlook.	A1, A2, A3
Program processes	• Custom measure process including how they set baselines and what documentation is needed	A4
Customer engagement practices	• Methods used to engage customers including methods for identifying target customers, increasing customer awareness of the program, building customer interest, making initial contact with customers, converting interested customers to participants, and supporting customers throughout their participation.	C1- C5
Trade ally engagement practices	• Methods used to engage trade allies including methods for identifying trade allies, building potential trade ally interest in becoming trade partners, converting interested trade allies to trade partners, communicating with existing trade partners, and using trade allies to fill the pipeline.	C2, C6-C12

Recruiting Instructions

The research team plans to send advance emails to any program managers with available emails. The email will contain an explanation of the research, as well as both an Xcel Energy and EMI Consulting contact person the utility can reach out to if they have additional questions or would like to schedule an interview at their convenience.

Potential respondents will be recruited by consultants on the research team who will be conducting interviews and have been trained on the purpose and goals of the Data Center qualitative research. The research team will be as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews when possible to accommodate busy utility schedules. The research team will leave a voicemail or receptionist message on the first attempt whenever possible, and then use discretion to determine any additional messages left on subsequent attempts. The research team will strive to attempt to contact each peer utility a minimum of 4 times before giving up on that particular contact, but depending on each unique situation, the research team may need to attempt some contacts more times to ultimately reach the correct person.

Interview

Introduction/Recruitment

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

INTRO 2 We are working with Xcel Energy on a benchmarking and best practices study for Data Center energy efficiency programs. As part of this study, we are reaching out to leaders of Data Center programs to learn about innovative programs and best practices in the field.

We would like to include UTILITY in this study, as your Data Center Program has been identified as an [innovative/peer] program. We would like to spend some time [add estimated time once final/tested] talking with you about your Data Center Program's design and implementation, as well as your successes and challenges with the Data Center Program.

[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]**

Section A: KPIs/Program Design

A1. First, we'd like to talk through the basic design and organization of your program. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

Can you describe your program at a high level?

d. What are the program's overall objectives?

e. Is your program run by utility staff or a third-party implementer?

f. How many PROGRAM STAFF OR IMPLEMENTER STAFF members support the program?

A2. Can you describe the implementation strategies used by STAFF OR IMPLEMENTER?

b. What is the typical length of a project?

A3. Next, I'd like to talk about your program's efficiency incentives. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

e. What types of measures do you offer? [**PROBE:** Prescriptive, Custom, Design]

f. What specific measures are offered?

g. How do you estimate savings?

h. What are the incentive levels?

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

a. What documentation is needed?

Section B: Savings goals/cost

Next, I'd like to talk about the participation and energy savings achieved through the program in 2016. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

B1. What were the program's energy savings goals in 2016? (MWh and Mcf)?

B2. Are these goals based on gross or net savings?

e. Did/will you apply a NTG ratio to these savings?

f. What NTG ratio do you use?

g. What methods are used to calculate NTG ratio?

h. Are NTG ratios estimated at the program level, project level, or measure level?

B3. How much net/gross energy savings did the program report in 2016?

B4. What was the total energy efficiency portfolio goal in 2016?

B5. 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?

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. How do you identify target customers?

b. Do you target certain customer types? What are the characteristics of your target customers?

C2. What methods do you use to raise awareness of your program within your tartget market?

b. What has been the most effective?

C3. What steps does the utility take to initially engage potential program particpants?

b. What has been the most effective?

C4. What works best to convert potential customers into participants?

C5. What support do you offer to participants throughout the duration of the Program?

Next, I'd like to talk about the program's trade allies.

C6. How do you identify potential trade allies?

C7. What methods do you use to raise awareness of your program with trade allies?

C8. What activities do program staff conduct to engage trade allies? Approximately how many trade allies are active in the program?

C9. How do you communicate with trade allies?

b. How often?

C10. What roles do trade allies play in driving participation in the program?

C11. What have you found to be the most effective ways of engaging trade allies to drive participation in the program?

C12. What business value does participating in the utility bring to trade allies?

Section D: Closing

D1. Great! Thank you so much for your time. Those are all the questions we have for you today. Before we finish, do you have any questions for me, or anything else you would like to add?

APPENDIX C: STAFF INTERVIEW FINDINGS

This memo provides summative notes from discussions with product staff as part of the 2017 evaluation cycle. To support the process and impact evaluation of the 2016 Xcel Energy efficiency products, members of the EMI Consulting evaluation team interviewed key staffing managing and implementing the Data Center Efficiency Program in Colorado. These interviews include the following staff:

- Product Manager
- Key Account Manager
- Account Manager
- Trade Partner Managers (current and past)
- Engineer
- Engineer (new hire formerly with study provider)

This memo contains our summary of the key takeaways, a description of the product, an inventory of the product's strengths and barriers to its success, as well as feedback on evaluation priorities provided by program staff during the interviews.

1.1 Key Takeaways

The following bullets present key takeaways from staff experiences with the Data Center Efficiency Program in Colorado. These key takeaways provide a summary of the product context and feedback received during both the kick-off meeting and the subsequent staff interviews.

- Incentive levels appear to be effectively motivating customers to engage with the Datacenter product.
- While the product was originally comprised of only custom measures, the addition of prescriptive measures (especially EC Motors) has greatly simplified and expedited customer engagement with the product.
- The fast pace of decision making for customers considering datacenter projects poses a challenge to the product team to engage with customers at the right time with the right measures.
- For most datacenter customers, energy efficiency is not a top priority. Concerns about downtime often overshadow efficiency concerns.
- Datacenter decision makers can be difficult targets for customer engagement. They often operate out-of-state and typically utilize a "trusted advisor" model that requires sustained trust building, technical expertise, and name recognition of providers.
- Datacenters constitute a unique customer segment with complex technologies and decision making. The comfort and skill level of staff promoting and implementing the program varies widely as a result of staffing changes over time.
- Datacenter projects tend to have large savings opportunities but capturing these savings in a timely manner is complicated both by customer decision making and, at times, internal processes related to custom project reviews.

1.2 Product Description

The following bullets present the evaluation team's understanding of the product based on staff interview results and review of available product documentation.

- Program started in 2009 because of a perceived need to offer a segment-specific product to customers. Datacenter customers consumed a lot of energy and needed specific studies.
- The program originally included only rebates on datacenter studies and custom incentives but now includes several prescriptive incentives for measures such as mini splits, EC motors, and waterside economizers. If a measure goes through the custom track often enough, program managers develop a prescriptive saving option.
- To recruit participants, the product provides customers with free walkthroughs with a product team engineer to assess potential energy efficiency measures.

1.3 Product Strengths and Barriers

During interviews, staff identified the following strengths and barriers to implementing this product in 2016 and at the time of the interview. Strengths include factors that product staff identified as supporting the success of the product; barriers include factors that product staff identified as preventing the product from reaching its goals.

Strengths

Interviewees reported several strengths of the Colorado Data Center Efficiency Program. These strengths are grouped by the category they are most strongly associated with, although several strengths could be placed in multiple categories.

Data Center Customer Segment

- Colorado is a good location for new construction of datacenters, with free cooling and limited risks related to earthquakes or hurricanes.
- Account management staff report that many owners and operators of datacenters/colocation facilities have aggressive sustainability goals and are strongly interested in positive marketing and PR - both of which are potentially addressed with energy efficiency projects.

Product Design and Internal Communications

- While the product was originally comprised of only custom measures, the addition of prescriptive measures (especially EC Motors) has greatly simplified and expedited customer engagement with the Datacenter product.
- There are a variety of opportunities for future development and expansion of the product to provide support for new prescriptive measures.
- Energy studies are perceived as a high-value offering as they help customers make internal business cases for capital expenditure investments. While not used often, staff view these studies as effective in identifying and motivating energy efficiency improvements.
- Incentive levels appear to be effectively motivating customers to engage with the Datacenter product.
- Engineering staff are engaged and active in seeking out communications and coordination across internal stakeholders. Account management staff also find engineering staff easy to work with and feel supported by them.

- Xcel recently on-boarded a new engineer with extensive background in datacenter projects and experience working for study providers. This provides an extension of the current DC engineering capabilities and a unique opportunity for the product manager to get specific input on how to promote product offerings to customers.

Customer/Network Engagement

- A dedicated, skilled, and engaged engineering staff can provide free walkthroughs and technical support to account management staff. Account staff and customers seems to value this support highly.
- Account management staff proactively collaborate with engineers to provide customers with an informative summary of measures that may benefit their datacenters.
- Xcel staff appear to have access to the right decision makers and appear to be involved sufficiently early in the decision-making process to guide customers in making informed decisions about the energy efficiency projects they undertake.
- Vendors and other key market actors appear to be aware of the product.
- Account management is engaged and dedicated to fulfilling their customer needs and are actively working their prospect pipeline. Savings potential associated with datacenter projects is clearly a strong motivator.
- Xcel's biannual Datacenter Advisory Meetings are well attended and enjoy broad engagement from vendors, manufacturers, and customers. Additionally, the Trade Partner Manager and Product Manager appear to collaborate well.

Barriers

Interviewees reported several barriers facing the Colorado Data Center Efficiency Program. These barriers are grouped by the category they are most strongly associated with, although several barriers could be placed in multiple categories.

Data Center Customer Segment

- For most datacenter customers, energy efficiency is not a top priority. Concerns about downtime often overshadow efficiency concerns.
- Datacenter decision makers typically utilize a "trusted advisor" model that requires sustained trust building, technical expertise, and name recognition of providers.
- Decision making in datacenters can be very fast, with short windows of time between initial project conception, planning, and execution. The product has struggled to engage with customers at exactly the right time and to keep pace with the speed of decision making, resulting in some missed opportunities.
- Datacenter technology tends to change rapidly making it difficult for product offerings to keep up.
- Slow buildout of datacenters is a typical practice and can greatly delay payout of incentives. Many big projects can be on hold due to product/regulatory constraints related to build out of IT load that prohibit payout of the full potential project incentives estimated upfront. This challenge can and has resulted in some customer frustration.
- Many large datacenters have security requirements that make it hard for them to use providers other than those already working for them (thus having the necessary security clearance and trust of the DC staff). As a result, only some customers appear to look to Xcel's list of pre-qualified vendors to get support.

Product Design and Internal Communications

- Custom measure review process is very detailed, requiring extensive back-and-forth communications with customers that can take 2-6 months. Staff reported that this process has frustrated several customers and is a likely reason that many near-participants ultimately decided not to participate. Several vendors and study providers have provided staff with feedback that indicates concerns and frustrations regarding the unpredictability and typical duration of the custom project review.
- Due in part to the unique nature of datacenters and the energy efficiency projects within them, some customers and account staff appear to experience the initial study and application process as insufficiently organized specifically highlighting the absence of sufficient explanations upfront regarding the participation requirements.
- There appears to be lack of clarity regarding who is responsible for developing/reviewing new prescriptive measures (engineering vs. product development).
- Account management staff report having very little regular or structured engagement with Product Manager or with the Trade Partner Manager.

Customer/Network Engagement

- There appears to be limited awareness of product offerings among customers with smaller embedded data centers or among potential participants considering construction of a new datacenter.
- There appear to be limited number of qualified firms who can provide credible study services and several study providers have gone out of business in recent years.
- The value proposition to trade partners for working with Xcel may be unclear and misaligned with the various business models trade partners use.
- Program managers do not have access to a detailed market scan of datacenter customers. Program staff are uncertain how many datacenters exist in their territory, who they are, and where they are. This limits their ability to utilize targeted marketing approaches.

1.4 Feedback on Evaluation Priorities

During interviews, staff identified research topics they would like the evaluation to address. The following bullets compile these topics along with additional topics that the evaluation team identified based on staff interview findings. The evaluation team will consider these research topics when prioritizing portfolio-wide evaluation needs and as able, incorporate them into the final evaluation plan for the 2016 Data Center Efficiency Program. The EMI Consulting team will deliver this plan at the end of May.

- The current product appears to be driven primarily by customers and key accounts, without much support from trade partners. This constitutes a potential opportunity to expand trade partner engagement. However, there are a lot of questions regarding the value proposition that the product offers to study providers and how that lines up with the study providers' business models. The EMI Consulting team believes the evaluation should examine trade partners' business models, what challenges they experience, and how they can become more engaged with the product.
- Product staff requested additional information about what opportunities exist to further standardize or streamline the review process for custom measures.
- Product staff reported concerns about the short window of time between project conception, planning, and execution for many data center customers. The EMI Consulting team believes it is worth examining alternative strategies for customer engagement that might increase the product team's awareness of these opportunities and allow them to quickly convert them into participation.

- For the benchmarking task, it appears to be an important research objective to assess the degree to which other utilities similarly struggle with engaging consultants, study providers, vendors, and other partners. The EMI Consulting team believes it is important to examine alternative methods that other utilities use to effectively engage market actors to support a utility product.

MEMO

To: Nick Minderman, Xcel Energy
Meagan Madden, Xcel Energy
Stephanie Doyle, Xcel Energy

From: Joan Effinger, EMI Consulting
Matt Galport, EMI Consulting
Lauren Holstein, EMI Consulting

Date: July 26, 2018

RE: Data Center Framework Development and Customer Journey Mapping – Results Memo

Introduction

In 2017, EMI Consulting conducted an impact and process evaluation of the Minnesota and Colorado Data Center Efficiency Products. To assess the net-to-gross ratio for the Data Center Efficiency Products, the evaluation team conducted phone interviews with a sample of participants. The evaluation team employed the Core Nonresidential Protocol outlined in the Illinois TRM to evaluate free ridership, market effects, and spillover. The evaluation found no evidence of market effects, no spillover, and several drivers that indicated some customers were completing energy efficient data center projects primarily due to factors other than those services offered by the Xcel Energy product. The evaluation team found that most participants were repeat participants and that product influence seemed inversely correlated with participation (i.e. more frequent participation results in decreased influence). Additionally, most participants reported their decision to install energy efficient equipment was driven by standard industry practice and that they would have taken the same action at the same time if the product were not available. However, the small number of participating data centers, typically high level of turnover in data centers, and frequent mergers and acquisitions suggests that some responses to net-to-gross questions may be affected by a limited sample or limited respondent recall of the incentivized projects.

However, based on discussions with Xcel Energy product staff, these results did not align with feedback staff received from the market. To address this concern Xcel Energy requested EMI Consulting conduct follow-up research to examine the results of the initial evaluation. The overarching goal of this new work was to support Xcel Energy in increasing product influence by identifying the drivers of inconsistencies between the evaluation results and market feedback to Xcel Energy. An overarching finding from this work was that the available data collected by Xcel Energy, while high quality, lacked sufficient information to allow the research team to confidently reach different conclusions about the Data Center Efficiency Products' influence than the conclusions reached in the evaluation.

It is important to note that this data availability issue is not unique to the Xcel Energy Data Center Efficiency Products – the key pieces of information that enable assessments of product influence, described in the sections below, are rarely captured by utility energy efficiency programs or products. The research team recommends adopting practices that enable the collection of some of this data that can more

fully characterize the product's influence. As noted above, accurately evaluating the influence of data center products presents unique challenges that can be partially addressed through the additional data collection and documentation practices outlined below.

The research team addressed the project goals by:

1. Documenting Xcel Energy influence on repeat participants, if found.
2. Supporting implementation of evaluation recommendations by establishing metrics and a methodology for Xcel Energy to measure product influence through the customer journey on an ongoing basis.
3. Using the results to create five data center customer journey maps to visually illustrate the timeline of equipment installation and customers' interactions with Xcel Energy, as well as to highlight opportunities for product staff to collect additional data to document product influence.

This research provides Xcel Energy product staff with a framework and methodology for documenting the actions customers planned on taking alongside the actions actually taken (including influence on repeat participants), reducing any recall bias associated with customers' decision to purchase energy efficiency products.

The rest of this memo describes the research methodology, key findings, and detailed findings including a sample of the framework, metrics, and the five customer journey maps.

Methodology

To create a methodology and framework for documenting the customer participation journey in the Xcel Energy Data Center Efficiency Product, we sought to identify eight participants who demonstrated a wide variety of experiences with the product. In conjunction with the Product Managers, the research team identified the following criteria for identifying ideal data center participants for this research:

- Higher priority:
  - Mostly custom projects, one prescriptive project between the two states
  - Repeat participants

- Lower priority:
  - 1 or 2 data centers with complicated participation histories (were acquired, merged) between the 2 states
  - 1 or 2 data centers that were/are something close to a "typical" or ideal custom participant, where product staff felt the product worked as intended
  - 1 or 2 smaller data center participants (though most should be large, if possible)
  - 1 or 2 participants who participated in a study

EMI worked with the Product Manager to determine which participants best fit the above criteria, recognizing it likely wasn't possible to meet all the criteria with such a small group of participants. EMI Consulting requested all data associated with each participant including study reports, analysis workbooks, applications, and email correspondence. After initial analysis was completed of each participant's data, EMI Consulting requested data from an additional data center who did not receive a study (total of five for Minnesota, four for Colorado). This request was made to ensure an even representation of the variety of different customers who participate in the product.

Table 1 identifies the data received by EMI Consulting by data center name and the sampling criteria met for this study.

Table 1. Comparison of data center sites received with the sampling criteria

Data Center	State	Sampling Criteria Met
Customer 1	MN	Provided useful interview data
Customer 2	MN	Participated in two studies, repeat participant, many custom projects, "typical" or ideal participant
Customer 3	MN	No study completed, custom projects, repeat participant
Customer 4	MN	Participated in a study, custom projects, repeat participant
Customer 5	MN	Participated in a study, multiple sites, custom projects, repeat participant
Customer 6	CO	Participated in a study, custom projects, repeat participant, complicated history, "typical" or ideal participant
Customer 7	CO	Provided useful interview data
Customer 8	CO	Participated in a study, smaller data center participant
Customer 9	CO	Custom projects, repeat participant, "typical" or ideal participant, completed a recent study, slightly complicated history and a recent merger

After EMI Consulting received the data, the research team began a systematic review of each data center mentioned in the table above. In this review, the research team examined study reports, analysis workbooks, rebate applications, and all email correspondence. The research team then compared this information to Salesforce data received for the net-to-gross (NTG) study conducted by EMI Consulting in 2017. This comparison facilitated the identification of gaps in the program tracking data and provided opportunities to improve current data tracking by implementing specific data collection points that will help inform future NTG analyses. The research team then constructed a program tracking tool that tracks program data at the customer and measure level. Once a tracking tool was created, EMI Consulting collaborated with product staff to identify areas where improvements should be made, revising the tool as necessary to best fit program staff needs.

EMI Consulting worked collaboratively with the Minnesota and Colorado Product Managers to develop "journey maps" depicting five participants' interactions with the Data Center Efficiency Product. The five data centers were selected to include a range of participant experiences and were not intended to be a statistically representative sample of the population of data centers. The chosen sample of data centers includes study participants and non-participants, participants who installed a large quantity of measures and those who installed few measures. These maps are intended to show the activities of each of the five participants – the studies they commissioned and the measures they installed – along with the timelines for these activities. In addition, these maps depict points in these project timelines where Xcel Energy could have collected additional data to improve their ability to characterize the product's influence on participants' actions. These aspirational data collection opportunities include:

- Pre-participation data
- Post-study data
- Post-project data, for projects incentivized by the Data Center Efficiency Product
- Post-project data, for known projects not incentivized by the product
- Incomplete project data, for planned incentivized projects that are not completed

It should be noted that during the 2017 evaluation interviews, we told participants, "We will only report information in aggregate, so your specific responses will not be tied to your name nor will they be reported on their own," so we cannot tie specific net-to-gross ratios (NTGR) or responses to the journey maps. Instead, we make broad observations based on confidential results from the 2017 study.

Key Results

The wide range of participant-level NTGR found in the 2017 evaluation illustrated that some participants are high free riders while other participants are influenced by the product. Thus, the product is having an impact on parts of the market. Similarly, the five data centers analyzed in the detailed journey maps for this research also show a range of results:

- The data center market is a fast-moving environment with complex decision-making and high turnover, so it is likely a combination of factors influencing customers' decisions to install energy efficient measures.
- Xcel Energy appears to have strong influence on parts of the market, but low influence on other parts of the market.
- For some customers, Xcel Energy's influence is likely higher than what customers are recalling (a customer with low NTG), but for other customers the data supports the influence as reported by customers (a customer with low NTG and a customer with high NTG)[1].
- Xcel Energy should incorporate a system to better track customer information as they move throughout the Data Center's Product. This will help inform future NTG analyses and can act as assurance against the fast-moving and complex decision-making nature of the data center market.

Detailed Findings

The next two sections present the detailed findings from the framework and metrics, followed by the five customer journey maps.

Framework and Metrics

The 2017 retrospective NTGR, 0.54, indicated significant levels of free-ridership. A wide-range of participant-level NTGR indicated that some participants are high free riders while other participants are influenced by the product. EMI Consulting recommended Xcel Energy implement a method for tracking project details to document influence the product has on customer decision-making, perhaps in ways the customers do not realize.

The framework developed through this project offers Xcel Energy Product Managers a template for documenting the influence Xcel Energy has on customer decision-making. The framework tracks existing equipment and efficiency levels when customers first participate in the product, the equipment and efficiency levels customers would have installed without the product, and the equipment and efficiency levels they actually installed each time customers participate in the product. There is a column for each data field and a row for each measure implemented. Each project is reflected through the opportunity

[1] Two customers in the journey maps were not participants in the 2017 evaluation and cannot be analyzed in this manner.

number. It should be noted that this framework could be incorporated into Xcel Energy's current tracking program processes in SalesForce, rather than used as a separate tool.

The fields included in the framework and their description are shown in Table **2**. Framework Fields (Measure Level) and Table **3** below.

Table 2. Framework Fields (Measure Level)

Framework Field	Definition/Notes
State	State data center operates in
Opportunity number	Salesforce opportunity number
Opportunity measure number	Salesforce opportunity measure number
Data center name	Name of data center
Premise ID	Premise ID of data center
Measure	Description of measure installed
Existing measure prior to upgrade	Description of existing measure prior to installed measure
Invoice date	Date customer invoiced for measure installed
Opportunity close date	Date measure installation was considered completed and opportunity closed
Recommended measure	Indicator variable to identify if a measure was recommended to a customer by a study, JEEP, or Xcel staff walkthrough
Installed measure	Indicator variable to identify if a measure was installed
Model number	Model number of measure installed
Existing efficiency	Efficiency of old equipment
Planned efficiency	Efficiency of new equipment
Simple payback	Time required to recoup the funds expended on measure installed
Increase of actual equipment over planned equipment	Difference between planned efficiency and existing efficiency
Where customer learned about measures	How the customer learned about the measure they installed
Baseline plans for installations	What were the customers' plans for installing this equipment, if any
Date installation originally planned	The date the customer originally planned to install equipment if the customer had planned on installing equipment prior to product participation

Table 3. Framework Fields (Customer/Project Level)

Framework Field	Definition/Notes
State	State data center operates in
Account number	Data center account number
Premise ID	Data center premise ID
Account name	Name of data center

Framework Field	Definition/Notes
Phone	Data center phone number
Mobile	Mobile phone number of data center contact
Premise street name	Street name where data center is located
Premise city	City where data center is located
Premise state	State where data center is located
Premise zip	Zip code where data center is located
First name	First name of data center contact
Last name	Last name of data center contact
Email	Email address of data center contact
Account manager	Name of data center account manager
Managed	Identified if data center is managed
kWh total	Total kWh for data center
Premise kWh total	Total kWh for data center premise
Aggregate demand (kW)	Total kW for data center
Premise peak demand (kW)	Total kWh for data center premise
Premise customer electricity status	Indicator variable that identifies if data center is an electric customer
Premise customer gas status	Indicator variable that identifies if data center is a gas customer
Premise electricity status as of date	Date data center became an electric Xcel customer
First product participation date	Date data center first participated in Xcel Data Centers product
Number of measures installed	Total number of measures customer has installed throughout the product
Point of contact title	Title of data center contact
Date of first contact	Date data center was first contacted by Xcel or contacted Xcel
Source of initial product contact	Who initiated first contact with customer or Xcel
Reason for initial contact	Why did the data center first contact Xcel or why did Xcel first contact data center
Source of awareness	How did the customer learn about the data centers product
Has point of contact changed in last year?	If the point of contact at the data center changed in the last year

Framework Field	Definition/Notes
Has name of data center changed in the last year?	If the name of the data center has changed in the last year
Any other factors that influence customer participation?	Other factors that have influenced customer participation in the data centers product not previously identified in the tracking tool
Information Learned from Study	New information learned from participation in a study; Strengthened or expanded information from participation in a study
Study / Other Product Factors' Influence on Plans	Changes in installation plans (timeline, type of equipment, amount of equipment) as a result of study participation
Satisfaction with Study / Other Product Factors	Satisfaction with study or other program factors
Recommendations for Product Improvement	Recommendations for improving the Data Center Efficiency Product. Anything Xcel Energy could have done differently.

Drawing from the NTG methodology employed in the 2017 evaluation of Xcel Energy's products, the EMI Consulting team proposed the following opportunities for additional data collection over the course of Data Center Efficiency Product projects:

- Pre-participation data
- Post-study data
- Post-project data, for projects incentivized by the Data Center Efficiency Product
- Post-project data, for known projects not incentivized by the product
- Incomplete project data, for planned incentivized projects that are not completed

The fields identified in the tracking tool can be maintained and used in the future by product staff in several ways. First, product staff can update information in the customer/project level of the tracker after the first interaction with a new customer, and in the measure level of the tracker after each time a customer participates in the data centers product. Second, during each interaction with the customer, product staff such as account managers can refer to the tool and ensure that each field in the tracking tool has been completed to the fullest possible extent. Finally, product staff can use this tracking tool to inform future NTG analyses and estimate a level of influence that the data centers product has in each participating data center's decision to install energy efficient products. Some specific examples include:

- Pre-participation data
    - Collecting information about customers prior to their participation in the product will help to document their baseline equipment, any plans for improvement in the absence of the product, the sources of their awareness about the product, and their reasons for wanting to participate in the product. Deviations from this baseline can help to indicate product influence.

- Post-study data
    - Collecting information after participation in a study will help to document what study participants learned and what they plan to do with that information. The extent to which the study provided new information or strengthened participants' motivation to install new measures can help to indicate product influence.

- Post-project data, for projects incentivized by the Data Center Efficiency Product

  - Collecting information from participants about their experiences with a project immediately after its conclusion will significantly increase the data quality, compared to collecting this information months or years after project completion. Any product influence is likely to be more salient to participants immediately following participation. Additionally, information gathered at this stage can help to inform product improvement.

- Post-project data, for known projects not incentivized by the product
  - Collecting data about known projects that were not incentivized by Xcel Energy could provide insight into the reasons why customers completed these projects without support from Xcel Energy. This information could help with understanding barriers to product participation, inform adjustments to incentive amounts, or inform other changes to product processes.

- Incomplete project data, for planned incentivized projects that are not completed
  - Collecting data about project opportunities that are either not pursued or not completed provides information about barriers to product participation, inform adjustments to incentive amounts, or inform other changes to product processes.

This project has not contemplated the impact of standard practice for the projects reviewed. However, standard practice and how it has evolved over time can also be documented in this spreadsheet through the addition of additional columns. Tracking standard practice can demonstrate how projects went above standard practice and also show a record of influence through multiple engagements.

Customer Journey Maps

To retain customer anonymity with 2017 project-specific NTG results, we offer generalized analysis on product influence as reported by customers and their journey maps here. Three of the customers included in the journey maps were participants in the 2017 evaluation. Two of these had low NTG scores and one had a high NTG score.

For the participants with low NTG scores, the interviewees rated past experience with the product, past experience with the equipment, payback, minimizing operating costs, and standard practice as most influential in their decision to implement energy efficiency measures. They both said they would have done the same measures at the same time without the product. For one customer, EMI Consulting does not see any inconsistencies between the customer's responses and the data in the journey map. As the EMI Consulting NTG study suggests, Xcel Energy's influence on this customer's decision to participate in the data centers product appears to also be low, based on the journey map and no further documentation. For the other customer, as discussed in the following section, the information presented in the journey map suggests that the product may have had more influence over the data center's decision making than the customer reported.

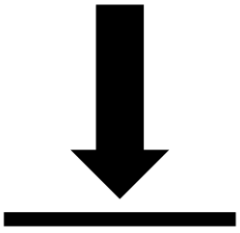
For the customers with lower NTG, it appears that the lower score could be due to factors such as changes in the facility management staff, causing an illusory reduction in the perceived influence of the product on the data center's decision-making. A new facility manager could have inherited a list of efficiency measures to implement as time and budget allowed, without recognizing where that list originated from. The data center market is a fast-moving environment with complex decision-making and high turnover, so it is likely a combination of factors influencing customers' decisions to install energy efficient measures. The influence of Xcel Energy's Data Center Efficiency Product may not be salient to staff who completed the projects long ago, let alone newer staff who did not play a role in completing the projects.

For the customer with a high NTG, the interviewee reported past experience with the product as the highest factor that influenced their decision to install measures and that they were unlikely to install the measures without the product. In the customer's journey map, the actions taken by Xcel Energy seem to play a significant part in the customer's decision to participate in the product. In this instance, there does not appear to be any inconsistency between the evaluation results and the customer's perspective with the data provided by Xcel Energy.

For the two customers who were not participants in the 2017 evaluation, one customer's journey through the product suggests that Xcel Energy was influential in the customer's decision to participate. This is inferred from the propensity of the customer installing measures after Xcel Energy actions. However, without evaluation interview data to compare against we cannot assess whether there are any inconsistencies between the evaluation results (i.e. customer reported influence) and their journey map. We would hope this customer would have reported higher influence. For the second customer without project-level NTG, the data suggests there would not be a strong link between Xcel Energy actions and the customer installing measures. We would expect this customer to report lower influence.

Detailed customer journey maps for the five selected data centers are depicted below. Each of these maps includes several icons along the timeline that indicate possible data collection opportunities. Each of these data collection opportunity icons corresponds to the icons in Table 4 below with a list of suggested data fields for collection. To take advantage of these data collection opportunities, Xcel Energy staff can fill out the following key pieces of data in the tracking tool at the designated points in the customer journey:

Table 4: Journey Map Key - Data Collection Opportunities and Key Date Fields

Icon	Data Collection Opportunity	Key Data Fields
	Pre-participation	Efficiency of existing equipment (if relevant) Efficiency of planned equipment to be installed without Data Center Efficiency Product Source(s) of product awareness Source of initial product contact Reason for interest in participating Baseline plans for equipment installation
	Post-study	Recommended measures Information learned from study Changes in plans to install measures based on study Satisfaction with study and recommendations for improvement

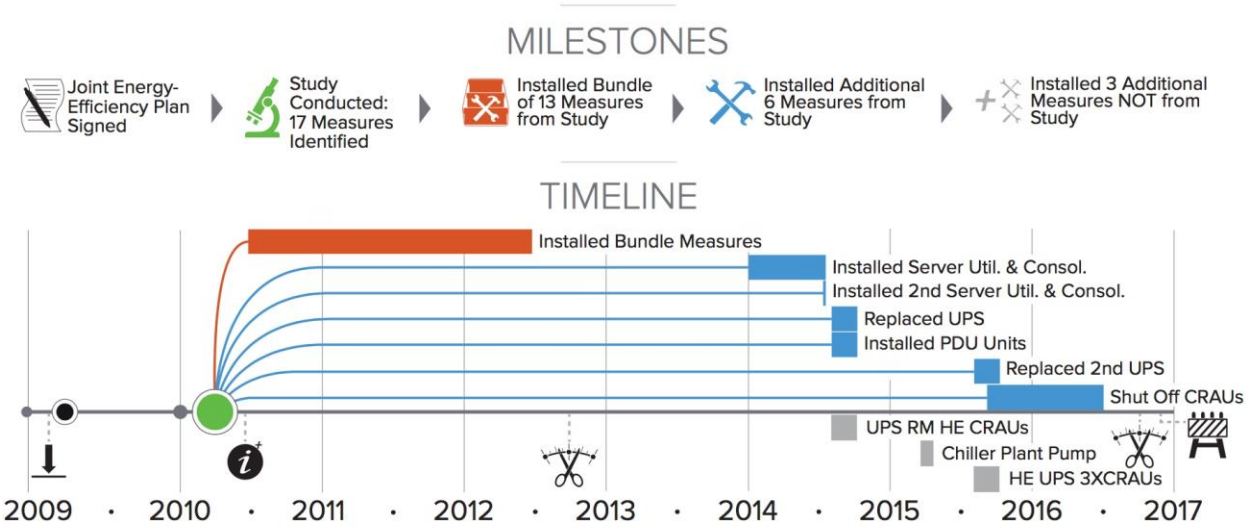
Icon	Data Collection Opportunity	Key Data Fields
	Post-project (incentivized)	Efficiency of existing equipment (if relevant) Efficiency of equipment installed Where participant learned about installed measures Changes in type or quantity of measures installed based on Data Center Efficiency Product factors Changes to project timeline based on Data Center Efficiency Product factors Satisfaction with project processes and recommendations for improvement
	Post-project (not incentivized)	Efficiency of existing equipment (if relevant) Efficiency of equipment installed Where customer learned about installed measures Motivation for installing measures Why were measures installed without Xcel Energy support? Is there anything Xcel Energy could have done to motivate customer to install more efficient equipment, or to change the project timelines?
	Post Incomplete Project	Efficiency of existing equipment (if relevant) Efficiency of planned equipment Where customer learned about planned equipment Why were measures not installed / Why was project not completed? Is there anything Xcel Energy could have done to motivate customer to complete the project?

Customer 1

Customer 1's first interaction with the Xcel Energy Data Center Efficiency Product was nine years ago, when they signed a joint energy efficiency plan in late 2009. In early 2010, an Xcel sponsored study found 17 measures, 13 of which were installed from 2010 through 2012. Customer 1 installed six additional measures (two were repeat measures) identified in the study in 2014 and 2015. However, in that same timeframe (2014 and 2015) they also installed three measures that were not identified in the study. No data was found in the project documentation linking the idea for these three projects to the Xcel Energy product.

The journey map appears to show that it is likely the product had influence on the customer's decision. If this customer had a high NTG score, the customer journey map would generally lend credence to this score, while a low NTG score would be at odds with the general impression of the map. To improve prospective NTG for customers such as this one, product staff could more clearly document the product's impact on participants' decision-making. Incorporating the suggested data collection opportunities outlined above may remedy this documentation gap.

Figure 1. Customer 1 Journey Map



Customer 2

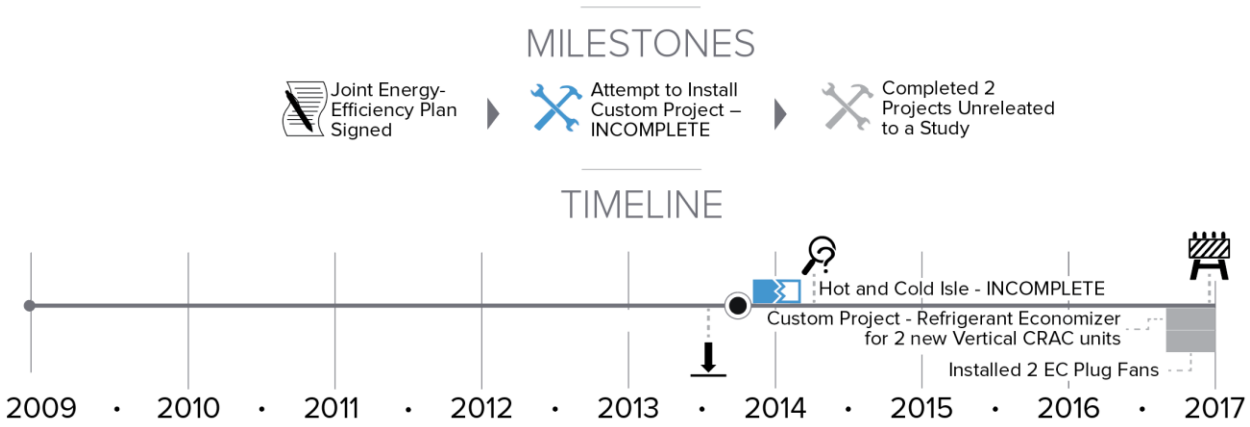
Customer 2 first interacted with the Xcel Energy Data Center Efficiency Product in late 2013 by signing a joint energy efficiency plan. After the plan was signed, participant data suggests that the data center tried to install a measure in early 2014. However, for an unknown reason, the project was not completed and abandoned several months later. The customer then did not interact with the product at all between 2014 and 2015 but did install two projects later in 2016. This data center did not have a study conducted.

Customer 2's journey map is presented in Figure 2. It is possible that the customer's joint energy efficiency plan influenced their decision to participate in the product. However, it is unknown why the customer abandoned an attempted project, or what motivated the customer to complete two projects four years after their joint energy efficiency plan was signed. If this customer had a high NTG score, the

customer journey map would generally be at odds with this score, while a low NTG score would be generally aligned with the overall impression of the map.

To more accurately track possible product influence, EMI Consulting has identified several points on the customer journey map below where Xcel staff could collect data while simultaneously engaging with the customer and building the customer relationship. Suggested data collection opportunities referenced in the map are detailed above.

Figure 2. Customer 2 Journey Map



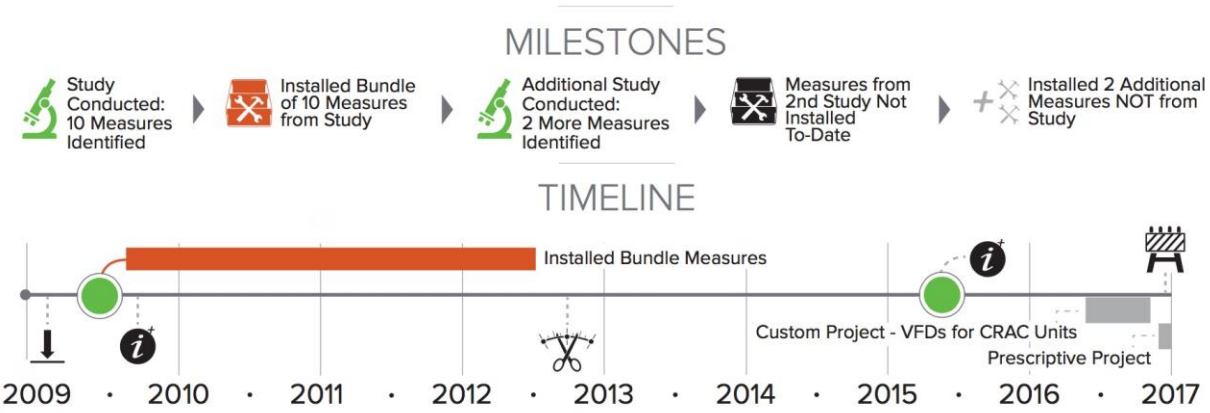
Customer 3

Customer 3 began their interaction with the Xcel Energy Data Center Efficiency Product in mid 2009, when they participated in an Xcel Energy-sponsored study. The study identified 10 measures and the customer installed all 10 measures from this study starting in late 2009 and ending in mid-2012. After the customer installed these measures, the customer did not participate in the product again until mid 2015, nearly three years later. In mid 2015, the customer completed a second study; however, this study was solely focused on energy improvements related to the data center's existing servers. The study recommended two measures to increase server efficiency, but these measures have yet to be installed. However, beginning in mid 2016, the customer did install an additional two measure not related to either study.

As shown in the customer's journey map in Figure **3**, Xcel Energy appears to have had high influence over the customer's installation of the original bundle of 10 measures. Additionally, the customer's decision to participate in a second study demonstrates they likely had a positive experience with the previous study and a desire to further increase their energy efficiency. However, the link, and therefore Xcel Energy's influence on customer decision-making, between the second study and the installation of measures not recommended in the study is unclear. If this customer had a high NTG score in 2017, the customer journey map would generally be at odds with this score, while a low NTG score in 2017 would be generally aligned with the overall impression of the map. However, the data is suggestive of product influence for the first bundle of measures.

As identified in previous maps, EMI Consulting has placed several points of suggested data collection in the timeline shown below. These opportunities are explained in greater detail in the introduction section above.

Figure 3. Customer 3 Journey Map



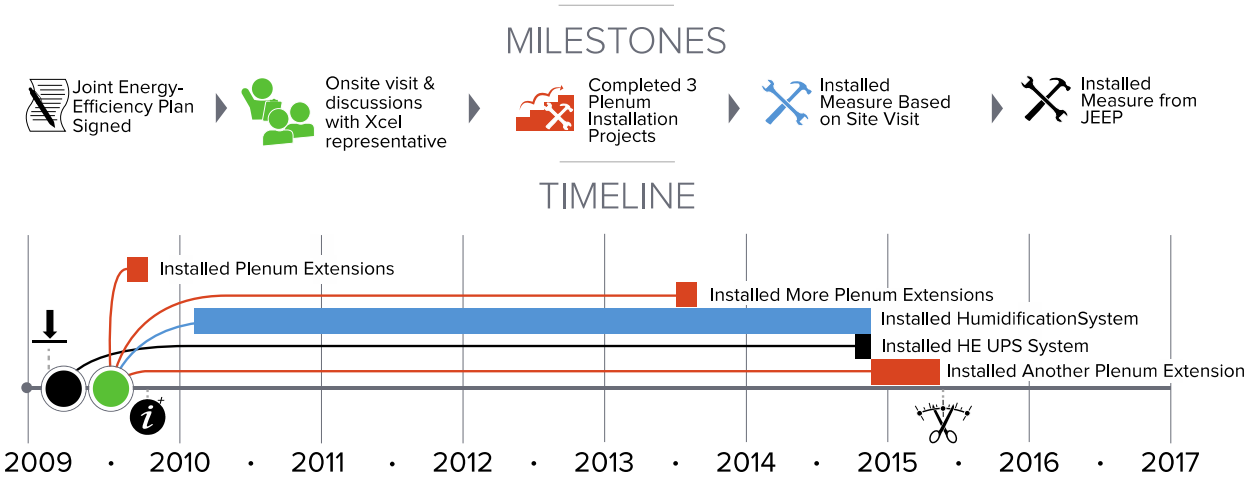
Customer 4

Customer 4 began their participation in the Xcel Energy Data Center Efficiency Product in 2009 by signing a joint energy efficiency plan. Following the signing of this document, Customer 4 installed a measure identified in the joint energy efficiency plan. Soon after the installation of this measure, the data suggest that the data center received an audit from an Xcel engineer, who suggested several measures to improve energy efficiency. Between 2010 and 2014, the data center installed the recommended measures. In late 2014, the data center installed another measure recommended from their joint energy efficiency plan. The data center also installed another two projects between 2009 and 2016, which were identical to the measure first installed in 2009.

In the customer's journey map below in Figure **4**, it can be inferred that the customer's joint energy efficiency plan and the site visit by the engineer played a part in the customer's decision to participate in the product. If this customer had a high NTG score, the customer journey map would generally be aligned with this score, while a low NTG score would be generally at odds with the overall impression of the map.

To increase certainty of Xcel Energy's influence, EMI Consulting has identified several opportunities on the customer's journey map below where Xcel could gather additional information.

Figure 4. Customer 4 Journey Map



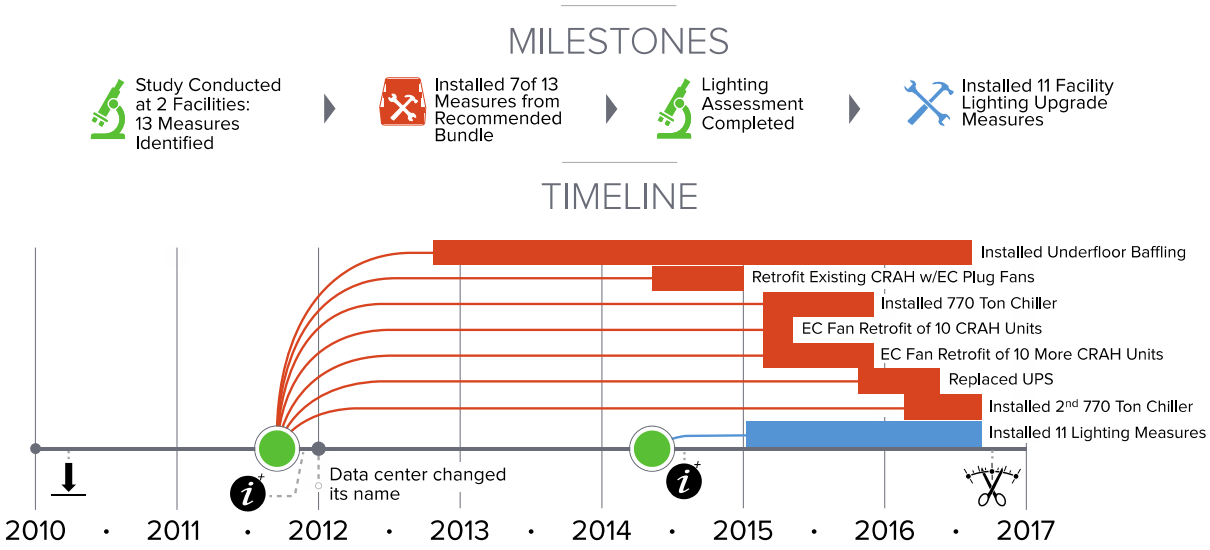
Customer 5

Customer 5 first participated in the Xcel Energy Data Center Efficiency Product in late 2011 under a different name, when they received an Xcel Energy-sponsored study. The study was conducted at each of the two facilities the company operates. The study identified 13 measures, and between late 2012 to late 2016, Customer 5 installed 7 of the 13 recommendations. Soon after the study's completion in 2012, Customer 5 changed the name of their data center to a different name. During the installation of these measures, Customer 5 also participated in a lighting assessment that was sponsored by Xcel Energy. The assessment recommended 11 lighting measures to increase energy efficiency. These 11 measures were installed between early 2015 and late 2016.

Customer 5's journey map is displayed in Figure **5**. The customer's journey through the product suggests that Xcel Energy was influential in the customer's decision to participate. This is inferred from the customer's participation in an Xcel Energy-sponsored study, installing recommended measures, participation in an Xcel Energy-sponsored lighting assessment, and installing recommended lighting measures. If this customer had a high NTG score, the customer journey map would generally be aligned with this score, while a low NTG score would be generally at odds with the overall impression of the map.

As in previous maps, EMI Consulting has preliminarily identified points in time that could increase the certainty of Xcel Energy's influence over the customer.

Figure 5. Customer 5 Customer Journey Map



CO Data Center Efficiency

2018 Program Evaluation: Recommendations and Responses

The Xcel Energy Data Center Efficiency product in Colorado helps customers address energy conservation opportunities in both new and existing data centers. This specialized product was designed in response to the significant energy savings potential of these customers, and the projected growth in energy use in data centers. The product encourages a holistic approach to energy efficiency within the data center. Any size data center may participate.

Xcel Energy (The Company) engaged a team of researchers led by EMI Consulting to conduct a process and impact evaluation of the Data Center Efficiency 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 projects in their data center and the customer journey paths that lead to such projects
- The roles, successes, and challenges faced by participating trade partners
- Opportunities to increase product implementation and delivery
- The impact of customer free ridership on product savings

Based on the results of this research, the evaluation team developed key findings and recommendations for Xcel Energy.

Recommendation	Response
1) Conduct a targeted market characterization study. The goals of this study would be to: (1) identify potential new participants, (2) understand the characteristics of trade partners who influence data center decision-makers, and (3) identify other market actors that may be worth developing relationships with.	The Company agrees to conduct a market characterization study.
2) Increase product influence. The recommended prospective NTGR is 0.65. Consider segmenting and incentivizing the market based on how and how many times they participate. Devise a method for documenting the counterfactual in the customer journey.	The Company proposes using a NTGR of 80% for projects that the Company or a trade partner is actively involved to drive identification and implementation of the project. The Company proposes using a NTGR of 45% for projects that customers identify without active involvement of the Company or trade partner. The Company will utilize internal software to track project details and document influence of customer participation.
3) Target outreach efforts towards customers, trade partners, or other market actors with characteristics that indicate increased barriers to energy efficiency.	The Company will analyze various communication channels to increase outreach efforts to generate awareness and encourage participation among customers and trade partners that have not previously engaged in energy efficiency.
4) Engage potential new participants. Consider having a	The Company will re-educate team members focused on data center customers. The Company will increase

dedicated resource to promote the product to potential new participants.	communication across internal teams that interact with data center customers.
5) Offer trade partner incentives. Incentivize trade partners for recruiting first-time participants and for upselling projects, increasing the value proposition for trade partner participation.	The Company will review the trade partner incentive structure to encourage first-time participants or increasing the scope of potential projects.
6) Target outreach efforts on trade partners with greater ability to influence customer decision-making.	The Company will maintain partnerships with industry associations to create relationships with new trade partners and deepen relationships with existing trade partners.
7) Support trade partners to identify and implement opportunities by developing a trade partner list, holding advisory board meetings or roundtable discussions.	The Company has a trade partner list currently in place and will continue to maintain the list. Additionally, the Company does host advisory board meetings with all interested parties. Efforts will be made to include new, interested parties in the advisory board meetings.
8) Change the study design. Review study content to increase the efficiency of projects or identify additional opportunities not already under consideration.	The Company will review the current study design. The Company will engage with trade partners to review potential improvements to the study design to encourage identification and implementation of energy efficient recommendations.
9) Make changes to the incentive design. Promote technologies that are not well accepted through implementing a tiered incentive structure.	The Company agrees to review technologies that are not widely accepted for value and market transformation potential.
10) Review facility and equipment eligibility criteria and communications. Make sure eligibility requirements are explicit, clearly communicated, and easy to find on every communication channel.	The Company will review and make necessary improvements to all internal and external materials on all communication channels to clearly communicate eligibility requirements.
11) Make rebate forms easier to complete. To make forms easier to complete, consider changing the format to an Excel workbook or online form and review fields and structure of documents to make them more user-friendly.	The Company will review rebate forms to make improvements while ensuring consistency across the portfolio. The Company does offer online rebate applications for prescriptive offerings available to data center customers.