

2014 Comprehensive Evaluation: Colorado Energy Management Systems

Recommendations and Responses

February 2015

Executive Summary

The Energy Management Systems product follows a custom participation process. This product offers rebates to business customers for installing building automation systems that control and reduce a building's energy usage. All commercial and industrial PSCO customers are eligible to participate, with a primary target market of commercial customers with a demand of 500 kW or greater. Electric and gas customers are eligible for participation in this product.

The full report, completed by Tetra Tech, is attached to this summary.

Recommendation	Response
<u>Program Design</u>	
1. Continue current portfolio-wide efforts to review and revise program-level goals as needed to ensure goals are achievable and reasonable.	The Company will continue to be proactive in aligning energy savings goals with the market potential for EMS.
2. Continue to monitor the program's cost-effective delivery as a stand-alone program versus integrated delivery.	The Company will evaluate best practices for EMS as a stand-alone product offering versus a potentially more integrated delivery option.
3. Further assess situations when the integration of lighting controls into EMS systems is the best option for participants and consider program strategies to encourage the integration of lighting controls in those situations. Strategies could include targeted offerings to segments with the greatest savings potential and/or facilitating partnerships between mechanical and lighting contractors.	The Company will continue to optimize integration of new technologies, such as lighting controls, into the product. The Company intends to facilitate partnerships with mechanical and lighting vendors through vendor meetings and "lunch and learns."

<p>4. If determined to be cost-effective, proceed with ongoing plans for an EMIS offering in response to the growing demand for informational systems in the Colorado market.</p>	<p>This recommendation has been addressed in the 2015/16 DSM Plan, with the addition of an EMIS measure to the product.</p>
<p>5. Monitor the influence of current and any new program offerings, such as EMIS, on the customer decision-making process. If participation levels permit, consider quantitatively measuring free-ridership and spillover effects to ensure the program’s NTG assumptions accurately reflect program attribution</p>	<p>Historical program participation on an annual basis has been too low to support calculation of a statistically significant NTG. However, in 2010, the Company conducted an evaluation in Minnesota of a similar program—Efficiency Controls—which recommended a NTG of 0.90 for new system installations. Likewise, Massachusetts utilities—National Grid, Until, NSTAR, and Western Massachusetts Electric—have utilized similar NTGs for their EMS products, as documented in 2012, having a NTG of 93% for their C&I Large Retrofit. Cape Light Compact has a 90% NTG for their C&I New Construction and Major Renovations. Thus, the Company feels that the current NTG of 87%, which aligns with the NTG applied to th Company’s other custom electric projects, based on the National Energy Efficiency Best Practices Report (http://www.eebestpractices.com), takes a conservative approach. The Company will continue to monitor key quantitative factors in a manner consistent with our EM&V plan for all DSM products in the portfolio.</p>
<p><u>Program Delivery</u></p>	
<p>1. Maintain current internal communication processes and continue to ensure there are adequate resources to effectively administer program functions.</p>	<p>The Company will continue to maintain its internal communication and coordination procedures, and evaluate opportunities for further efficiency and effectiveness improvement.</p>

<p>2. Continue efforts to optimize the tracking systems for administration and evaluation purposes and continue exploring opportunities to further enhance system capabilities, weighing the associated benefits and costs of these efforts</p>	<p>The Company will evaluate additional opportunities and methods for tracking additional information in Salesforce. In Salesforce, the “Engineering Details” section for an EMS opportunity will be utilized to track descriptions of measures including control systems. The Company will improve tracking descriptions of the systems controlled by EMS using Salesforce as the electronic tracking system, versus paper applications. This will enhance efficiency for future process and impact evaluation efforts.</p>
<p>3. Continue ongoing outreach efforts to EMS contractors, educating them on program requirements. Be proactive in informing trade allies of key program design changes and consider strategies for leveraging the trade infrastructure to support the implementation of those strategies.</p>	<p>The Company intends to facilitate partnerships with mechanical and lighting vendors through opportunities such as vendor meetings and “lunch and learns,” etc.</p>
<p>4. Encourage customers and contractors to provide as much detail on their proposed project, including any expected energy savings estimates, upfront in their proposals to facilitate comparison with Xcel Energy’s energy savings analysis. In cases where there are substantial discrepancies between energy savings estimates, attempt to reconcile these differences with the contractor who submitted the proposal before preapproving or rejecting the project.</p>	<p>The Company will increase coordination with customers at early project stages to help educate them on our energy savings analysis and parameters. The EMS application’s “Program Requirements and Guidelines” section will be updated to enable the customer / vendor provides savings estimates. If the customer’s / vendor’s energy savings estimates show a 10% or more difference from the Company’s savings analysis, the Company will offer the opportunity to discuss the calculations with the customer / vendor via phone, web conference, or an in-person meeting.</p>

<p>5. Consider cost-effective strategies to document system setting changes made post-implementation and assess the impact of these changes on realized energy savings. Possible strategies could include reviewing the program's M&V protocols and/or conducting a formal impact evaluation of the program. Any additional costs of these efforts should be balanced with the potential associated benefits and program savings, in accordance with industry standards.</p>	<p>The Company will continue to follow the International Performance Measurement & Verification Protocol (IPMVP) criteria and the Company's custom M&V process for determining energy savings' persistence, in accordance with industry standards. Thus, the Company will continue to conduct M&V for projects that have 1 GWh or more of electric savings.</p> <p>The Company will work to improve customer outreach to encourage communication with Account Management and the trade for ongoing system improvements.</p>
<p>6. Continue to tailor customer outreach messaging and encourage sales staff and trade allies to highlight additional benefits to installing EMS beyond energy savings to find the messaging that resonates best with customers.</p>	<p>The Company will continue to inform and train internal sales staff to communicate and highlight the benefits of EMS systems to a variety of customers based on their unique needs. Channel Management and Program Management will continue to meet with trade allies to ensure marketing messaging highlights the benefits and importance of the product offerings for the customer.</p>
<p><u>Program Satisfaction</u></p>	
<p>1. Continue current efforts to maintain high participant satisfaction and monitor issues that could lead to dissatisfaction.</p>	<p>The Company will work to improve follow up with customers after a project is rebated to assess the EMS system's ongoing operations and any additional changes.</p>



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Xcel Energy

Process Evaluation of the Energy Management Systems Program— Colorado

December 17, 2014



Xcel Energy

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EXECUTIVE SUMMARY

Xcel Energy is looking for meaningful ways to improve the elements of its demand side management (DSM) business programs, its customer-reach capabilities, and the operation efficiency of their programs so that they can successfully meet program goals and objectives. To assist Xcel Energy in this aim, Xcel Energy selected a third-party vendor (Tetra Tech) through a competitive Request for Proposals (RFP) process.

The Colorado Energy Management Systems program was evaluated in 2014. This executive summary provides an overview of the 2014 process evaluation of the Energy Management Systems program in Colorado.

I. PROGRAM OVERVIEW

Xcel Energy offers a comprehensive portfolio of energy-related products and services to 3.4 million electricity and 1.9 million natural gas customers. In Colorado, Xcel Energy has 193,624 commercial customers and 4,195 industrial customers. These include electric only, gas only, and combined electric and gas customers.

The Energy Management Systems program offers rebates to business customers for installing building automation systems that control and reduce a building's energy usage. All commercial and industrial Xcel Energy customers are eligible to participate in the program. However, the primary target market of the Energy Management Systems program is large commercial customers with a demand of 500 kW or more. Only new, centrally based energy management systems are eligible for rebates through the program. In 2014, the program offered electric rebates of up to \$600 per kW saved and natural gas rebates of \$4 per Dth saved. In 2013, the Energy Management Systems program had 44 electric participants and 14 natural gas participants.

The program is primarily marketed through trade allies and account management staff, leveraging their direct relationships with customers. Xcel Energy works with vendors who provide energy management system services to the market in order to encourage participation. The program also uses some marketing collateral, including a program brochure and the program website.

The Energy Management Systems program follows a custom participation process. Each project requires preapproval and is individually analyzed to estimate energy savings. Prospective participants work with their account manager and/or vendor to submit an application. A third-party engineering consultant then conducts an initial project analysis using a spreadsheet model to determine projected energy savings. Xcel Energy's engineering staff review the initial analysis, and once the analysis is approved, a preapproval or rejection letter is sent to the customer. Xcel Energy verifies project implementation before finalizing rebates.

II. EVALUATION METHODOLOGY

Tetra Tech conducted a process evaluation of the program in 2014. The process evaluation provides Xcel Energy with a thorough understanding of how the program is operating from the perspectives of internal program staff, participating business customers, and participating



trade allies, as well as benchmarked information for similar programs offered throughout the country.

The evaluation research included four primary activities—an internal review including interviews with 13 program staff, 18 participant interviews, qualitative interviews with 9 trade allies engaged in the program, and a benchmarking study of 12 other peer-utility programs including 5 peer-utility program staff interviews.

III. SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

The evaluation research indicates that overall the program is operating effectively and is well-situated to promote the implementation of energy management systems. The program has been generally successful in meeting its goals, and communications work well among program staff. Program staff have been proactive in taking steps to improve the program processes and documents, and maintain relationships with trade allies. Program messaging, which highlights both energy savings and other non-energy related benefits of energy management systems (EMS), aligns well with priorities identified by participants during the evaluation research. Participants and trade allies are largely satisfied with their experiences with the program, and generally spoke highly of their interactions with Xcel Energy staff. The benchmarking research revealed that Xcel Energy's EMS offerings are fairly well aligned with other offerings across the country, though the program's stand-alone structure is somewhat unique.

While the program has been operating well, the evaluation research also identified some opportunities for additional program support. Feedback from trade allies and Xcel Energy staff indicates that while improvements have been made, there remain opportunities to improve communication with trade allies and increase transparency during the preapproval process. Evaluation findings also suggest that additional follow-up with participants may be warranted after project implementation to document any changes in system settings that may affect energy savings impacts, as several participating customers and trade allies reported making changes to settings after implementation. These reports, along with mixed qualitative feedback from both trade allies and participants on the program's influence on the customer decision-making process, suggest the program might benefit from quantitative evaluation research to verify program gross and net impacts.

In addition, program staff continue to seek out opportunities to grow EMS offerings. One ongoing challenge faced by the program is difficulty in incorporating integrated lighting controls into EMS projects. Participant, trade ally, and benchmarking findings indicate that commercial customers may not see a need to integrate lighting controls, as the projects are often expensive and customers may be satisfied with their current lighting setup. Compounding this difficulty, trade ally and program staff reports suggest that lighting and mechanical EMS services are often offered by separate firms, who only occasionally partner together. Xcel Energy is also exploring offering a more advanced EMS product, such as energy management information systems (EMIS), in Colorado. Research with both trade allies and benchmarked utilities supported this opportunity. Both groups reported a growing demand in the market for technologies that provide monitoring or feedback capabilities. All benchmarked utilities are currently or planning to offer a similar offering.

The key findings and recommendations from the evaluation are discussed in more detail below.



IV. PROCESS EVALUATION FINDINGS

The process evaluation findings and recommendations synthesize findings across program staff interviews, participating customer interviews, in-depth interviews with trade allies, and benchmarking of similar programs across the country. Below we summarize key findings and recommendations in the following areas: program design, program delivery, and program satisfaction.

a. Program design

Xcel Energy has been proactive in right-sizing program energy savings goals to portfolio goals and technology market potential.

The Energy Management Systems program has met, or almost met, its energy savings goals in recent years. According to program staff, the program struggled to achieve goals after its initial launch, largely due to overstated goals for the Colorado market. In recent years, Xcel Energy has responded by revising EMS goals and its contributions to the business demand side management (DSM) portfolio to be better aligned with the Colorado market. This continuing effort is especially important for programs like EMS that have a limited target market and offerings that can potentially overlap with other Xcel Energy programs (e.g., Segment Efficiency, Process Efficiency, Custom Efficiency, and Recommissioning). Benchmarking research with peer utilities indicates that Xcel Energy's target market and current participation levels are in line with other programs that offer EMS.

Recommendation #1: Continue current portfolio-wide efforts to review and revise program-level goals as needed to ensure goals are achievable and reasonable.

The Energy Management Systems program is delivered similarly to benchmarked peer utility programs, though its stand-alone structure is somewhat unique.

While specific program designs and goals varied across benchmarked programs, like Xcel Energy, most researched programs offer custom-calculated incentives for EMS, employ similar customer recruitment strategies, and follow a similar application process. Preapproval is a standard requirement for most EMS projects across programs. Participation processes generally follow a similar custom incentive process—(1) preapproval application is submitted, (2) program reviews application, estimates energy saving and rebate levels, and approves project, (3) customer implements project, (4) program conducts necessary QA and verification, and (5) incentive is paid to the customer. In addition, like Xcel Energy's program, account management and trade allies are the primary customer outreach arms for other EMS offerings.

The evaluation team found relatively few utilities that offered stand-alone energy management system offerings, and those that did tended to focus on advanced technologies such as EMIS or advanced lighting controls. While Xcel Energy's stand-alone focus is



relatively unique, it may offer benefits in terms of the ability to market EMS more deliberately to customers and trade allies, as opposed to offering EMS under a more general custom program umbrella. This is supported by interviews with trade allies, who were all highly aware of and engaged in the program.

Recommendation #2: Continue to monitor the program's cost-effective delivery as a stand-alone program versus integrated delivery.

External barriers such as a segregated trade market and the comparatively high cost of integrated lighting controls have made encouraging the adoption of these measures difficult, but this challenge is not unique to Xcel Energy's program.

Program staff stated that the Energy Management Systems program has had less success encouraging the implementation of integrated lighting controls, as compared to HVAC or mechanical EMS projects. Research with participating customers revealed that one-third of the interviewed participants reported that their lighting controls were integrated into their larger EMS. The evaluation research uncovered several reasons behind this. One challenge is the structure of the trade ally market, as HVAC/mechanical and lighting services are often offered by separate firms who only occasionally partner together.

Additionally, the push for more efficient lighting bulbs and fixtures in recent years may also have an effect, especially when combined with the relatively high cost of integrated lighting controls. Research with trade allies, program participants, and peer utilities all indicated that customers may be satisfied with the efficiency and energy savings from a simpler and less-expensive lighting retrofit project, and commercial customers in particular may be able to satisfy their control needs simply by using occupancy or daylight sensors. Given this, it may not be reasonable for the program to try and achieve integration of lighting controls across all program participants, but instead for those participants where there are more substantial energy savings for the customers.

A couple of programs included in the benchmarking research are attempting to address these challenges through a targeted lighting controls strategy. One utility offers a separate integrated lighting controls program targeted at industrial customers, which program staff noted as a better fit in terms of energy savings potential for advanced lighting controls projects than commercial customers. Another major utility is also currently in the development stages of a similar lighting controls offering, though the target market is currently not known.

Recommendation #3: Further assess situations when the integration of lighting controls into EMS systems is the best option for participants and consider program strategies to encourage the integration of lighting controls in those situations. Strategies could include targeted offerings to segments with the greatest savings potential and/or facilitating partnerships between mechanical and lighting contractors.



Xcel Energy’s plans to add an energy management information systems product appear to align well with the EMS market, as both trade allies and benchmarked utilities reported an increased interest in and demand for EMS technologies that include feedback or monitoring capabilities.

Xcel Energy is planning to expand the Energy Management Systems program to include the addition of an energy management information system offering, focused on providing building managers with more granular monitoring and feedback system capabilities to optimize controls strategies. All of the interviewed peer utility program managers indicated that they were currently or were considering implementing EMS offerings that included monitoring or feedback capabilities, such as EMIS or advanced lighting controls. Several trade allies noted that the growing demand for data to drive decisions would also result in higher demand for technologies like EMIS. These findings suggest that Xcel Energy’s plans to offer an EMIS product align well with industry practices and the direction of the EMS market.

Recommendation #4: If determined to be cost-effective, proceed with ongoing plans for an EMIS offering in response to the growing demand for informational systems in the Colorado market.

Qualitative feedback from a sample of participating customers and trade allies indicates varying levels of perceived influence on customer decision-making.

Due to limited participation numbers, the evaluation research did not include a quantitative assessment of program attribution. However, qualitative feedback on the program’s impact on the customer decision-making process was gathered during in-depth interviews with a subset of participants and trade allies. Responses were mixed when participating customers were asked what impact the program rebate and other assistance provided by Xcel Energy had on their decision to implement the EMS they did through the program. Several participants reported that the program rebate was vitally important in gaining approval for the project, defining the project scope, or expediting the timing of implementation, while some others felt that their firm would have implemented the same project regardless of whether or not a rebate or other assistance was available from Xcel Energy. Trade ally perceptions of the influence of the program rebate in driving customers’ decisions to install EMS systems were also mixed, though several trades noted the role of Xcel Energy rebates in maximizing return-on-investment and freeing up funds for additional upgrades.

As mentioned above, the process evaluation scope did not include a quantitative assessment of program attribution. In order to accurately assess program attribution, a quantitative assessment of free-ridership and spillover effects using a statistical sample of participating customers and contractors involved in the customer decision-making process would be warranted.

In addition, new measure offerings can have a substantial impact on program attribution, especially for emerging technologies with low market penetration. If an EMIS offering is



added to the program and becomes a substantial contributor, this addition may have a positive impact on program attribution levels.

Recommendation #5: Monitor the influence of current and any new program offerings, such as EMIS, on the customer decision-making process. If participation levels permit, consider quantitatively measuring free-ridership and spillover effects to ensure the program's NTG assumptions accurately reflect program attribution.

b. Program delivery

Internal processes are well defined and coordination within the internal Xcel Energy team is working well.

Internal communications appear to be working well, both internally within Xcel Energy and with the program's contracted third-party engineer. Program processes and staff roles are well defined and understood, and staff generally felt that they had sufficient and appropriate resources to effectively administer the program. Several staff members reported excellent communication among team members and efficient coordination between staff to keeping turnaround times short. Additionally, account management and Business Solutions Center (BSC) staff spoke positively of the program, were well versed in program requirements, and reported that they actively marketed the program to their customers.

Recommendation #6: Maintain current internal communication processes and continue to ensure there are adequate resources to effectively administer program functions.

The program tracking system is working effectively to administer program activities and track project status.

Now in its second full year of use, program staff expressed positive feedback toward the Salesforce tracking system. Interviewees report the tracking system transition has helped to make strides in application processing, resulting in shorter turnaround times and improved reporting functions. In 2014, Xcel Energy began using Salesforce to run marketing campaigns, facilitating more targeted outreach and enhanced tracking.

In addition, the participant data tracked within Salesforce was generally sufficient to support process evaluation activities, though there may be opportunities to track additional information electronically to further support evaluation purposes. In particular, at the time of the evaluation, a description of the systems controlled by the rebated EMS (e.g., heating, cooling, lighting, etc.) and project costs were currently only tracked on paper applications, not electronically. These key project details may be used in both process and impact evaluation efforts for end-use stratification, participant recall, and customer decision-making research.



Notably, according to Xcel Energy staff, efforts are currently underway to link project costs into Salesforce.

Recommendation #7: Continue efforts to optimize the tracking systems for administration and evaluation purposes and continue exploring opportunities to further enhance system capabilities, weighing the associated benefits and costs of these efforts.

The program has been successful in engaging trade allies with extensive experience working in the EMS market to play integral roles in customer recruitment and project implementation.

In recent years, Xcel Energy has worked to re-engage EMS contractors. All participating trade allies interviewed reported substantial experience specifying and selling EMS to the commercial market and were able to provide considerable insight on EMS technologies and the larger market for integrated controls.

Consistent with the program's design, trade allies were mentioned by program participants as key sources of program awareness alongside Xcel Energy account management staff. In addition, trade allies play a central role in completing program applications and project proposals for customers. A majority of participants stated that their contractor completed or assisted in the completion of the preapproval application. Feedback from trade allies also indicated that trade allies were very familiar with program processes; most had submitted at least two or three program applications in the past year.

Given the high "touch" level trade allies have with Energy Management Systems program participants, regular outreach from Xcel Energy is a good practice to ensure trade allies, and therefore customers, are receiving the most accurate program information. This outreach is especially important when implementing program design changes (e.g., addition of EMIS).

Recommendation #8: Continue ongoing outreach efforts to EMS contractors, educating them on program requirements. Be proactive in informing trade allies of key program design changes and consider strategies for leveraging the trade infrastructure to support the implementation of those changes.

While the program has recently taken steps to improve the preapproval process, several trade allies still experienced challenges with Xcel Energy's rebate and energy savings calculations process.

In recent years, program staff have taken steps in response to trade ally feedback to streamline the preapproval process, including revising the preapproval application. Program staff have also taken proactive approaches to gathering feedback from trade allies and are working to maintain and improve those relationships.



While trade allies were generally satisfied with the program, three out of seven interviewees reported some frustration and confusion during preapproval processes on recent projects. Most confusion centered on projects being rejected or estimated energy savings and rebates being much lower than trade allies projected. All three interviewees said they requested additional information on why the projects were rejected or rebate amounts differed, but they were not fully satisfied with the explanation they received from Xcel Energy on these projects. One interviewee noted that the uncertainty of not knowing what had caused previous projects to fail had made them wary to submit future EMS applications.

One challenge noted by Xcel Energy engineering staff is that contractors rarely provide their own energy savings estimate calculations in their proposals. As a result, it may not be possible to identify situations where Xcel Energy's analysis differs substantially from the contractor's or customer's own savings estimate until after the preapproval decision has been made and communicated to the customer. Engineering staff report learning about discrepancies between the savings analysis and the contractor's expectations from the contractor only after the preapproval letter had been sent. In these cases, staff report meeting with the contractor to discuss the discrepancies and attempt to reconcile. However, identifying these differences only after preapproval may still, at a minimum, cause contractor confusion or embarrassment with their customer.

As discussed above, trade allies are an important means of program awareness and program support. While it is likely not desirable or practical to provide trade allies with all calculations used by Xcel Energy to calculate project energy savings, providing trade allies more direction on reasons behind project rejections or discrepancies may help limit application rework and participant frustration that could discourage future program participation.

Recommendation #9: Encourage customers and contractors to provide as much detail on their proposed project, including any expected energy savings estimates, upfront in their proposals to facilitate comparison with Xcel Energy's energy savings analysis. In cases where there are substantial discrepancies between energy savings estimates, attempt to reconcile these differences with the contractor or customer who submitted the proposal before preapproving or rejecting the project.

A majority of participants interviewed report making adjustments to system settings of their rebated EMS system several weeks after installation.

The research with participating customers revealed that a majority of respondents (12 of 18) have changed system settings or set points after project implementation. The magnitude of the changes is unclear; some respondents noted they had made changes in order to save more energy, while others noted they changed their settings due to building occupancy schedules or tenant comfort. These changes appear to be happening weeks or months post-installation, as participants tweak the systems.



Currently, the program verifies installation of qualifying EMS via phone or in-person visit before the rebate is paid. In addition, the program follows Xcel Energy's standard measurement and verification (M&V) protocols for custom projects, requiring post-M&V for projects with at least 1GWh or 20,000 Dth in estimated energy savings. Few EMS projects have met this savings threshold for post-M&V, and these activities are typically conducted within two weeks of installation. Considering the timing of changes participants have made to their EMS systems, these verification procedures are likely not able to detect the impacts of system adjustments on realized energy savings.

The benchmarking research found that while M&V protocols for EMS vary by program, at least two benchmarked programs conduct some type of post-M&V activities several months after implementation to verify estimated savings. One utility conducts post-M&V for custom EMS projects meeting a savings threshold typically after the system is functioning to its design intent and possibly longer to verify seasonal measure impacts. Another peer-utility program reviews customer interval consumption data the following year after implementation to determine if there are substantial variances from the original savings estimate.

While minor system changes likely would not significantly impact Xcel Energy's savings calculations, an additional follow-up visit several months after project installation would allow the system to "settle" into more consistent operations and also allow Xcel Energy to assess whether significant changes have been made to the system. Additionally, a formal impact evaluation using industry standard methods could shed light on the magnitude of changes made to systems and the implications of these changes on realized energy and demand savings.

Recommendation #10: Consider cost-effective strategies to document system setting changes made post-implementation and assess the impact of these changes on realized energy savings. Possible strategies could include reviewing the program's M&V protocols and/or conducting a formal impact evaluation of the program. Any additional costs of these efforts should be balanced with the potential associated benefits and program savings, in accordance with industry standards.

The program has been successful in highlighting additional perceived benefits to participation beyond energy savings, such as reduced equipment maintenance and higher tenant satisfaction, in customer outreach messaging.

All participants mentioned energy savings as a benefit they had considered when implementing their EMS through the program; however, participants mentioned non-energy related benefits as well. More control over building systems and less wear and tear on equipment were also mentioned by participants, as was higher tenant satisfaction and fewer tenant complaints.



Highlighting non-energy benefits of participation in marketing messages and focusing on benefits of particular importance is recognized as industry best practice.¹ The non-energy related benefits discussed above are well-documented on Xcel Energy’s program website and in the program informational brochure. Given its target market, this practice is likely especially important for the Energy Management Systems program to help overcome split-incentive barriers by giving building owners who may be paying energy bills additional motivations for making capital investments in EMS and other energy efficiency projects.

Recommendation #11: Continue to tailor customer outreach messaging and encourage sales staff and trade allies to highlight additional benefits to installing EMS beyond energy savings to find the messaging that resonates best with customers.

c. Program satisfaction

Both participating customers and trade allies are largely satisfied with the program and their interactions with Xcel Energy staff.

A vast majority of interviewed participants (13 of 18) indicated they were “very satisfied” with the program overall, and satisfaction levels with specific program components (such as the preapproval process) were fairly high as well. Respondents especially emphasized the helpfulness of Xcel Energy and contractor staff, positive experiences with program processes, and benefits from more reliable and efficient equipment. A few participants noted dissatisfaction in certain areas—such as the complexity of the custom rebate process or smaller-than-expected rebates—but these issues were not systemic. Participants were also generally satisfied with Xcel Energy overall, and all but two respondents said their experience with the Energy Management Systems program has positively impacted their satisfaction with Xcel Energy as their provider.

Trade allies generally reported very positive interactions with Xcel Energy staff throughout the participation process and view Xcel Energy as a valued partner in offering energy efficiency to their customers. Aside from requesting additional clarification on energy savings and rebate calculations during preapproval as discussed above, there were no reports of issues or problems within the working relationships between trade allies and Xcel Energy.

Recommendation #12: Continue current efforts to maintain high participant satisfaction and monitor issues that could lead to dissatisfaction.

¹ Best Practices Benchmarking for Energy Efficiency Programs. *BP_Self_Benchmarking_Tool_Final_110707*. California Public Utility Commission in association with the California Energy Commission, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. <http://www.eebestpractices.com/>.



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The Tetra Tech Business DSM Program Evaluation Team was made up of the following individuals: Steve Drake, Lisa Obear, Lark Lee, and Scott Wagner.



TABLE OF CONTENTS

Executive Summary	i
I. Program Overview	i
II. Evaluation Methodology.....	i
III. Summary of Key Findings and Recommendations	ii
IV. Process Evaluation Findings	iii
a. Program design	iii
b. Program delivery	vi
c. Program satisfaction	x
1. Introduction	1-1
1.1 Program Overview	1-1
1.2 Program Logic Model and Process Flow Map	1-1
1.3 Evaluation Methodology	1-6
1.4 Report Organization	1-6
2. Summary of Key Findings and Recommendations	2-1
2.1 Overview of Program Successes and Challenges	2-1
2.2 Process Evaluation Findings	2-1
2.2.1 Program design	2-2
2.2.2 Program delivery	2-5
2.2.3 Program satisfaction	2-9
3. Evaluation Results—Internal Review	3-1
3.1 Introduction	3-1
3.2 Summary of Findings	3-1
3.2.1 Areas that are working well	3-3
3.2.2 Opportunities for improvement or additional research	3-5
4. Evaluation Results—Participant Findings.....	4-1
4.1 Introduction	4-1
4.2 Key Findings	4-2
4.3 Detailed Findings	4-3
4.3.1 Sources of program awareness	4-3
4.3.2 Project implementation and participation experience	4-4
4.3.3 Decision-making processes	4-5
4.3.4 Participant satisfaction	4-7
4.3.5 Customer profile	4-8



5. Evaluation Results—Trade Ally Findings	5-1
5.1 Introduction	5-1
5.2 Key Findings	5-2
5.3 Detailed Findings	5-3
5.3.1 Program awareness and involvement	5-3
5.3.2 Customer awareness and decision-making processes	5-4
5.3.3 Program procedures	5-5
5.3.4 Commercial market	5-6
6. Evaluation Results—Benchmarking	6-1
6.1 Introduction	6-1
6.2 Key Findings	6-2
6.3 Detailed Findings	6-3
6.3.1 Program design	6-8
6.3.2 Program delivery	6-14
6.3.3 Emerging and advanced technologies	6-15
APPENDIX A: Program Staff Interview Guide	A-1
APPENDIX B: Trade Ally Interview Guide.....	B-1
APPENDIX C: Participant Interview Guide.....	C-1
APPENDIX D: Benchmarking Interview Guide	D-1

TABLE OF TABLES

Table 4-1. Likelihood of Implementing Same Project without Program Rebate	4-6
Table 4-2. Participant Satisfaction with Program Components.....	4-7
Table 4-3. Participant Building Type	4-8
Table 6-1. Summary Table of Benchmarking Study Findings.....	6-4
Table 6-2. National Grid Massachusetts Incentive Structure	6-11
Table 6-3. Levels of Participation in SMUD’s EMS Performance Incentive	6-12

TABLE OF FIGURES

Figure 1-1. Colorado Energy Management Systems Program Logic Model	1-3
Figure 1-2. Colorado Energy Management Systems Program Process Flow Map	1-5



1. INTRODUCTION

Xcel Energy is looking for meaningful ways to improve the elements of its demand side management (DSM) business programs, its customer-reach capabilities, and the operation efficiency of their programs so that they can successfully meet program goals and objectives. To assist Xcel Energy in this aim, Xcel Energy selected a third-party vendor (Tetra Tech) through a competitive Request for Proposals (RFP) process.

In 2014, Tetra Tech conducted a process evaluation of the Colorado Energy Management Systems program.

1.1 PROGRAM OVERVIEW

Xcel Energy offers a comprehensive portfolio of energy-related products and services to 3.4 million electricity and 1.9 million natural gas customers. In Colorado, Xcel Energy has 193,624 commercial customers and 4,195 industrial customers. These include electric only, gas only, and combined electric and gas customers.

The Energy Management Systems program offers rebates to business customers for installing building automation systems that control and reduce a building's energy usage. All commercial and industrial Xcel Energy customers are eligible to participate in the program. However, the primary target market of the Energy Management Systems program is large commercial customers with a demand of 500 kW or more. Only new, centrally based energy management systems are eligible for rebates through the program. In 2014, the program offered electric rebates of up to \$600 per kW saved and natural gas rebates of \$4 per Dth saved. In 2013, the Energy Management Systems program had 44 electric participants and 14 natural gas participants.

The program is primarily marketed through trade allies and account management staff, leveraging their direct relationships with customers. Xcel Energy works with vendors who provide energy management system services to the market in order to encourage participation. The program also uses some marketing collateral, including a program brochure and the program website.

The Energy Management Systems program follows a custom participation process. Each project requires preapproval and is individually analyzed to estimate energy savings. Prospective participants work with their account manager and/or vendor to submit an application. A third-party engineering consultant then conducts an initial project analysis using a spreadsheet model to determine projected energy savings. Xcel Energy's engineering staff review the initial analysis, and once the analysis is approved, a preapproval or rejection letter is sent to the customer. Xcel Energy verifies project implementation before finalizing rebates.

1.2 PROGRAM LOGIC MODEL AND PROCESS FLOW MAP

A program logic model documents the activities a program undertakes and the intended consequences of those activities. In addition, it lists the inputs and resources needed to complete those activities. Evaluators drafted a program logic model in July of 2014 based on a review of program documentation and interviews with program staff. The logic model presented in Figure 1-1 includes edits based on product manager feedback.



1. Introduction

The Energy Management Systems program features core primary activities—develop program infrastructure, trade partner communications, customer communications, project analysis and preapproval, and project implementation and rebates. These activities have both short- and long-term goals, including knowledgeable Xcel Energy staff, engaged trade allies, informed customers, streamlined and cost-effective program delivery, and increased penetration of integrated energy management systems in the Colorado business market.



1. Introduction

Figure 1-1. Colorado Energy Management Systems Program Logic Model

Inputs/ Resources	Budget and staff (sufficient and reflected in corporate budget and strategy/planning)	Channel Manager, Account Managers, BSC staff, Engineering Department, 3rd party engineering support	Marketing materials, program website, case studies, worksheets and informational materials support	Engineering staff, account managers, BSC staff, program manager, 3rd party engineering support	Program manager, EEEs, Account managers, BSC staff, Rebate Ops
	Corporate and DSM support: DSM Regulatory, Corporate Accounting, IT support; Rebate Operations	Trade partner relationships	Internal training to account managers and BSC staff	Post-installation follow-up and M&V policies	Project preapproval application and worksheet
	PUC support and approval				
	Xcel Energy CO EMS Team (Program Manager, Account Managers, BSC staff, EEEs, Channel manager) and 3rd party engineering support	Salesforce	Corporate Communications, Corporate Design, Public Affairs and Legal Affairs	Preapproval application documentation, project worksheets, and vendor proposal	Project close out / final approval documents and process
Activities	Develop Program Infrastructure	Trade Partner Communications	Customer Communications	Project Analysis and Preapproval	Project Implementation and Rebates
Outputs	Program eligibility, incentives, website, program applications, M&V documents, equipment worksheets, correspondence and marketing strategy are developed	Trade partners identify opportunities, prepare proposals for customers, and deliver/assist with applications	Account Managers and BSC staff respond to and assist with completing program applications	Project reviews capture key approval factors, including energy savings, payback, and cost effectiveness	Projects are completed and relevant project invoices are submitted by customers, trade and/or sales representatives.
	Xcel Energy staff trained on eligible customers and projects, incentive structure and participation processes	Trade partners are trained on the program and are updated with program updates/changes	Account Managers and BSC staff track and assist customers through project implementation and close-out process	Ongoing improvements to improve project review timelines while maintaining project review standards	Energy savings are verified according to protocols
	Tracking and information systems developed	Account Managers and BSC Staff work with vendors to assist in completing applications	Marketing materials and advertisements are used to communicate technology opportunities and program offerings		Customer receives appropriate rebate payment upon project completion in a timely manner
	Savings goals, application process, pre-approval process, policies, guidelines	Xcel Energy Engineers and 3rd party engineering firm communicate with trade partners for clarifications on information needed to complete engineering analysis			Xcel Energy records the correct energy savings credit and authorizes the correct rebate amount.
Short to medium term outcomes	Xcel Energy staff knowledgeable about the program and its requirements	Trade partners actively seek out EMS projects and recommend customers participate in the program	Program offerings and participation requirements are clear to customers and communicated in a timely manner	Applications present complete information needed to make project approval decisions	7.3 GWh, 173 kW, and 2,960 Dth savings in 2014; 39 electric and 10 gas participants in 2014
	Energy saving goals of the program are achieved within budgetary constraints	Trade partners understand program rules, changes, and accurately inform customers to facilitate application process	Customers find value in program offerings and perceive benefits to their business	Approved and completed projects pass cost effectiveness requirements	Xcel Energy is able to capture savings not available from prescriptive or holistic programs
	Targets and goals are adjusted based on portfolio objectives and market potential	Trade partners interact with customers and Xcel Energy in a manner that improves the program and customer outcomes	Enhanced incentive levels encourage increased interest in program participation	Approved and completed projects present accurate energy savings and rebate estimates	Customer expectations are met in regards to technology performance, incentive offer, Xcel Energy support and communication, and processing time
	Tracking and information systems used and improved, with necessary information is captured for implementation and evaluations	Fewer rejected applications as trade allies fully understand program requirements	Applications demonstrate complete information needed to make project preapproval and project completion decisions		Post-installation protocols verify installation and system settings
Long term outcomes	Energy savings goals are achieved cost-effectively with high participant satisfaction	Trade partners have an improved understanding of energy savings opportunities	Xcel Energy customers actively seek out EMS project opportunities and proactively engage Account Managers and BSC staff	Application rework is minimized	Customers and trade partners seek additional projects
	Program integrity and credibility remain in good standing with all stakeholders	Trade partners are able to provide complete information at the time of application	Sales, Marketing, Engineering, and Trade Channel staff are viewed as valuable technical resources by customers	Savings and cost effectiveness estimates continue to be accurate	Increased penetration of energy management systems in Xcel Energy's CO commercial customers
		Trade allies understand the benefit to their own business in participating in Xcel Energy programs - new customers, higher customer satisfaction, etc.	Customers engage the program as they implement EMS at multiple facilities, providing continued participation		
		Trade partners help expand technology opportunities for the program		Program is cost-effective overall	



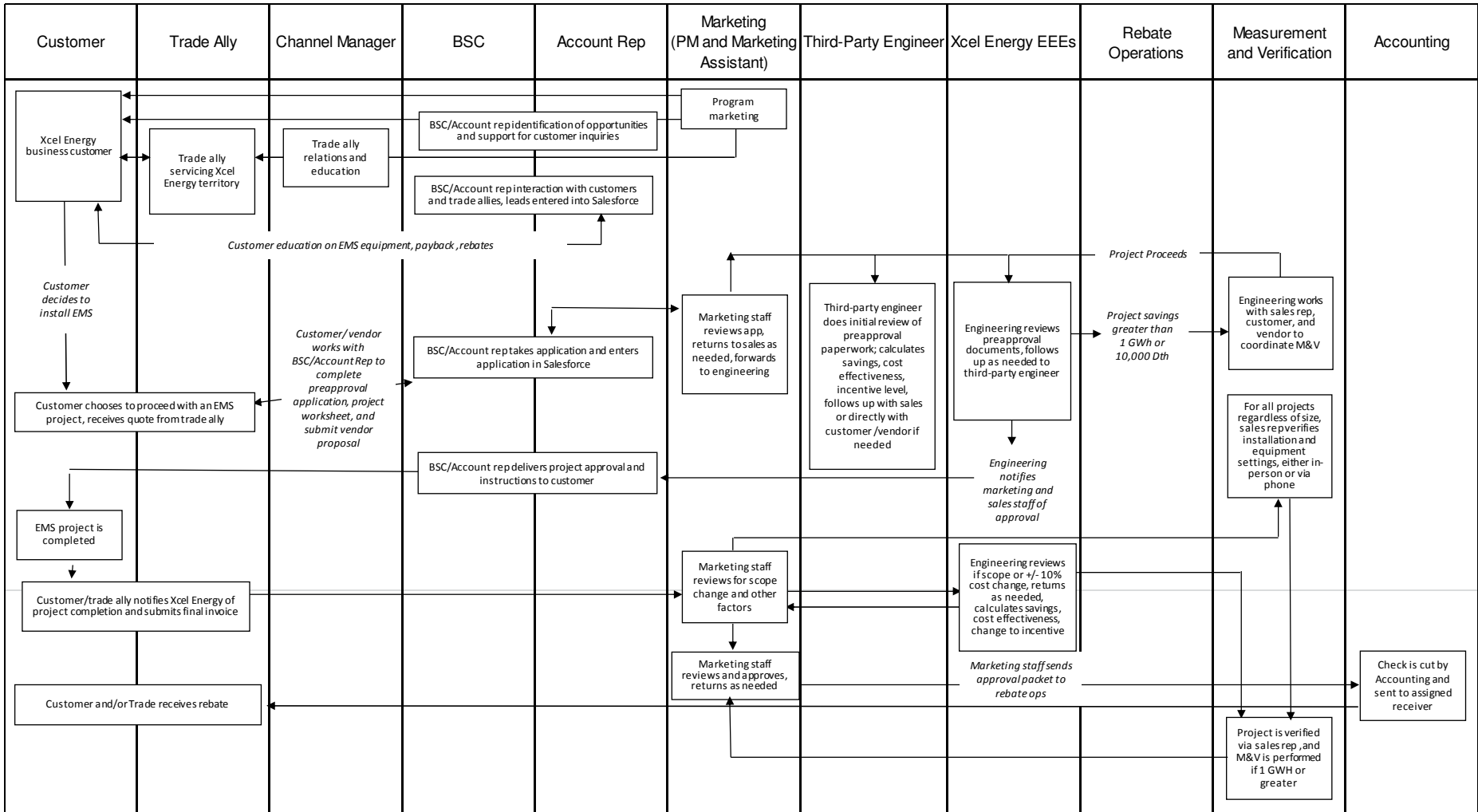
1. Introduction

In addition, the evaluation team developed a program process flow map to further capture the program's design and delivery. Process flow maps capture key implementation tasks and coordination points across the different groups involved in program delivery. The process flow map for the Energy Management Systems program is detailed in Figure 1-2.

1. Introduction



Figure 1-2. Colorado Energy Management Systems Program Process Flow Map





1. Introduction

1.3 EVALUATION METHODOLOGY

Tetra Tech conducted a process evaluation of the program in 2014. The process evaluation provides Xcel Energy with a thorough understanding of how the program is operating from the perspectives of internal program staff, participating business customers, and participating trade allies, as well as benchmarked information for similar programs offered throughout the country.

The evaluation scope of work consisted of the following evaluation tasks:

- Task 1: Start-up meeting and evaluation plan
- Task 2: Internal review and development of logic model and process flow map. This included interviews with a total of 13 internal staff regarding the Colorado Energy Management Systems program, including 12 Xcel Energy staff—the program manager (1), the program trade relations manager (1), Business Solutions Center (BSC) energy efficiency specialists (2), account managers (2), energy efficiency engineers (2), DSM regulatory staff (2), the Colorado DSM marketing manager (1), an Xcel Energy residential and low-income product portfolio manager (1)—and the program’s contracted third-party engineering consultant (1).
- Task 3: Interviews with 18 participating customers who completed a rebated project through the program since the beginning of 2013.
- Task 4: Interviews with nine different trade ally contacts representing seven firms who recently submitted applications through the Energy Management Systems program.
- Task 6: Peer utility benchmarking, which included secondary research on 12 other utility programs and in-depth interviews with staff at five utilities.
- Task 7: Progress reporting, which took place biweekly to keep the evaluation on task and engage Xcel Energy staff throughout the evaluation process.
- Task 8: Reporting and results presentation. This task included interim memo reports and discussion of results for tasks 2–6 as each task was completed, as well as draft and final reports, and a results meeting based on all evaluation research.

1.4 REPORT ORGANIZATION

Section 2 of this report synthesizes overall key findings across all of the evaluation activities. Sections 3 through 6 detail findings from each of the evaluation activities as follows: internal review, participant interviews, trade ally interviews, and peer utility benchmarking. These sections are followed by appendices containing interview guides used for all evaluation primary research activities.



2. SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

2.1 OVERVIEW OF PROGRAM SUCCESSES AND CHALLENGES

The evaluation research indicates that overall the program is operating effectively and is well-situated to promote the implementation of energy management systems. The program has been generally successful in meeting its goals, and communications work well among program staff. Program staff have been proactive in taking steps to improve the program processes and documents, and maintain relationships with trade allies. Program messaging, which highlights both energy savings and other non-energy related benefits of energy management systems (EMS), aligns well with priorities identified by participants during the evaluation research. Participants and trade allies are largely satisfied with their experiences with the program, and generally spoke highly of their interactions with Xcel Energy staff. The benchmarking research revealed that Xcel Energy's EMS offerings are fairly well aligned with other offerings across the country, though the program's stand-alone structure is somewhat unique.

While the program has been operating well, the evaluation research also identified some opportunities for additional program support. Feedback from trade allies and Xcel Energy staff indicates that while improvements have been made, there remain opportunities to improve communication with trade allies and increase transparency during the preapproval process. Evaluation findings also suggest that additional follow-up with participants may be warranted after project implementation to document any changes in system settings that may affect energy savings impacts, as several participating customers and trade allies reported making changes to settings after implementation. These reports, along with mixed qualitative feedback from both trade allies and participants on the program's influence on the customer decision-making process, suggest the program might benefit from quantitative evaluation research to verify program gross and net impacts.

In addition, program staff continue to seek out opportunities to grow EMS offerings. One ongoing challenge faced by the program is difficulty in incorporating integrated lighting controls into EMS projects. Participant, trade ally, and benchmarking findings indicate that commercial customers may not see a need to integrate lighting controls, as the projects are often expensive and customers may be satisfied with their current lighting setup. Compounding this difficulty, trade ally and program staff reports suggest that lighting and mechanical EMS services are often offered by separate firms, who only occasionally partner together. Xcel Energy is also exploring offering a more advanced EMS product, such as energy management information systems (EMIS), in Colorado. Research with both trade allies and benchmarked utilities supported this opportunity. Both groups reported a growing demand in the market for technologies that provide monitoring or feedback capabilities. All benchmarked utilities are currently or planning to offer a similar offering.

The key findings and recommendations from the evaluation are discussed in more detail below.

2.2 PROCESS EVALUATION FINDINGS

The process evaluation findings and recommendations synthesize findings across program staff interviews, participating customer interviews, in-depth interviews with trade allies, and benchmarking of similar programs across the country. Below we summarize key findings and



2. Summary of Key Findings and Recommendations

recommendations in the following areas: program design, program delivery, and program satisfaction.

2.2.1 Program design

Xcel Energy has been proactive in right-sizing program energy savings goals to portfolio goals and technology market potential.

The Energy Management Systems program has met, or almost met, its energy savings goals in recent years. According to program staff, the program struggled to achieve goals after its initial launch, largely due to overstated goals for the Colorado market. In recent years, Xcel Energy has responded by revising EMS goals and its contributions to the business demand side management (DSM) portfolio to be better aligned with the Colorado market. This continuing effort is especially important for programs like EMS that have a limited target market and offerings that can potentially overlap with other Xcel Energy programs (e.g., Segment Efficiency, Process Efficiency, Custom Efficiency, and Recommissioning). Benchmarking research with peer utilities indicates that Xcel Energy's target market and current participation levels are in line with other programs that offer EMS.

Recommendation #1: Continue current portfolio-wide efforts to review and revise program-level goals as needed to ensure goals are achievable and reasonable.

The Energy Management Systems program is delivered similarly to benchmarked peer utility programs, though its stand-alone structure is somewhat unique.

While specific program designs and goals varied across benchmarked programs, like Xcel Energy, most researched programs offer custom-calculated incentives for EMS, employ similar customer recruitment strategies, and follow a similar application process. Preapproval is a standard requirement for most EMS projects across programs. Participation processes generally follow a similar custom incentive process—(1) preapproval application is submitted, (2) program reviews application, estimates energy saving and rebate levels, and approves project, (3) customer implements project, (4) program conducts necessary QA and verification, and (5) incentive is paid to the customer. In addition, like Xcel Energy's program, account management and trade allies are the primary customer outreach arms for other EMS offerings.

The evaluation team found relatively few utilities that offered stand-alone energy management system offerings, and those that did tended to focus on advanced technologies such as EMIS or advanced lighting controls. While Xcel Energy's stand-alone focus is relatively unique, it may offer benefits in terms of the ability to market EMS more deliberately to customers and trade allies, as opposed to offering EMS under a more general custom program umbrella. This is supported by interviews with trade allies, who were all highly aware of and engaged in the program.



2. Summary of Key Findings and Recommendations

Recommendation #2: Continue to monitor the program's cost-effective delivery as a stand-alone program versus integrated delivery.

External barriers such as a segregated trade market and the comparatively high cost of integrated lighting controls have made encouraging the adoption of these measures difficult, but this challenge is not unique to Xcel Energy's program.

Program staff stated that the Energy Management Systems program has had less success encouraging the implementation of integrated lighting controls, as compared to HVAC or mechanical EMS projects. Research with participating customers revealed that one-third of the interviewed participants reported that their lighting controls were integrated into their larger EMS. The evaluation research uncovered several reasons behind this. One challenge is the structure of the trade ally market, as HVAC/mechanical and lighting services are often offered by separate firms who only occasionally partner together.

Additionally, the push for more efficient lighting bulbs and fixtures in recent years may also have an effect, especially when combined with the relatively high cost of integrated lighting controls. Research with trade allies, program participants, and peer utilities all indicated that customers may be satisfied with the efficiency and energy savings from a simpler and less-expensive lighting retrofit project, and commercial customers in particular may be able to satisfy their control needs simply by using occupancy or daylight sensors. Given this, it may not be reasonable for the program to try and achieve integration of lighting controls across all program participants, but instead for those participants where there are more substantial energy savings for the customers.

A couple of programs included in the benchmarking research are attempting to address these challenges through a targeted lighting controls strategy. One utility offers a separate integrated lighting controls program targeted at industrial customers, which program staff noted as a better fit in terms of energy savings potential for advanced lighting controls projects than commercial customers. Another major utility is also currently in the development stages of a similar lighting controls offering, though the target market is currently not known.

Recommendation #3: Further assess situations when the integration of lighting controls into EMS systems is the best option for participants and consider program strategies to encourage the integration of lighting controls in those situations. Strategies could include targeted offerings to segments with the greatest savings potential and/or facilitating partnerships between mechanical and lighting contractors.

Xcel Energy's plans to add an energy management information systems product appear to align well with the EMS market, as both trade allies and benchmarked utilities reported an increased interest in and demand for EMS technologies that include feedback or monitoring capabilities.



2. Summary of Key Findings and Recommendations

Xcel Energy is planning to expand the Energy Management Systems program to include the addition of an energy management information system offering, focused on providing building managers with more granular monitoring and feedback system capabilities to optimize controls strategies. All of the interviewed peer utility program managers indicated that they were currently or were considering implementing EMS offerings that included monitoring or feedback capabilities, such as EMIS or advanced lighting controls. Several trade allies noted that the growing demand for data to drive decisions would also result in higher demand for technologies like EMIS. These findings suggest that Xcel Energy's plans to offer an EMIS product align well with industry practices and the direction of the EMS market.

Recommendation #4: If determined to be cost-effective, proceed with ongoing plans for an EMIS offering in response to the growing demand for informational systems in the Colorado market.

Qualitative feedback from a sample of participating customers and trade allies indicates varying levels of perceived influence on customer decision-making.

Due to limited participation numbers, the evaluation research did not include a quantitative assessment of program attribution. However, qualitative feedback on the program's impact on the customer decision-making process was gathered during in-depth interviews with a subset of participants and trade allies. Responses were mixed when participating customers were asked what impact the program rebate and other assistance provided by Xcel Energy had on their decision to implement the EMS they did through the program. Several participants reported that the program rebate was vitally important in gaining approval for the project, defining the project scope, or expediting the timing of implementation, while some others felt that their firm would have implemented the same project regardless of whether or not a rebate or other assistance was available from Xcel Energy. Trade ally perceptions of the influence of the program rebate in driving customers' decisions to install EMS systems were also mixed, though several trades noted the role of Xcel Energy rebates in maximizing return-on-investment and freeing up funds for additional upgrades.

As mentioned above, the process evaluation scope did not include a quantitative assessment of program attribution. In order to accurately assess program attribution, a quantitative assessment of free-ridership and spillover effects using a statistical sample of participating customers and contractors involved in the customer decision-making process would be warranted.

In addition, new measure offerings can have a substantial impact on program attribution, especially for emerging technologies with low market penetration. If an EMIS offering is added to the program and becomes a substantial contributor, this addition may have a positive impact on program attribution levels.

Recommendation #5: Monitor the influence of current and any new program offerings, such as EMIS, on the customer decision-making process. If participation levels permit, consider



2. Summary of Key Findings and Recommendations

quantitatively measuring free-ridership and spillover effects to ensure the program's NTG assumptions accurately reflect program attribution.

2.2.2 Program delivery

Internal processes are well defined and coordination within the internal Xcel Energy team is working well.

Internal communications appear to be working well, both internally within Xcel Energy and with the program's contracted third-party engineer. Program processes and staff roles are well defined and understood, and staff generally felt that they had sufficient and appropriate resources to effectively administer the program. Several staff members reported excellent communication among team members and efficient coordination between staff to keeping turnaround times short. Additionally, account management and Business Solutions Center (BSC) staff spoke positively of the program, were well versed in program requirements, and reported that they actively marketed the program to their customers.

Recommendation #6: Maintain current internal communication processes and continue to ensure there are adequate resources to effectively administer program functions.

The program tracking system is working effectively to administer program activities and track project status.

Now in its second full year of use, program staff expressed positive feedback toward the Salesforce tracking system. Interviewees report the tracking system transition has helped to make strides in application processing, resulting in shorter turnaround times and improved reporting functions. In 2014, Xcel Energy began using Salesforce to run marketing campaigns, facilitating more targeted outreach and enhanced tracking.

In addition, the participant data tracked within Salesforce was generally sufficient to support process evaluation activities, though there may be opportunities to track additional information electronically to further support evaluation purposes. In particular, at the time of the evaluation, a description of the systems controlled by the rebated EMS (e.g., heating, cooling, lighting, etc.) and project costs were currently only tracked on paper applications, not electronically. These key project details may be used in both process and impact evaluation efforts for end-use stratification, participant recall, and customer decision-making research. Notably, according to Xcel Energy staff, efforts are currently underway to link project costs into Salesforce.

Recommendation #7: Continue efforts to optimize the tracking systems for administration and evaluation purposes and continue exploring opportunities to further enhance system capabilities, weighing the associated benefits and costs of these efforts.



2. Summary of Key Findings and Recommendations

The program has been successful in engaging trade allies with extensive experience working in the EMS market to play integral roles in customer recruitment and project implementation.

In recent years, Xcel Energy has worked to re-engage EMS contractors. All participating trade allies interviewed reported substantial experience specifying and selling EMS to the commercial market and were able to provide considerable insight on EMS technologies and the larger market for integrated controls.

Consistent with the program's design, trade allies were mentioned by program participants as key sources of program awareness alongside Xcel Energy account management staff. In addition, trade allies play a central role in completing program applications and project proposals for customers. A majority of participants stated that their contractor completed or assisted in the completion of the preapproval application. Feedback from trade allies also indicated that trade allies were very familiar with program processes; most had submitted at least two or three program applications in the past year.

Given the high “touch” level trade allies have with Energy Management Systems program participants, regular outreach from Xcel Energy is a good practice to ensure trade allies, and therefore customers, are receiving the most accurate program information. This outreach is especially important when implementing program design changes (e.g., addition of EMIS).

Recommendation #8: Continue ongoing outreach efforts to EMS contractors, educating them on program requirements. Be proactive in informing trade allies of key program design changes and consider strategies for leveraging the trade infrastructure to support the implementation of those changes.

While the program has recently taken steps to improve the preapproval process, several trade allies still experienced challenges with Xcel Energy's rebate and energy savings calculations process.

In recent years, program staff have taken steps in response to trade ally feedback to streamline the preapproval process, including revising the preapproval application. Program staff have also taken proactive approaches to gathering feedback from trade allies and are working to maintain and improve those relationships.

While trade allies were generally satisfied with the program, three out of seven interviewees reported some frustration and confusion during preapproval processes on recent projects. Most confusion centered on projects being rejected or estimated energy savings and rebates being much lower than trade allies projected. All three interviewees said they requested additional information on why the projects were rejected or rebate amounts differed, but they were not fully satisfied with the explanation they received from Xcel Energy on these projects.



2. Summary of Key Findings and Recommendations

One interviewee noted that the uncertainty of not knowing what had caused previous projects to fail had made them wary to submit future EMS applications.

One challenge noted by Xcel Energy engineering staff is that contractors rarely provide their own energy savings estimate calculations in their proposals. As a result, it may not be possible to identify situations where Xcel Energy's analysis differs substantially from the contractor's or customer's own savings estimate until after the preapproval decision has been made and communicated to the customer. Engineering staff report learning about discrepancies between the savings analysis and the contractor's expectations from the contractor only after the preapproval letter had been sent. In these cases, staff report meeting with the contractor to discuss the discrepancies and attempt to reconcile. However, identifying these differences only after preapproval may still, at a minimum, cause contractor confusion or embarrassment with their customer.

As discussed above, trade allies are an important means of program awareness and program support. While it is likely not desirable or practical to provide trade allies with all calculations used by Xcel Energy to calculate project energy savings, providing trade allies more direction on reasons behind project rejections or discrepancies may help limit application rework and participant frustration that could discourage future program participation.

Recommendation #9: Encourage customers and contractors to provide as much detail on their proposed project, including any expected energy savings estimates, upfront in their proposals to facilitate comparison with Xcel Energy's energy savings analysis. In cases where there are substantial discrepancies between energy savings estimates, attempt to reconcile these differences with the contractor or customer who submitted the proposal before preapproving or rejecting the project.

A majority of participants interviewed report making adjustments to system settings of their rebated EMS system several weeks after installation.

The research with participating customers revealed that a majority of respondents (12 of 18) have changed system settings or set points after project implementation. The magnitude of the changes is unclear; some respondents noted they had made changes in order to save more energy, while others noted they changed their settings due to building occupancy schedules or tenant comfort. These changes appear to be happening weeks or months post-installation, as participants tweak the systems.

Currently, the program verifies installation of qualifying EMS via phone or in-person visit before the rebate is paid. In addition, the program follows Xcel Energy's standard measurement and verification (M&V) protocols for custom projects, requiring post-M&V for projects with at least 1GWh or 20,000 Dth in estimated energy savings. Few EMS projects have met this savings threshold for post-M&V, and these activities are typically conducted within two weeks of installation. Considering the timing of changes participants have made to



2. Summary of Key Findings and Recommendations

their EMS systems, these verification procedures are likely not able to detect the impacts of system adjustments on realized energy savings.

The benchmarking research found that while M&V protocols for EMS vary by program, at least two benchmarked programs conduct some type of post-M&V activities several months after implementation to verify estimated savings. One utility conducts post-M&V for custom EMS projects meeting a savings threshold typically after the system is functioning to its design intent and possibly longer to verify seasonal measure impacts. Another peer-utility program reviews customer interval consumption data the following year after implementation to determine if there are substantial variances from the original savings estimate.

While minor system changes likely would not significantly impact Xcel Energy's savings calculations, an additional follow-up visit several months after project installation would allow the system to "settle" into more consistent operations and also allow Xcel Energy to assess whether significant changes have been made to the system. Additionally, a formal impact evaluation using industry standard methods could shed light on the magnitude of changes made to systems and the implications of these changes on realized energy and demand savings.

Recommendation #10: Consider cost-effective strategies to document system setting changes made post-implementation and assess the impact of these changes on realized energy savings. Possible strategies could include reviewing the program's M&V protocols and/or conducting a formal impact evaluation of the program. Any additional costs of these efforts should be balanced with the potential associated benefits and program savings, in accordance with industry standards.

The program has been successful in highlighting additional perceived benefits to participation beyond energy savings, such as reduced equipment maintenance and higher tenant satisfaction, in customer outreach messaging.

All participants mentioned energy savings as a benefit they had considered when implementing their EMS through the program; however, participants mentioned non-energy related benefits as well. More control over building systems and less wear and tear on equipment were also mentioned by participants, as was higher tenant satisfaction and fewer tenant complaints.

Highlighting non-energy benefits of participation in marketing messages and focusing on benefits of particular importance is recognized as industry best practice.² The non-energy related benefits discussed above are well-documented on Xcel Energy's program website

² Best Practices Benchmarking for Energy Efficiency Programs. *BP_Self_Benchmarking_Tool_Final_110707*. California Public Utility Commission in association with the California Energy Commission, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. <http://www.eebestpractices.com/>.



2. Summary of Key Findings and Recommendations

and in the program informational brochure. Given its target market, this practice is likely especially important for the Energy Management Systems program to help overcome split-incentive barriers by giving building owners who may be paying energy bills additional motivations for making capital investments in EMS and other energy efficiency projects.

Recommendation #11: Continue to tailor customer outreach messaging and encourage sales staff and trade allies to highlight additional benefits to installing EMS beyond energy savings to find the messaging that resonates best with customers.

2.2.3 Program satisfaction

Both participating customers and trade allies are largely satisfied with the program and their interactions with Xcel Energy staff.

A vast majority of interviewed participants (13 of 18) indicated they were “very satisfied” with the program overall, and satisfaction levels with specific program components (such as the preapproval process) were fairly high as well. Respondents especially emphasized the helpfulness of Xcel Energy and contractor staff, positive experiences with program processes, and benefits from more reliable and efficient equipment. A few participants noted dissatisfaction in certain areas—such as the complexity of the custom rebate process or smaller-than-expected rebates—but these issues were not systemic. Participants were also generally satisfied with Xcel Energy overall, and all but two respondents said their experience with the Energy Management Systems program has positively impacted their satisfaction with Xcel Energy as their provider.

Trade allies generally reported very positive interactions with Xcel Energy staff throughout the participation process and view Xcel Energy as a valued partner in offering energy efficiency to their customers. Aside from requesting additional clarification on energy savings and rebate calculations during preapproval as discussed above, there were no reports of issues or problems within the working relationships between trade allies and Xcel Energy.

Recommendation #12: Continue current efforts to maintain high participant satisfaction and monitor issues that could lead to dissatisfaction.



3. EVALUATION RESULTS—INTERNAL REVIEW

This section provides high-level key findings resulting from internal interviews conducted as part of the 2014 evaluation of Xcel Energy's Business demand side management (DSM) Energy Management Systems program in Colorado.

3.1 INTRODUCTION

The evaluation team interviewed a total of 13 contacts provided by Xcel Energy that support the implementation and administration of the Energy Management Systems program. Evaluators interviewed a range of staff, including the program manager (one), the program trade relations manager (one), Business Solutions Center (BSC) energy efficiency specialists (two), account managers (two), energy efficiency engineers (two), DSM regulatory staff (two), the Colorado DSM marketing manager (one), an Xcel Energy residential and low-income product portfolio manager (one), and a contracted outside engineering consultant (one).

Evaluators conducted these interviews over a two-week period in June 2014. The interviews covered a variety of issues, including:

- Roles and responsibilities of staff
- Communication and interaction with others in the program
- Program design
- Role of program in business portfolio
- Resources to support the program
- Program marketing efforts
- Program operations
- Areas where the programs are working well
- Past, current, and future challenges of the program
- Researchable issues of interest for the process evaluation.

3.2 SUMMARY OF FINDINGS

Xcel Energy's Energy Management Systems program in Colorado provides enhanced incentives for business customers who install or upgrade centralized building energy management systems (EMS) that control and reduce their facility's energy usage. Both electric and gas customers are eligible to participate. Energy management systems can control multiple systems within a building, including heating/cooling, ventilation, lighting, refrigeration, etc. This program is custom-based; there are no prescriptive elements offered through the program and projects are analyzed individually for cost-effectiveness and energy savings. The program currently offers rebate levels of \$600/kW and \$4/Dth, which is higher than the standard Custom Efficiency program rebate. The primary target market for the program is large commercial buildings with over 500 kW in demand. In 2014, program savings goals are 7.3 GWh and 2,960 Dth, and participation goals are 39 electric and 10 natural gas participants.



3. Evaluation Results—Internal Review

The Energy Management Systems program was modeled after its counterpart offering in the Minnesota DSM portfolio. Since its inception, there have been few substantial design changes and the program offerings and requirements have stayed relatively consistent. The most prominent design change was an increase in rebates a few years ago to their current levels due to the high incremental costs of EMS upgrades. According to program staff, current rebate levels typically cover 40–50 percent of the incremental cost for energy efficiency upgrades, which may only be a portion of the overall project costs.

Program marketing and outreach is driven through three core mechanisms: account management staff, Business Solutions Center staff, and trade allies/vendors. Account managers have direct contact with their assigned customers, enabling one-on-one communications between Xcel Energy and their larger customers regarding their opportunities for energy efficiency. BSC energy-efficiency specialists field incoming customer questions and conduct proactive outreach to customers without dedicated account managers with profiles suggesting an opportunity for energy management systems. Sales staff reported that they bring up the program with customers they identify as good candidates for the program, such as large office buildings with high demand or customers that are simultaneously heating and cooling.

Along with Xcel Energy account managers and BSC staff, vendors are also a venue to drive customers to the program. The Xcel Energy trade relations manager in Colorado oversees the relationships between the DSM programs and trade allies or vendors. The trade relations manager identifies and trains new trade allies and works with established vendors and distributors to market Xcel Energy's DSM programs. They also engage trade allies in Advisory Councils that meet periodically to provide advice and input on Xcel Energy's DSM programs. Program staff estimated that approximately 30–35 trade allies have participated in the Energy Management Systems program, although not all may be currently active. Trade allies involved in the program represent a range of businesses; some specialize in energy management systems, while others offer multiple other services to customers, such as motors or HVAC installation, in addition to energy management systems. While account management and BSC staff are key drivers of participation for the Energy Management Systems program, several program staff also noted that trade allies drive customers into the program as well.

In addition to these outreach efforts, program manager and marketing staff develop marketing materials and outreach campaigns for the program. Recent direct outreach and marketing has included advertisements in business journals, on the radio, and in the newspaper. The program is also well documented on the Xcel Energy website, with downloadable marketing information and program application documents.

In order to participate in the program, potential participants must first receive preapproval from Xcel Energy to ensure that the project meets customer eligibility and cost-effectiveness requirements. This preapproval process helps screen potential opportunities and helps ensure approved projects are cost-effective. Customers must submit preapproval applications as well as an itemized bid from their trade ally or vendor, which is then reviewed and approved or rejected. Once approved, projects retain their preapproved status for up to two years.

Account managers and BSC staff (sales staff) are integral to the implementation of the program. Either an account manager or a BSC representative is assigned to each project. Like other holistic or custom programs, the Energy Management Systems program is “high



3. Evaluation Results—Internal Review

touch” in terms of hand-holding and coordination with both vendors and customers throughout the preapproval and implementation process. Program staff report that it is “rare” that a customer submits their own application. Rather, sales staff or trade allies will assist the customer in gathering all details needed for a complete preapproval packet, which includes a six-page application and worksheet, billing usage history, as well as a bid or proposal from an implementation vendor.

In order to assist with the preapproval process, Xcel Energy retains a third-party engineering consultant for this program. This third-party engineer performs the initial review of all projects, which includes reviewing applications for completeness, analyzing cost-effectiveness, and calculating energy savings. The third-party engineering consultant coordinates with sales staff, vendors, and customers if additional information or corrections are needed. Once the application is complete and approved by the third-party engineer, it is forwarded to Xcel Energy Energy Efficiency Engineer staff (EEEs) for review and final approval. As stated above, once a project is preapproved, customers have up to two years to implement their project. Program staff report that the timeframe from preapproval to implementation for this program is fairly long; customers may not implement their project for a year after preapproval or longer, or may implement in a staged process. This lengthy lead-time is in part due to the high cost of energy management systems, as customers may need to incorporate them into long-term planning budgets. Once a project is completed, documentation on implemented technology and associated costs must be gathered to ensure adequate project close-out and incentive payments. Sales staff gather this information and also verify equipment set-points and settings, in person if possible, or over the phone. Post-measurement and verification (M&V) protocols are followed if a project meets defined savings thresholds.

Xcel Energy has established tracking systems that assist in the effective tracking and monitoring of the program. In 2012, the DSM program tracking system was transitioned from Siebel to Salesforce to provide increased functionality for DSM staff to manage and implement the programs. All program activity is entered into Salesforce as soon as leads are identified through to when the rebate check is sent to the customer and the project is closed.

Program staff report that participants to date have tended to be mainly within the commercial real estate or office building segment. While energy management systems projects can control a variety of different building systems, participating projects have most commonly controlled heating and cooling systems. The program has seen lower uptake in lighting controls projects, though one staff member did note that they are recently seeing lighting controls come through the program more often.

Interviews with program staff identified several areas that are working well as well as some opportunities for continuing improvement and/or additional research:

3.2.1 Areas that are working well

- **The program has historically neared or met savings goals.** In recent years the Colorado Energy Management Systems program has grown in participation and achieved energy savings, and staff report that the program has historically met or been just shy of reaching their savings goals. As of July 2014, program staff report that they have already met their gas savings goal for the year and are on track to meet electric targets. When the Energy Management Systems program first launched in Colorado the program struggled to meet goals set as part of the planning process. Feedback from staff suggests that this initial underperformance was due



3. Evaluation Results—Internal Review

primarily to goals that were too aggressive for the Colorado market. In recent years, staff feel program goals have been right-sized to the market potential for energy management systems.

- **Customer satisfaction appears to be high.** Program staff generally stated that customers are usually quite satisfied with the program. One staff member noted that they were creating a case study around one particular participant who recently installed an energy management system through the program and achieved substantial savings. This customer planned to participate in the program at several other facilities in Xcel Energy's territory.
- **Staff roles are well defined and understood, and there are adequate resources to administer the program.** Feedback from interviewees suggests that staff roles are well defined, and interviewees had a clear understanding of their role, the role of other team members, and how those roles worked together within the program. Staff also agree that there are sufficient resources to effectively administer the program given current participation levels.
- **Communications among program staff, including the third-party engineering consultant, are working well.** Several staff members reported excellent communication and cooperation among team members. Sales staff noted that when customer follow-up was needed during the preapproval process, the coordination between engineering and marketing and customers is handled well and sales staff are usually included appropriately in all conversations with customers. In addition, program staff generally felt that coordination with the program's third-party engineer had been going well.
- **Sales staff are well versed in the program and actively market it to customers.** Both account management and BSC staff spoke positively of the program and noted that they actively market the program to customers and assist in program applications.
- **The Salesforce tracking system is working effectively to administer the program and track project status.** Now in its second year of use, interviewees generally expressed very positive attitudes towards the Salesforce tracking system. Interviewees report the tracking system has helped to make strides in reporting and application processing. One staff member did note that when Salesforce was first implemented it slowed down turnaround times on projects slightly, as staff adjusted to and learned the new system. However, program staff now report the turnaround time for project preapproval is typically quite fast (around two weeks) unless substantial follow-up is needed with the customer or the trade ally. Xcel Energy has also been committed to expanding the capabilities of Salesforce beyond data tracking and reporting. In 2014, program managers have begun using Salesforce to run marketing campaigns, allowing more targeted outreach and better tracking of marketing efforts. Xcel Energy is also exploring additional capabilities, such as online applications, in the near future.
- **Program staff have taken steps to address identified issues and make improvements to the program where necessary.** Several staff members noted that the program has recently strived to improve its preapproval review time periods as well as its relationships with trade allies. One interviewee commented that past higher application rejection rates (often due to confusion on the trade ally side about



3. Evaluation Results—Internal Review

program requirements and documentation) led to strained relationships with several trade allies. This staff stated that the program staff proactively streamlined the program application as well as reached out to trade allies in order to encourage them to again participate in the program.

3.2.2 Opportunities for improvement or additional research

- **While improvements have been made, staff report some continued issues with trade allies understanding the requirements of the program.** While program staff noted the quality of applications has recently improved, staff also noted that they still continue to see incomplete applications or insufficient vendor proposals, leading to project delays or rejections. Examples include breakout of systems included in the energy management system and providing insufficient detail on the specifications of controlled systems. In addition, sometimes vendors may add to the project scope after the preapproval has already been completed, which results in reanalysis and sometimes causes the project to be rejected. Staff mentioned that a certain amount of hand-holding and training with vendors and customers is often required. One interviewee emphasized the importance of having trained sales staff in educating customer and trade allies on how to best take advantage of program offerings and maximize energy savings.
- **The program has struggled to engage customer and trade allies in incorporating lighting controls in EMS projects.** One challenge mentioned by interviewees has been engaging trade allies in incorporating lighting controls in their proposals. Staff noted lighting vendors often promote specialized lighting control systems, as opposed to incorporating lighting controls in EMS.
- **As an opportunity for additional research, staff identified several market segments that could be good candidates to target for the program.** Program staff report that they see the highest levels of participation in the Energy Management Systems program from the commercial real estate market, and several program staff members noted that they felt there was still considerable potential among this segment. However, program staff identified several additional market segments of interest for the program going forward, including hospitals, data centers, schools, and hotels. One staff member specifically mentioned in-room controls for hotels (tied to reservation systems based on occupancy) and stated that they felt it would be a good item to include prescriptively in the program.



4. EVALUATION RESULTS—PARTICIPANT FINDINGS

This section presents the findings from semi-structured participant interviews conducted for the evaluation of the Xcel Energy Colorado Energy Management Systems program.

4.1 INTRODUCTION

The Energy Management Systems program offers rebates for building automation and energy management systems (EMS) to commercial customers. As part of the process evaluation of the program, the evaluation team conducted semi-structured, in-depth interviews with participants to learn about their experiences with the program.

Interviews were conducted over a seven-week period between August and September 2014. The evaluation team attempted to contact all 54 unique participants who have completed at least one project in its entirety through the program since 2013 (as of August 2014). The contacts were identified by Xcel Energy. Of these, a total of 18 interviews were completed with respondents in a variety of roles within their company, including facilities/energy managers, engineers, property managers, as well as those involved in business or administrative roles. This research with participants provided meaningful process insights into the program's operations, their interactions with the program, their relationships with Xcel Energy, and how the program is serving the market.

The interviews focused on the following researchable questions:

- How satisfied are participating customers with the program overall, along with individual aspects, such as the rebate amount, assistance from Xcel Energy, the length of time it took to participate in the program, etc.? Has participation in their Energy Management Systems program impacted their satisfaction with Xcel Energy overall as their provider?
- How have customers learned about the program? How do customers prefer to receive information about Xcel Energy offerings?
- What were the primary reasons for participating in the program?
- Did participants consider integrating lighting controls into their EMS? If not, why?
- What challenges, if any, did the customer experience throughout the process of participating in the program? How did the program help them overcome these challenges?
- Is the EMS system installed through the program still in place and operating? Have there been any changes to the system setting since installation that might impact the persistence of energy/demand savings?
- How has the Energy Management Systems program impacted the customer decision-making process? What influence has the program rebate or technical assistance had on customers' decisions to install or upgrade their EMS systems?
- What aspects, if any, would the customer change about the program if they could?
- What types of customers are participating in the Energy Management Systems program? What energy efficiency actions have participants taken outside of the



4. Evaluation Results—Participant Findings

program, and do they have any future plans for implementing additional energy efficiency projects?

Next, this section summarizes the key findings from the participant interviews. These are followed by detailed findings.

When reviewing findings presented below, it is important to note that these interviews were semi-structured and qualitative. Where possible, responses have been quantified in this section (examples are simple yes or no questions, or scale rating questions), but most questions were open-ended, resulting in less-quantifiable responses. Additionally, while most respondents were asked most or all of the questions, some questions may not have been asked due to interview length, the question not being applicable, or the respondent not being involved in certain program processes.

4.2 KEY FINDINGS

Below we present key findings from interviews with participants of the Energy Management Systems program.

- **All respondents operated or managed commercial buildings, and a majority reported their business type as commercial real estate or office building.** This composition is consistent with the program's marketing strategy and target market for the program.
- **Both Xcel Energy and equipment contractors are actively educating customers on the Energy Management Systems program offerings.** A majority of participants learned about the Energy Management Systems program from Xcel Energy (n=10), often their account manager, followed by their equipment contractor (n=6). Most respondents preferred to be contacted about programs via email, or from direct reach-out from their account manager.
- **While all EMS systems installed through the program are reportedly still installed and operating, a majority of participants have changed their system settings or set points since installation.** Twelve respondents noted that they had changed system settings or set points since installing the EMS system through the program. Several respondents noted the changes were due to simply adjusting to the new equipment and determining preferred settings.
- **Integrated control of HVAC systems is a higher priority than their lighting equipment for most customers.** All respondents stated that their heating and/or cooling systems were integrated into their EMS, but only six respondents said their lighting systems were also integrated. Several did not feel integrating their lighting systems was necessary, as either new efficient lighting systems or occupancy sensors were satisfactory to them. One respondent did state that they were currently planning out an integrated lighting controls project.
- **Participants report seeing multiple benefits from installing EMS systems through Xcel Energy's program.** While all respondents mentioned energy savings as a perceived benefit, participants also noted increased tenant comfort, more control over systems, and better/easier equipment maintenance as important benefits of a new system. One respondent noted that they had reduced their tenant complaints by 80 percent since installing the new EMS system.



4. Evaluation Results—Participant Findings

- **Qualitative evidence suggests that the program rebate has had varying levels of influence in customers’ decision-making processes.** Responses were mixed when participating customers were asked what impact the program rebate and other assistance provided by Xcel Energy had on their decision to implement the EMS they did through the program. Several participants reported that the program rebate was vitally important in gaining approval for the project, defining the project scope, or expediting the timing of implementation, while some others felt that their firm would have implemented the same project regardless of whether or not a rebate or other assistance was available from Xcel Energy.
- **For a majority of participants, their installation contractor is completing program application documents.** A majority (n=12) of respondents noted that their contractor either assisted with or completed the preapproval application. Two specifically noted that their Xcel Energy account manager helped them with program paperwork.
- **Participants are generally satisfied with the Energy Management Systems program and with Xcel Energy overall, and feedback suggests that participation in the Energy Management Systems program has positively impacted customers’ views of Xcel Energy.** A majority of respondents (n=13) said they were “very satisfied” with the program overall, and satisfaction levels with program components (such as the preapproval process) were fairly high as well. A few participants noted dissatisfaction in certain areas—such as the complexity of the custom rebate process or smaller-than-expected rebates—but these issues were not systemic. Participants were also generally satisfied with Xcel Energy overall, and all but two respondents said their experience with the Energy Management Systems program has positively impacted their satisfaction with Xcel Energy as their provider.

4.3 DETAILED FINDINGS

Detailed findings are presented in the following topic areas: sources of program awareness, project implementation and participation experience, decision-making processes, participant satisfaction, and customer profile.

4.3.1 Sources of program awareness

When asked how they learned about the Energy Management Systems program, ten respondents stated they heard about the program directly from Xcel Energy (most commonly from their account representative) and six had heard of the program from their contractor or vendor. One respondent noted that they heard of the Energy Management Systems program through their participation in an energy audit program through the state of Colorado, which in turn led them to Xcel Energy’s programs. When asked if they were made aware of the rebates from Xcel Energy before or after their decision to install their EMS, a majority of respondents stated they were aware before their ultimate decision (n=15). Additionally, no respondents considered implementing their EMS project through any other Xcel Energy rebate program; most respondents were not aware that their project may have been eligible for other Xcel Energy rebate offerings.



4. Evaluation Results—Participant Findings

4.3.2 Project implementation and participation experience

All respondents confirmed that their energy management system was indeed installed at the location documented in the participant tracking data and that all of their system components were in place and operating. However, a number of respondents noted that they had either changed system settings or set points or added or removed equipment since installing the energy management system. Most respondents (n=12) noted that they have changed settings or set points, and several respondents cited simply adjusting to the new system and finding the settings they preferred as reasoning behind the changes. One respondent noted, *“There’s a break-in time where you kind of try to get [at] comfort levels for people [and] what makes sense. Do we start heating the building at 5, or 6, or 4:30? Or do we set it off on the weekends? Things like that. So yes, we’ve adjusted those since.”* Another reason given for changing set points was to achieve deeper energy savings, as one respondent noted: *“We’re trying to be as aggressive as we can with set times and recovery times, so we start very low setbacks and a really quick recovery times and about every couple months we tweak it and set back further and longer recovery time... At one point, we’ll be getting complaints saying it’s too darn cold. But until then, we’re still going down that path.”* Only three respondents noted making any equipment changes, and these mostly centered on removing unnecessary equipment or replacing problematic equipment. One respondent did note that they added a gas reheat function to their HVAC system.

All respondents noted incorporating their heating and/or cooling systems into their EMS system. Five respondents also mentioned that their lighting systems were incorporated into their EMS project. One respondent noted that they did have a building automation system that included both HVAC and lighting, but the project for which they received a rebate only included upgrades to their controls on their rooftop units.

When those who did not have integrated lighting controls were asked if they considered installing them, responses were mixed. Several said that they did not see a need to change their current lighting systems, either because they had occupancy sensors in place or because they had recently upgraded to high-efficiency lighting (such as LEDs). One respondent noted that they were in the process of planning out integrated lighting controls at the time of the call. Another noted that they felt HVAC controls were needed more than lighting controls, because while people would remember to turn off the lights, they would rarely remember to adjust the thermostat setting: *“It’d be either be really hot or cold, and then they would leave it and never turn it back. So although they [people using the building] were good at turning the lights off, they never did think about the HVAC.”*

Participants were also asked if the EMS project they implemented through the program replaced an existing EMS, or if the EMS was a new system to their building. Three respondents said they had no old system at all. The remaining respondents gave a variety of answers; some had fully integrated but aging systems in place, while others had several control systems that needed to be integrated or centralized, and still others mentioned having “minor” systems or equipment-level controls. Several noted they had a system but it was ineffective or failing, and one respondent noted that they had previously had a smart thermostat but staff at the facility had never programmed it, so it was replaced by a centralized EMS.

When asked if they faced any issues or challenges during the program processes, such as preapproval or project verification, most respondents did not report any issues. Only two respondents mentioned any considerable challenge, and both surrounded not having the



4. Evaluation Results—Participant Findings

correct or detailed enough information to input into the preapproval form, which resulted in more back and forth. However, 12 respondents noted that their contractor either assisted with or did the majority of the program paperwork; 2 noted they had help from their Xcel Energy account manager as well. No respondents mentioned any issues with the rebate processing or verification process. When asked if they interacted with Xcel Energy regarding the program application, several respondents again noted that their contractor handled a majority of those interactions. If they said they did interact with Xcel Energy, respondents generally noted their account manager; only two respondents mentioned interacting with Xcel Energy engineers.

Finally, respondents were asked if they received a facility audit or assessment before implementing their EMS project. Six respondents noted that they did have an audit or study performed at their facility prior to participating in the Energy Management Systems program, but only one specifically stated that it was through Xcel Energy.

4.3.3 Decision-making processes

When asked the reasons they decided to install an EMS and the benefits they hoped to receive, increasing equipment efficiency and/or achieving energy savings was mentioned by all respondents. However, respondents also listed several other reasons behind their decision to install an EMS at their facility. More control over building systems and easier diagnosis when systems have issues were listed as important reasons by several respondents. Several other participants noted that their old system was failing or difficult to service. One customer explained, *“There was really only one guy in the metro area here who had any knowledge about our system that could really change it. It was expensive to have him come out and change just a couple of set points.... [And] if the system guy got hit by a car, we were all in deep trouble.”* Finally, employee or tenant comfort was also cited as a reason behind installing a new EMS.

When asked to rate their likelihood of implementing the same project if the rebate or other assistance from Xcel Energy had not been available, on a scale of 0 to 10, with 0 being not at all likely and 10 being extremely likely, responses ranged from 2 to 10 (see Table 4-1 below). One respondent did not give a quantitative answer, although they said it would be “up there” on the scale, and one person was not asked, as they stated that they came onto the project after the decision had been made.



4. Evaluation Results—Participant Findings

Table 4-1. Likelihood of Implementing Same Project without Program Rebate

Likelihood Rating - 0 (not at all likely) to 10 (extremely likely)	Number of Responses
10	2
9	2
8	2
“7 or 8”	1
7	3
6	1
5	2
4	2
2	1
Not answered/unable to quantify	2

Several participants reported that the program rebate was vitally important in gaining approval for the project, defining the project scope, or expediting the timing of implementation. One respondent stated that the rebate was “*absolutely critical*” in their decision-making process and that they “*would have spread the project out many years, and it would be greatly reduced from what [we] did.*” Another respondent, who had rated their likelihood a 7, stated that they likely would have delayed the timeline and purchased cheaper equipment if they had not participated in the Energy Management Systems program.

Other interviewees attributed less influence to the program in shaping their decision to implement their EMS project. One respondent reported, “*We definitely would have [installed the project],*” if the program rebate had not been available. Another participant, when asked if their project would have changed if the program rebate had not been available said, “*[The project] would have been the same. The rebates, at least for my property, weren’t that significant.*” Another respondent provided similar feedback, stating, “*We would have done [the project] anyway, the rebates were just a little extra.*”

Respondents were asked what barriers they faced when considering implementing the EMS project at their facility(ies), and responses were varied. Some respondents noted that they faced few or no barriers, with one stating: “*I think we did our homework enough and had enough backup information that we didn’t really run into barriers. Our management knew what we were trying to do, and the goals we were trying to attain; they were fully supportive.*” Others mentioned considerable internal approval barriers, such as achieving approval from a board or upper management, as well as financial or first-cost barriers. Some respondents acknowledged that the program helped them overcome the financial barrier through offering rebates, and a few noted that it factored into helping to get the project approved from management or their board.



4. Evaluation Results—Participant Findings

4.3.4 Participant satisfaction

Using a scale from “very satisfied” to “very dissatisfied,” participants generally reported high levels of satisfaction with the program, with a majority of respondents (n=13) saying they were “very satisfied” with the program overall. The remaining respondents stated they were “satisfied,” with one stating they were neutral about the overall project, and another did not know. Respondents especially emphasized the helpfulness of Xcel Energy and contractor staff, positive experiences with program processes, and benefits from more reliable and efficient equipment. One respondent noted, *“We had tremendous cooperation from Xcel [Energy], and they analyzed all the measures that we were putting in place in a very timely manner, so we’re very pleased with that.”*

Those who were not completely satisfied noted the complexity of the custom rebate process and smaller-than-expected rebate amounts as reasons behind their satisfaction rating. One respondent, who rated their overall satisfaction with the program as “neutral,” explained that they felt that, compared to other rebate programs, the Energy Management Systems program rebates were too low, despite the fact that the Energy Management Systems program offers higher rebates per unit of energy savings than the Custom Efficiency program. This respondent stated: *“I think the rebates could be better, in comparison to their rebates for their other projects. I think they’re not evaluating the actual savings very well.”*

Participants were also asked about their satisfaction with specific program components, again using a scale from “very satisfied” to “very dissatisfied.” Table 4-2 below shows the responses to these questions. Overall, a majority of participants were satisfied or very satisfied with all of the program components. Two respondents noted they were dissatisfied with the project length, but both noted that the timeline extensions were due to the contractor and not Xcel Energy. All respondents were satisfied or very satisfied with their interactions with Xcel Energy, with several respondents mentioning especially positive relationships with their account representatives. One stated: *“[Our account representative] makes things really easy for us...they help us fill [out] applications, they meet with the contractors if there are any problems. I mean, I can't imagine a better situation.”*

Table 4-2. Participant Satisfaction with Program Components

Program Component	Satisfied or Very Satisfied	Neutral	Dissatisfied	Not Answered/ Don't Know
Preapproval process	13	1	0	4
Project length from start to finish	11	0	2	5
Amount of the rebate	10	1	1	6
Xcel Energy support and responsiveness to questions/complaints	12	0	0	6

Finally, respondents were also asked if they had seen energy savings since the project completed (and if they were satisfied with those savings). A majority of respondents (n=14) stated they had seen energy savings, and all of those noted that they were satisfied or pleased, although one respondent did note that they had hoped to see even more savings. For two respondents, the project was fairly recent so they had not yet seen a long-term pattern of energy savings, and in one of those cases the respondent stated their organization had not maintained records of past energy bills so they did not have a point of comparison.



4. Evaluation Results—Participant Findings

Over the course of the interviews, participants mentioned several benefits they had realized from installing the EMS equipment and participating in the Energy Management Systems program. Respondents most frequently mentioned energy savings as a benefit from installing EMS through Xcel Energy’s program. Respondents were also specifically probed for any additional benefits they had seen from their equipment. On top of the energy savings, respondents noted several other benefits. One benefit noted by several respondents was increased tenant or employee comfort, with one respondent saying, “*We have a lot less complaints. Participating in it has given us more flexibility in terms of managing our system and managing individual areas... We’ve reduced our complaints by 80 percent.*” Other benefits mentioned include better control over building systems, less wear and tear on equipment, reduced maintenance costs, and the ease of system operation. Finally, one respondent noted that they would be including the project in their carbon disclosure statements.

When asked if there was anything they would change about the program, respondents generally did not have substantive recommendations. Those who did suggest changes tended to recommend larger rebates or clearer program processes. One respondent suggested providing participants with a project timeline that documented “*what to expect and when to expect [it]*” in order to provide clearer expectations. Another recommended more comprehensive instructions on the preapproval process to ensure that all needed information is included in the analysis of the project.

In addition to their experiences with the Energy Management Systems program, participants were largely satisfied with Xcel Energy overall. On a 0 to 10 scale where 0 was very dissatisfied and 10 was very satisfied, 15 respondents gave Xcel Energy a rating of 7 or higher (1 additional respondent was not able to provide a rating and simply said they were “satisfied”). The remaining two respondents, who rated their satisfaction with Xcel Energy overall a 4 and a “6 or 7,” respectively, cited concerns surrounding fuel rates and communication issues as reasons for their lower satisfaction. With the exception of the respondent who was dissatisfied with the amount of the rebate they received, and one respondent who said that the program did not impact their satisfaction, participants generally felt that their experiences with the Energy Management Systems program positively impacted their overall satisfaction with Xcel Energy.

Respondents were also asked to rate Xcel Energy’s value, again on a 0 to 10 scale where 0 was very poor value and 10 was very good value. Thirteen respondents gave a rating of 8 or higher. The remaining respondents rated Xcel Energy’s value between a 4 and 7.

4.3.5 Customer profile

The 18 program participants interviewed represented a variety of the types of customers participating in the Energy Management Systems program. Three interviewees were each responsible for two different locations that participated in the program; therefore, the 18 interviewees represented 21 different buildings. All interviewees stated that their building was used for commercial (not industrial) purposes, and over half of interviewees (n=11, representing 12 buildings) reported their building type as office buildings, which is consistent with the program’s primary target market. Table 4-3 below details the remaining building types reported by participants.

Table 4-3. Participant Building Type



4. Evaluation Results—Participant Findings

Main Purpose/Use of Building	Number of Buildings
Office/commercial real estate	12
Education	3
Retail	2
Athletic facility	1
Apartment complex	1
Correctional facility	1
Performing arts space	1
Total commercial buildings	21

Slightly over half of respondents (n=10) noted that their organization owned the facility. Five worked for a property management company that managed the facility, and two others leased the building (one respondent did not know). The square footage of buildings varied widely, with one under 8,000 sq. ft. and another over 600,000.

When asked if their business or organization had a sustainability or energy conservation policy in place, eight respondents said yes. The remainder either said they did not have a policy or that it was not formalized. One noted, *“We don't have any goals that we're committed to as an organization. Obviously, [we want] more awareness about what it means to use less energy and so we try to use education [with] our field team members.”*

Throughout the interviews, most respondents noted other projects they had implemented at their facilities in the recent past. Other efficiency projects mentioned include lighting, motors/drives, building envelope, HVAC, water saving measures, and recommissioning. One respondent mentioned taking a variety of behavioral actions, stating, *“[We have] done a lot of tenant campaigning to turn off their lights, at their desk, to turn off their radios, just to change their culture.”*

Thirteen respondents noted that they had participated in other Xcel Energy programs and listed a variety of products for which they received a rebate. Most tended to be prescriptive, with lighting and motors/drives projects being the most commonly noted projects. When asked how they preferred to hear about Xcel Energy programs in the future, responses varied, but respondents most often mentioned preferring to hear about programs either through email or Xcel Energy's website, as well as directly from their account manager. Only one respondent stated that they preferred not to be contacted, and wanted to reach out themselves when they were interested in a particular program.

When asked if their organization had plans to install additional energy-saving equipment in the next two years, 11 participants mentioned specific plans for future upgrades. Planned upgrades mentioned updating lighting equipment, HVAC upgrades, or adding localized lighting controls (e.g., occupancy sensors or photo sensors). Two respondents specifically noted additional upgrades to their EMS equipment, and one mentioned conducting metering on existing equipment. Notably, seven respondents mentioned LED lighting at some point during their interview, either that they were looking into installing them or had already installed them at their facility. Five participants said they did not currently have any plans for additional upgrades, while two participants did not know for sure.



5. EVALUATION RESULTS—TRADE ALLY FINDINGS

This section presents the findings from qualitative trade ally interviews conducted for the evaluation of the Xcel Energy Colorado Energy Management Systems program.

5.1 INTRODUCTION

Trade allies and contractors play a key role in identifying project leads, implementing program-qualifying equipment, and assisting customers in the preapproval process for the Xcel Energy Energy Management Systems program. As part of the process evaluation for the Energy Management Systems program, the evaluation team conducted qualitative in-depth interviews with trade allies who are engaged in the program to gain insights on program operations and the marketplace.

In July 2014, Xcel Energy provided Tetra Tech with a list of 11 trade ally contacts who had recently submitted project applications through the Energy Management Systems program. The evaluation team attempted to contact all 11 trade ally contacts for interviews. Of these, we completed a total of seven interviews with nine different respondents. These trade allies included a mix of firms that specialize in building automation and energy management systems (EMS) as well as firms that offer EMS in addition to a broader range of energy efficiency solutions, such as HVAC end-use specification and service.

Interviews were conducted over a two-week period in September 2014. This research with trade allies provided meaningful process insights into the program's operations, their interactions with the program, their relationships with Xcel Energy, and how the program is serving the market.

The interviews specifically focused on discussion of the following topics:

- What are trade allies' experiences with the Energy Management Systems program? What is their experience selling energy management systems to the market in general?
- What types of measures or equipment present the highest savings opportunities from EMS? Are there additional EMS technologies that the program could be incorporating into the program?
- What are trade allies' experiences working with other utility energy efficiency programs?
- How satisfied are trade allies with the Energy Management Systems program? Is there anything Xcel Energy can do to improve satisfaction?
- What segment(s) is the program primarily serving in the commercial market? Where are opportunities for expansion into additional segments?
- How do trade allies perceive the program? Are there opportunities for improved communication or coordination with trades?
- Is there any additional support that the program can provide trade allies to help improve proposal quality or streamline the application process?



5. Evaluation Results—Trade Ally Findings

- How is the program influencing customer decision-making processes and contractor practices? What role does the program play in the Colorado market for energy efficiency?
- What are customer barriers to participation? Specifically, what are barriers to implementing lighting energy management systems? How can the program help overcome these barriers?

5.2 KEY FINDINGS

Below we present key findings from interviews with trade partners of the Energy Management Systems program.

- **The program has been successful in engaging trade allies with extensive experience working in the EMS market.** All interviewees reported substantial experience specifying and selling EMS to the commercial market and were able to provide considerable insight on EMS technologies and the market for integrated controls in general. Trade allies also reported familiarity with Xcel Energy programs, and the Energy Management Systems program specifically, with most stating that they have submitted at least two or three applications in the past year.
- **When specifying EMS projects, baseline conditions of existing equipment vary, from no existing integrated controls at all, to older pneumatic or direct digital control (DDC) systems.** Trade ally experience varied when asked whether most customers have an existing EMS system in place before installing or upgrading a new EMS system. Of those customers that did have existing systems, trade allies most often reported that they tended to see a 50/50 mix of pneumatic and older DDC systems.
- **While trades generally thought the application process is fairly straightforward, feedback suggests there is still some confusion on the preapproval process.** Three trade allies specifically reported confusion understanding how rebates and energy savings are calculated for projects they submit for preapproval. All three interviewees reported substantial differences in their own energy savings estimates and Xcel Energy's estimates, and all three trade allies stated that they had reached out to Xcel Energy but had not yet received clarification. One interviewee noted that this uncertainty had made them hesitant to submit additional applications.
- **Trades had mixed views on the influence of the Energy Management Systems program rebates on customer decision-making processes.** When asked if Xcel Energy rebates are driving customer decision making, responses were mixed. One trade ally noted that the rebate amounts they had seen were low—less than 10 percent of the project cost—and therefore did not motivate customers to take action. Another trade ally disagreed, and stated that they felt the incentives were major influencing factors for their customers.
- **Trade allies had relatively few recommendations for changes to the program; recommendations tended to focus on ideas for improving the preapproval experience.** Most recommendations centered on the issue of requesting feedback on discrepancies in calculated energy savings, as discussed above. One trade ally did specifically call out improving the electronic PDF application form as a possible



5. Evaluation Results—Trade Ally Findings

improvement; this trade ally hoped to see a more useable form with expandable fields to provide enough information, which they felt would result in less back and forth with Xcel Energy.

- **Trade allies generally reported positive working relationships with Xcel Energy staff.** Aside from requesting additional clarification on rebate calculations, there were no reports of issues or problems within the working relationships between trade allies and Xcel Energy. One interviewee specifically called out the willingness of sales and program staff to meet with their customers, and the credibility they lend to these interactions.
- **Interviewees acknowledged the challenges in offering lighting EMS to the market, and gave several reasons behind this.** The program has had less success rebating integrated lighting controls compared to HVAC and mechanical systems, which is what most interviewed trade allies focused on offering to the market. The structure of the EMS trade ally market, with lighting and HVAC/mechanical EMS services often residing with separate firms, was one reason noted by interviewees. Other reasons include the complexity and cost of lighting EMS, as well as the thought that commercial customers may not see a need for this technology in general.
- **Overall, trade allies felt that the demand for information feedback technologies, such as energy management information systems (EMIS), was growing in the commercial and industrial market.** Several trade allies felt that these technologies would become more popular in the market as demand for data to drive decision making continues to grow. Additionally, several trade allies called out a need in the market for better demand (kW) tracking and feedback, as demand costs can be a significant portion of customer energy bills.
- **Trade allies generally felt that the current target market for the program—commercial customers, with a focus on large office buildings—was appropriate.** Trade ally opinions on the ideal target market for EMS technologies aligned with the program’s current strategies. One trade ally noted that they felt property management firms, which tend to own office buildings, are not always the most sophisticated in knowing how to operate building systems, which is why automated EMS systems can be helpful for this segment.

5.3 DETAILED FINDINGS

Detailed findings are presented in the following topic areas: program awareness and involvement, customer awareness and decision-making processes, program procedures, and the commercial market.

5.3.1 Program awareness and involvement

All of the trade allies interviewed offered energy management services to the commercial market in Colorado, with some specializing in EMS and others offering a broad variety of other energy services. Most interviewees focused specifically on HVAC/mechanical services, with few offering lighting services. One trade ally that did offer lighting services noted that while they would include lighting EMS projects for some of their larger, more sophisticated customers with existing lighting systems, they tended to still generally focus on HVAC projects.



5. Evaluation Results—Trade Ally Findings

Trades interviewed generally have developed longstanding relationships with Xcel Energy and have been active in leveraging Xcel Energy rebates. All interviewees were aware of the Energy Management System program specifically, and most noted that they had participated in other Xcel Energy programs as well. Most trade allies noted that they had submitted at least two or three applications in the recent past, and most were familiar with the application process.

Few trade allies reported having participated in EMS programs offered by other utilities. One interviewee stated that they do work with a few other utilities but noted he did not feel he could compare their offerings to Xcel Energy's, as they do not offer a stand-alone EMS program. This interviewee noted that smaller utilities they work with tend to be more flexible in their offerings, but at the same time he/she appreciated the simplicity and straightforwardness of Xcel Energy programs, especially their prescriptive programs.

Interviewees spoke about the types of existing equipment being replaced during EMS retrofit projects. When asked if their projects tended to be replacing existing EMS or were entirely new systems to a building, responses ranged from 35 percent to 95 percent of their customers having existing EMS equipment in place. One interviewee noted: *"I would say about 40 percent might have an EMS system, but typically from what I've seen it's not operable or it's not being used."* When asked if the old systems they replace are pneumatic or DDC, interviewees again reported a mix, most often stating that it was about half and half.

5.3.2 Customer awareness and decision-making processes

When asked if customers are aware of Xcel Energy rebates for their projects, several trade allies noted that customers may be aware of the availability of Xcel Energy rebates in general, but not rebates for EMS specifically. One stated, *"I think most of our clients are aware of Xcel [Energy] rebates. They are not always aware of what might be available, but we are able to educate them very quickly on what rebates are available."* In addition, one trade ally noted that the customer awareness of EMS technologies available to them varies. The interviewee stated their typical customers—larger commercial buildings—are aware of the technology in general but may not know the details of how their systems work or how they could optimize building operations. For smaller customers such as small schools or churches, they often need to provide more education on energy management in general.

Trade allies were also asked about customer decision-making processes and motivations to implementing efficient technologies. When asked whether Xcel Energy's EMS rebates are driving customer decisions, responses were mixed. One interviewee noted: *"It's ROI. You're dealing with people who are not experts in the HVAC business. That's what they're relying on us to do. They've got to be able to financially make a sound business decision based on data, and they want to know if they can utilize the rebates to offset the cost of the retrofit."* Another interviewee estimated that 80 percent of their projects already have project funds allocated and that the rebate is just *"icing on the cake."* However, this interviewee noted that spillover may be an important outcome of those rebates: *"If they didn't get anything, not a big deal, they were still going forth with it. But if they did get something, then 100% of the time, they would put it right back into continuing to update more HVAC stuff on the control side."*

When asked if they felt Xcel Energy's rebate levels were set appropriately to drive project decision making for customers, interviewees had mixed responses. As discussed above, return on investment and payback periods were listed as important factors, which are impacted by rebate amounts. *"Not on any project that I've had,"* stated one trade ally, when



5. Evaluation Results—Trade Ally Findings

asked if EMS rebates drive decisions. This trade ally noted that the rebates they had seen for recent EMS projects tended to be a low overall percentage of the project cost. They noted, *“If it [the rebate] is going to matter, it’s got to be at least 10% [of the project cost], if they’re going to look at it and even have it be a factor in their decision.”* However, one trade ally disagreed and felt that rebates were a major influencing factor: *“We’re not finding people doing controls because they want to save energy; they are doing it because the rebates are an extra incentive.”*

5.3.3 Program procedures

A. Rebate application process

Interviewees generally felt that the preapproval application was fairly easy to understand. Several of the interviewed trade allies also noted that while they had had back and forth discussion with Xcel Energy staff on preapproval applications, the communications worked well and they had minimal issues. One noted, *“Typically, once you get accustomed to the form, it’s all about information. Garbage in, garbage out gets you a bad result. If you provide lots of documentation and define the energy conservation measures to where they can plug them in to modeling programs, then it goes quite smoothly.”*

At the same time, another interviewee stated that while they found the paperwork to be fairly easy to understand, they did not really have any context as to whether they were filling out the forms correctly; this trade ally noted that they did not understand the savings calculations process from Xcel Energy’s perspective and therefore wondered if they were *“going overboard”* and providing too much information. This trade stated that it would be useful to have additional context or examples in terms of the amount of information needed to come up with energy savings.

Several other recommendations for changes or requests for clarifications were brought up by trade allies when discussing the application and preapproval processes. One trade ally noted that they wished the preapproval form was more usable electronically—that the PDF form could be filled out more easily and submitted as such. This trade ally noted that the current PDF form does not allow fields to expand, and therefore they cannot fill in all the necessary information electronically. This trade ally felt that this results in more back and forth with Xcel Energy during the preapproval process.

Another trade ally brought up a challenge they faced for one project in which they had provided a preapproved proposal to their customer for an EMS project. The customer then shared their proposal with another contractor, who added some additional features to the project and resubmitted to Xcel Energy for preapproval. Due to the additional features, this second proposal received a higher estimated rebate, even though the interviewee believed the additional features were not appropriate for the project. While the interviewee did not have any specific recommendation for changes, he/she felt that it was inappropriate to allow the same project to be submitted multiple times for rebates by different firms. He/she noted, *“If we bring a building to Xcel [Energy] and it is preapproved, and then a competitor brings the same building to Xcel [Energy], there has to be some allegiance to the original application.”*

Additionally, three other interviewees noted feeling frustrated and confused during preapproval processes on recent projects, with most confusion centering around projects being rejected or estimated rebates being much lower than they projected. One of these interviewees described communication breakdowns between their firm and Xcel Energy



5. Evaluation Results—Trade Ally Findings

regarding discrepancies between the energy savings calculations performed for customers over the past two years; this interviewee was unsure of reasons behind changes in rebate amounts or rejected applications, and had requested but not yet received feedback on these projects from Xcel Energy. This interviewee stated, *“I have no problem with them challenging my calculations; they just haven’t even wanted to look at it.... I know that I can make mistakes and I know that when you take a bunch of energy engineers, we all calculate it a little bit different but I’m just bewildered as to how [the rebate is] at one-fourth of what it [was].”*

Two other interviewees noted a similar experience. One trade ally noted they had worked with the program for several years, and during the first few years of participating felt that their staff and Xcel Energy’s staff were consistently calculating similar savings values. Then, he/she said that starting at the middle of 2013 to present, *“[the program] has just shut the gate. I’ve been denied 3 times already.”* This interviewee stated that on one particular project, they did set up a meeting with Xcel Energy staff to discuss reasons behind the project being rejected, but felt that they were not able to get a clear explanation of why the project was ultimately denied. The interviewee noted that the uncertainty of not knowing what had caused previous projects to fail had made them wary to submit future EMS applications. Another interviewee recounted similar experiences, with several applications coming back with significant discrepancies in the energy savings calculated by the trade ally and by Xcel Energy. This trade also noted that they had reached out to Xcel Energy to understand the reasons behind this, but had not gotten any actionable feedback.

B. Interactions with Xcel Energy staff

Interviewees generally reported positive interactions with Xcel Energy staff, and respected Xcel Energy as a partner in offering energy efficient solutions to their customers. One interviewee stated: *“All those program managers and account managers, every time we have asked them to attend a meeting... they’ve always come through for us, they’ve always been there. They have a lot of credibility.”* Even interviewees who expressed confusion regarding the preapproval process still expressed positive thoughts on working with Xcel Energy in general. One trade ally specifically called out the events and seminars put on by Xcel Energy as highlighting their commitment to saving energy, and noted that in their experience Xcel Energy staff were professional and a pleasure to work with. This same trade also appreciated the accessibility of Xcel Energy staff if needed and the willingness to *“[do] what they have to do to make [the project] happen.”*

5.3.4 Commercial market

A. Barriers to incorporating lighting controls in EMS projects

Trade allies were asked about their experiences and thoughts about opportunities to incorporate lighting controls into their EMS projects as well as their opinions on the reasons behind slower uptake in these types of technologies. As stated above, most interviewees primarily focused on HVAC/mechanical upgrades and services, although several did specify and install lighting controls for customers as well.

Interviewees acknowledged the challenging nature of specifying lighting controls with EMS. One barrier mentioned is the structure of the contractor market for EMS and the traditional segregation of electrical and mechanical equipment controls. Oftentimes lighting and mechanical services are offered by separate firms, which can make incorporating both



5. Evaluation Results—Trade Ally Findings

systems into EMS projects more complex. One trade ally stated: *“It’s just cleaner from a general contracting standpoint [to keep them separate], and there are full capability lighting control systems that do not need to be tied into the mechanical EMS system.”* However, several interviewees noted that they either partner with, or refer customers to, firms that specialize in lighting controls if this is something customers have an interest in during the specification process. One stated: *“In a few instances we’ve had customers ask us, but you need to be a licensed electrical outfit to be doing a lighting retrofit upgrade. Over the years, I’ve established relationships with a few outfits, so I usually just pass their name on and whether it pans out I don’t know.”* Two mechanical contractors interviewed noted formal partnerships with lighting contractors, with only one stating that they consistently partner with that lighting firm to sell EMS to customers.

Another reason mentioned behind slower uptake of lighting EMS is the complexity of lighting configurations in large commercial and office buildings. One trade ally stated that this is especially exacerbated in buildings with many tenants and turnover. This trade explained: *“A lot of our customers are remodeling, they have various different tenants, and they have different sections of cubicles in offices that are constantly changing, and so it’s just been kind of a pain to get the lighting panels, get them set up and get them working... We’ve got massive buildings with their lighting systems laid out and we have to do a lot of work, a lot of expense to get the lighting controls to work.”*

Interviewees also noted the behavioral differences between lighting systems and mechanical systems in terms of saving energy, as well as the simplicity and effectiveness of more localized controls features like occupancy sensors instead of a fully-integrated controls system. One interviewee suggested that using occupancy sensors may be a more cost-effective solution for many customers’ lighting control needs. Another interviewee noted that while it is easy to turn off the lights when not needed, turning off systems such as pumps when not needed is more complex and more easily managed with an automatic system.

Finally, one interviewee stated that while the additional cost of lighting EMS systems can be a barrier, customers also may not be motivated to invest in lighting EMS systems if they have recently upgraded their lighting equipment, which many commercial customers have done. This interviewee said: *“Higher efficiency lighting is much more common in the existing building... They’ve already upgraded the lighting in the last five years so they already feel like they’ve got efficient lighting there.”*

B. Emerging EMS technologies

Most trade allies felt that the market for EMS technologies was growing and demand for these types of technologies would continue to rise in the coming years. One interviewee likened demand for EMS in commercial buildings to advances in residential efficient technology, such as electric cars and smart thermostats; as customers begin to see more advanced efficient technologies in their daily life they would also begin to demand these technologies in their work spaces as well.

Trade allies were asked about EMS technologies they saw as emerging in the commercial market. Overall, a majority of interviewees mentioned some type of informational feedback capability or more specific equipment monitoring (such as sub-metering) incorporated into EMS projects as being an important feature in future projects. When asked about these feedback- and monitoring-related EMS technologies, such as EMIS, interviewees gave responses such as:



5. Evaluation Results—Trade Ally Findings

I think the internet and accessibility through mobile devices all will lend itself to learning more about the building, and then executing what they learn into their operation because that's the only thing that is going to make their building more efficient.

I definitely think it [EMIS] is becoming more popular. I think there's been a huge push for it in the last five years from other companies challenging the traditional EMS installers.

If there's ever a rebate to metering, that'd be huge... Metering is data, not an energy saving method. [But] you have to have the data in order to make those energy saving decisions.

It's mind-boggling that all the customers at the end of the month—here's your consumption and here's your peak consumption. Well, when did your peak consumption happen? Where was the demand? Well, you have to have a recording meter in order to do that.

Sub-metering and the level of granularity of the information, and the software that's available, and the analytics that are available now help define when a building gets out of whack.

One interviewee stated that the more complex systems provide better insight into issues within the building, and that contractors will need to be more sophisticated as well to service and sell them. He noted: *"The industry is way out-pacing the 'Boiler Bob' guy... Mechanical maintenance is required on any given piece of equipment but making sure the EMS is maximizing the capability of the energy efficiency of the equipment is just as fundamental and necessary. And if you don't have the expertise in house to do that, you better be paying somebody that does. Optimizing a cooling tower to make condenser water the correct temperature to get the best kw/ton out of a chiller is not a 'Boiler Bob.'"*

In addition to feedback and monitoring technologies, several trade allies also noted increasing focus and demand for technologies that assist in demand (kW) reduction. One trade ally noted that often their projects provide more savings on the demand than the consumption side, and that demand charges in the state of Colorado can be more costly than consumption. Another trade agreed that demand costs are often expensive for their commercial customers, and expressed a desire for Xcel Energy to offer rebates for sub-metering technologies that allow for load shedding, as well as live-time building data tracking: *"It would certainly be nice to either have a separate rebate for adding those [load-shedding] devices because there's a lot of customers nowadays that are definitely asking. And I'm trying to sell that in the scenario, that, hey, if we can do an energy dashboard, and display your information for electrical usage on a daily basis, and monthly, and yearly, and then you can match it with last year."*

C. Market segments

When asked what types of customers they typically serve (and which are the best fit for EMS projects), several mentioned high-rise office buildings and property management firms as the best end-clients for these types of projects. One interviewee noted that even though they may own a huge building, property management firms are not always the most sophisticated in knowing how to best operate the systems. For these customers, the automation provided by EMS can be a big benefit.



5. Evaluation Results—Trade Ally Findings

However, several other trade allies noted that they work within other markets than just large office buildings. One stated that their organization provides EMS to customers *“across all vertical markets, so its healthcare, K-12 public and private, higher education public and private, data center, industrial, manufacturing, municipalities, whether its local, state, or federal. I’m really at a loss as to any of those vertical markets that do not employ the resources of a facilities management system, an EMS system, or a building automation system.”* Additionally, another interviewee noted that while they felt office buildings in general were a good fit, larger office buildings tend to have engineering staff and may already have an upgraded EMS in place. This trade ally felt that the biggest opportunities were within the small- to medium-sized office buildings, although they acknowledged that it can be difficult to sell cost-effective projects to this market segment. Finally, one interviewee noted that while they felt hotels have very large potential in terms of savings through EMS, that segment has historically been difficult to engage in energy efficiency projects as their main focus is on marketing and customer experience (and not improving infrastructure or energy efficiency).



6. EVALUATION RESULTS—BENCHMARKING

This section presents the findings of a benchmarking study of peer utility programs conducted for the evaluation of the Xcel Energy Colorado Energy Management Systems program.

6.1 INTRODUCTION

This benchmarking study characterizes utility programs identified by Xcel Energy and the evaluation team as of particular interest to review and compare against the Colorado Energy Management Systems program. The research focused on gathering the following types of information:

- *Program structure:* What incentives and services does the program offer to the commercial and industrial market? Do they offer a stand-alone energy management systems (EMS) program, or is EMS rolled up into an umbrella program?
- *Marketing and outreach strategies:* What are the key program channels to market and promote customer participation?
- *Customer participation:* How many customers have programs been able to recruit? Are there particular sub-sectors of commercial and industrial customers that programs have been more successful recruiting?
- *Trade ally/contractor engagement:* Does the program include or leverage trade allies throughout the program process? If so, how?
- *Program goals:* Do the programs have formal and/or informal goals? If so, what are the goals under which programs operate?
- *Measure and incentive structures:* What are the common measures implemented across programs? Do programs offer custom or prescriptive incentives, and how are these structured?
- *Emerging/advanced technologies:* What advanced or emerging EMS technologies are programs offering? What technologies are they considering offering? Where do program staff see the most opportunities in the EMS market?
- *Savings verification:* How do other utilities or programs verify savings estimates for EMS? What measurement and verification (M&V) protocols are used?

The benchmarking research was conducted using a combination of internet searches, email inquiries, and telephone interviews with utility program staff. The internet research provided high-level program information for 12 utility programs of interest identified by the evaluation team and Xcel Energy staff. Five in-depth interviews were conducted with six program staff members to obtain further insight into design and implementation. The secondary internet research was completed in June 2014, and the in-depth interviews were completed in September and October 2014. Interviews were conducted with program/initiative managers at the following organizations:

- Pacific Gas and Electric (PG&E), California
- National Grid, Massachusetts
- Sacramento Municipal Utility District (SMUD), California
- Duke Energy, North Carolina



6. Evaluation Results—Benchmarking

- Alliant Energy, Iowa.

6.2 KEY FINDINGS

The benchmarking study identified the following key findings:

- **There are relatively few stand-alone programs that focus specifically on EMS or EMS-related offerings; most are included in umbrella custom programs.** Xcel Energy's Energy Management Systems program is relatively unique in that few other researched programs had formal goals specifically tied to their standard EMS offerings; most rolled up into custom (or in National Grid's case, prescriptive) programs.
- **While most programs focus on rebating end-use technologies, two programs offer incentives for adding programming or energy-saving strategies to already-existing EMS systems.** Unlike Xcel Energy's program, which currently offers incentives for end-use technology, both SMUD and National Grid offered incentives for improving EMS operation and adding additional energy saving strategies. Among all the programs for which program staff were interviewed, only National Grid's program offered prescriptive incentives for their EMS strategy improvement program.
- **Similar to the Energy Management Systems program, account managers and trade allies are the main outreach arm for other EMS programs.** Customer outreach is primarily driven by account management or business representative staff and trade allies. Most interviewees reported that they do not have a formal trade ally network or program, but rather use contractors and vendors more informally reach out to customers.
- **Two utilities integrate automated demand response capabilities into their EMS offerings.** Xcel Energy program staff stated their Energy Management Systems program has struggled historically to achieve peak demand savings; two interviewed utilities integrated both demand and consumption reduction through incorporating demand response with their EMS offerings. PG&E's automated demand response program focuses mainly on demand savings, although there are energy efficiency components included in the program. SMUD also requires that all lighting systems installed are auto-demand response capable, although participants are not currently required to participate in a demand response program.
- **Peer utility program staff echoed the challenges Xcel Energy has seen in integrating lighting controls into EMS systems.** Interviewed staff members acknowledged the difficulties in integrating lighting and HVAC controls systems, one being the nature of the trade ally market with lighting and HVAC services often offered by different contractors. Only one program included in the benchmarking research, SMUD's advanced lighting controls program, currently focuses specifically on lighting EMS. SMUD's offering targets large industrial customers as the best fit for these technologies due to the nature of the building use, occupancy schedules, and the state of existing equipment. National Grid program staff also stated that they are currently working towards offering an advanced lighting controls option in the near future.
- **Similar to Xcel Energy, all interviewed utilities currently offer or are considering offering advanced EMS technologies such as energy management information systems (EMIS).** PG&E, SMUD, and Duke Energy all currently offer incentives for advanced EMS measures that include monitoring or feedback capabilities. Both National Grid and Alliant Energy are in the program development stages for new offerings, which include advanced EMS or controls technologies.



6. Evaluation Results—Benchmarking

- **Xcel Energy’s custom application process is comparable to other benchmarked programs.** Across programs, preapproval is a standard requirement for most EMS projects. Participation processes generally follow a typical custom incentive process—(1) preapproval application is submitted, (2) program reviews application, estimates energy saving and rebate levels, and approves project, (3) customer implements project, (4) program conducts necessary QC and verification, and (5) incentive is paid to the customer.
- **Specific measurement and verification protocols for EMS vary by program, though two benchmarked programs conduct post-M&V activities several months after implementation to verify estimated savings.** National Grid conducts post-M&V for custom EMS projects meeting a savings threshold typically after the system is functioning to its design intent and possible longer to verify seasonal measure impacts. SMUD reviews customer interval consumption data the following year after implementation to determine if there are substantial variances from the original savings estimate.

6.3 DETAILED FINDINGS

Table 6-1 summarizes study findings from the internet research as well as information from the program manager interviews.



6. Evaluation Results—Benchmarking

Table 6-1. Summary Table of Benchmarking Study Findings

Program (Name of Utility)	Goals and objectives	Measures	Eligibility	Incentives	Application/approval process	Links to Program Documentation
Energy Efficiency in Empire Zones (National Grid), NY	To provide assistance to customers not eligible for assistance through the NYSERDA commercial energy efficiency programs because they do not pay the NY state Systems Benefit Charge on their Empire Zone Rider eligible usage. Empire Zones are urban areas with inefficient buildings with aging infrastructure, making them a good place for energy initiatives.	Includes building automation systems and energy management systems. Also includes equipment-level lighting and HVAC controls as well as several other HVAC, lighting, and refrigeration equipment. Provides incentives for the installation of energy-efficient lighting, controls, HVAC equipment, motors/electronic speed controls, and other systems that reduce energy use and/or enhance productivity.	Must be participating in National Grid ("Niagara Mohawk")'s Empire Zone Rider program. That program gives electricity discounts—including not having to pay the energy efficiency rate add-on—to businesses located in State-designated redevelopment zones. (The reason the program exists is that these customers are not eligible for OTHER energy efficiency programs because they don't pay the add-on) - Must meet 3 qualifications: 1. be owner of eligible business; 2. be a certified Energy Zone customer; 3. be receiving energy delivery benefits under National Grid's Empire Zone Rider program OR undertaking EZR qualifying expansion. Projects involving new construction are not eligible.	Incentives will be no more than 50% of total project cost; customer must cover at least 25% of costs. Incentives will not exceed \$25,000; Incentives must be installed within 2 years of grant approval date	Online application. Necessary application materials: completed and signed application; copy of federal tax ID certificate; copy of New York State Empire Zone certification; detailed project description; project cost estimates; commitment letters or documentation of secured funding (including applicants).	Application: http://www.shovelready.com/application/PrintApp.asp Program description: http://www.shovelready.com/ProgramDocuments/EnergyEfficiencyInEmpireZones.pdf
Commercial Incentives and Rebates (Sawnee EMC), GA		Energy Management System to control lighting, HVAC, and other office functions. Lighting upgrade, solar film window tinting, upgrade equipment.	All Sawnee EMC requirements must be met in order to receive a rebate	Prescriptive: 1/2 of the total cost up to a maximum of \$500. Different incentives for other equipment through program	Program recommends that customers have an on-site evaluation performed by a Commercial Marketing Representative (CMR) to verify eligibility for grant money. Grant money is not paid until improvements have been inspected and/or verified by the CMR. Customers can email receipts to program staff with a Sawnee account number and a contact phone number.	
Custom Rebates (Business, IA) (Alliant Energy)	Provide assistance for equipment that does not qualify for standard rebates. 2014 kWh goal is ~68,000,000 kWh. Gas goal is 252,000 therms.	Custom program including rebates for a variety of different measures, including energy management systems.	Commercial/industrial; must have a minimum two-year payback after incentive. Ineligible if equipment powered by renewable energy sources. Energy savings associated with fuel switching also ineligible. Projects must demonstrate permanency or sustainability of savings. Savings resulting from reduced production or shutdown are ineligible.	Custom rebates, equal to 150% of the annual energy dollar savings. Rebate based on percentage of annual energy dollar savings. Require a 2-year minimum payback.	Must have preapproval.	Brochure: http://www.alliantenergy.com/wcm/groups/wcm_internet/intl@ae/documents/application/mdaw/mdaw-edisp/023892.pdf Filings: http://www.state.ia.us/government/com/util/enery/energy_efficiency/ee_plans_reports.html https://efs.iowa.gov/cs/groups/external/documents/docket/mdaw/mctw-edisp/139327.pdf



6. Evaluation Results—Benchmarking

Program (Name of Utility)	Goals and objectives	Measures	Eligibility	Incentives	Application/approval process	Links to Program Documentation
Technology Incentive (TI) Program (Pacific Gas and Electric), California Automated Demand Response Program	<p>Demand-response program. The objective of the program is to allow voluntary load shedding when notified by PG&E.</p> <p>Encourages customers to expand energy management capabilities by participating in DR programs using semi-automated and automated electric controls and management strategies.</p> <p>Goal for 2012-2014 is 72 MW of peak load reduction. 7 MW using advanced technologies.</p>	<p>2 program options: automated DR or semi-automated DR. Also provides participants with assistance identifying load curtailment strategies & technical coordination during the equipment installation.</p>	<p>Must:</p> <ul style="list-style-type: none"> • Have PG&E interval meter • Receive electric services from PG&E • Have an existing utility service account with at least 12 months billing and usage history • Be enrolled in a qualifying PG&E DR program for at least 3 years • Not installing a communicating thermostats project as a small or medium business 	<p>Semi-automated DR: \$125 per kW; Automated DR: \$200 per kW. Participants receive 60% of incentive after successful verification of equipment installation and remaining 40% upon verification of performance in full DR season. Incentives may not exceed 100% of total project cost.</p>	<p>1) submit application package; 2) notify PG&E of installation; 3) Operating Report if involved in M&V</p> <p>See <i>ADR Project Milestones on program website for more detailed project steps.</i></p>	<p>Program overview: http://www.pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/demandresponse/AutoDR_Overview_Policies.pdf</p>
Energy Initiative: HVAC Systems (National Grid - Massachusetts, Nantucket, Rhode Island)	<p>Promote high-efficiency specifications and quality installation of unitary air conditioning and heat pump equipment.</p> <p>Goal for commercial/industrial programs overall in Rhode Island is ~97,000 MWh.</p>	<p>Focuses on HVAC and controls—HVAC Energy Management Systems (see "Massachusetts utilities...") and hotel room occupancy sensors.</p>	<p>Nonresidential and prescriptive. Equipment must be new and installed in a commercial, industrial, institutional, educational or municipal building within PA's service territory. Fuel controls, lighting controls, and alarm points are not eligible. Only new or expanded EMS is eligible (replacement of existing EMS is not).</p>	<p>Hotel room occupancy sensors—prescriptive @ \$75/sensor. \$225/pt for EMS.</p>	<p>Preapproval is required. Equipment must be installed within 12 months of preapproval. Then customer submits final cut sheets, and invoice. Verification post-installation.</p>	<p>HVAC retrofit EMS application: http://www.nationalgridus.com/non_html/shared_energyeff_ei_ems_pif.pdf</p> <p>Benchmarking for energy efficiency programs: http://www.eebestpractices.com/pdf/SummaryProfileReport_NR57.PDF</p> <p>Rhode Island 2013 program plan: http://www.nationalgridus.com/non_html/leer/i/2013%20EPP%20Final%20w%20Rev%20Att%205%2020121204.pdf</p>
Massachusetts Utilities Commercial and Industrial Retrofit Program (EMS retrofits) (Cape Light Compact; National Grid Mass; NSTAR; Unilit; Western Massachusetts Electric)	<p>Designed for commercial and industrial customers to help replace aging, inefficient equipment and systems with energy efficient technologies.</p>	<p>Focuses on HVAC and controls—HVAC Energy Management Systems and hotel room occupancy sensors.</p>	<p>Nonresidential. Equipment must be new and installed in a commercial, industrial, institutional, educational or municipal building within PA's service territory. Fuel controls, lighting controls, and alarm points are not eligible. Only new or expanded EMS is eligible (replacement of existing EMS is not).</p>	<p>CLC: small business: up to 80% of cost, up to 300kW, capped at \$150,000 large business: 40-60% of cost, up to 300kW, capped at \$150,000 Max \$225/pt.</p>	<p>Preapproval is required. Equipment must be installed within 12 months of preapproval. Then customer submits final cut sheets, and invoice. Verification post-installation.</p>	<p>Brochure: http://www.capelightcompact.org/library/2010/06/CI-brochure-8-26A1.pdf</p> <p>Application: http://www.massave.com/~media/Files/Business/Applications-and-Rebate-Forms/RetrofitEMS-Retrofit-Form-Mass-Save.ashx</p> <p>2012 Annual report: http://www.nationalgridus.com/non_html/leer/mal/11_MA_E_EEAR_Pt_1.pdf</p>



6. Evaluation Results—Benchmarking

Program (Name of Utility)	Goals and objectives	Measures	Eligibility	Incentives	Application/approval process	Links to Program Documentation
Lighting & Controls Incentives (Sacramento Municipal Utility District), California	Achieve energy savings; create schedules to turn on, off and dim lighting; improve lighting quality; track energy costs and savings; plan maintenance of lighting; control lighting onsite or remotely; incorporate automated demand response capability into system	Energy Management Systems specifically targeted at lighting systems. Program also includes incentives for energy efficient lighting equipment.		\$0.25 per kWh saved, up to a max of \$100,000 or 70% of total project cost.	Preapproval required. Applications must include a copy of applicable invoices, receipts, or work orders. Contractor and customer must sign and submit a custom incentive application. Must be in compliance with Title 24.	<p>Program requirements: https://www.smud.org/en/business/save-energy/rebates-incentives-financing/lighting/documents/ALC-project-requirements.pdf</p> <p>Product list: https://www.smud.org/en/business/save-energy/rebates-incentives-financing/lighting/documents/ALC-qualified-product-list.pdf</p> <p>EMS Description: https://www.smud.org/en/business/save-energy/energy-management-solutions/control-systems/performance-incentive.htm</p>
Operation and Maintenance Program (Connecticut Light & Power)	<p>Improve electrical and thermal efficiency of operations by changes and repairs, rather than through capital investment.</p> <p>2009 goals: 462,142 kWh annual</p>	<p>Focus of program on technical advice on and maintenance of existing equipment. Maintenance of energy management system, including reprogramming and replacing defective sensors, relays, and actuators. They have a separate RCx program, which requires that buildings be over 100,000 sf and is much more formal.</p>	Commercial, industrial, municipal customers of any size.	Energy-efficiency measures may be eligible for incentives to offset a portion of the installed project cost. For EMS systems specifically, the incentive structure is: 40% of total cost. Measure Cap (greater of): \$0.30 / kWh OR \$800.00 / summer peak kW.	CL&P energy experts work with customer to identify savings opportunities. Create a contractual agreement with all energy efficiency measures and the anticipated incentive dollars. Last steps are verification and receipt of incentive.	<p>Incentive structure: http://www.cl-p.com/downloads/Retrofit%20Incentives.pdf?id=4294986588&dl=t</p> <p>RCx program: https://www.cl-p.com/Business/SaveEnergy/Services/Retro_Commissioning/</p>
Prescriptive/Custom Program (AEP Ohio)	Provides set financial incentives to business customers who implement energy-efficient improvements and technologies that reduce energy consumption.	<p>Water- and Air-cooled chillers; unitary and split Air Conditioning system and air source heat pump; variable refrigerant flow; ground source heat pump; water source heat pump; room air conditioner; package terminal AC and heat pump units; hotel guest room energy management system, centralized building EMS</p> <p>2014: increased sq. footage on EMS to 150,000 sq. ft.</p>	Buildings with 2,000–150,000 square feet. Incentive capped at \$30,000 per facility.	10% extra incentive for HVAC/EMS in March 2014. Incentive for HVAC EMS 20c per square foot, capped at \$30K per facility.	<ol style="list-style-type: none"> 1. Preapproval proposal submission 2. Preapproval proposal review 3. Funding reservation 4. Project completion 5. Final application review and approval 6. Incentives paid <p>Specifically for EMS, preapproval must include:</p> <ul style="list-style-type: none"> -Proposed EMS sequence of operations -Scaled floor plan of building with controlled area highlighted -Specifications of proposed EMS system -Estimated cost for proposed EMS system -Utility billing data and/or building sub-metering datum demonstrating kWh and kW information 	<p>Application: https://www.aepohio.com/global/utilities/lib/docs/save/programs/AEPOhio/2014_AEP_All_Measures_Prescriptive_Custom_Application.pdf</p> <p>Add'l docs: https://www.aepohio.com/global/utilities/lib/docs/save/programs/HowProgramsWork.pdf https://www.aepohio.com/global/utilities/lib/docs/save/programs/aepohio/2014_Prescriptive_Program_Fact_Sheet.pdf</p> <p>http://www.wcsen.org/Events/2014%20prescriptive%20presentation.pdf</p>



6. Evaluation Results—Benchmarking

Program (Name of Utility)	Goals and objectives	Measures	Eligibility	Incentives	Application/approval process	Links to Program Documentation
HVAC Incentives (Com Ed), IL	Offers incentives to help businesses reduce electricity use by improving the efficiency of their equipment.	Centralized EMS systems as well as other commercial/industrial HVAC measures. ComEd also offers rebates for hotel guest room energy management systems.	All ComEd commercial and industrial customers except public sector organizations. EMS systems must be new and include certain specifications. Existing EMS systems cannot have time of day scheduling and existing digital EMS must be 15 years old or older to qualify for replacement.	Building EMS: between \$0.15–\$0.35 per sq. foot of air conditioned space. Two tiers of rebates depending on number of strategies implemented. Rebate varies depending on current EMS and programmable thermostat status.	<ol style="list-style-type: none"> 1. Check project and equipment eligibility 2. Submit a preapproval application 3. Install equipment or perform project work 4. Submit a final application 5. Receive incentive payment 	<p>HVAC Incentives Worksheet: https://www.comed.com/Documents/business-savings/PY7_HVAC_v06.pdf</p> <p>Application: https://www.comed.com/Documents/business-savings/PY7_StandardApplication_v02.pdf</p> <p>Case Studies: https://www.comed.com/business-savings/resources/Pages/case-studies.aspx</p>
DDC/Controls (ConEd), NY	Assists customers in implementation of DDC/controls/EMS. Direct digital control (DDC) and other types of control allow for optimal performance of a building's HVAC and other systems.	This prescriptive measure provides an incentive for the installation of a new, or adding functionality to an existing, DDC control/automation system.	ConEd commercial or industrial customers in an existing building who pays the applicable gas or electric systems benefit charge. Has not received an incentive from NYSERDA or another utility for the same project. Existing facility (no new construction).	\$2 per Therm and \$0.12 per kWh. Max of 50% of project costs.	<ol style="list-style-type: none"> 1. Completed program application 2. SOW 3. Cut sheets for all equipment 4. Project timeline 5. List of multiple locations (if applicable) 	<p>Application: https://www.conedci.com/Documents/ConEd_Program_App.pdf</p> <p>Program Form: https://www.conedci.com/Documents/DDCC_controls.pdf</p> <p>Checklist: https://www.conedci.com/Documents/BMS-EMS-Control_Project_Checklist.pdf</p>
Building EMIS Pilot, Duke Energy	Assists customers in the implementation of building EMIS systems (separate from EMS systems). Allows for building monitoring and identification of issues as well as savings persistence.	Building EMIS systems and software.	<ol style="list-style-type: none"> 1. The building space must fall into one of the following categories: Office, universities, small hospital, large retail, or K-12 Schools 2. Annual electric energy usage greater than 850,000 kWh for the building 3. The building must be individually metered with one or more Duke Energy billing meters that record interval data (e.g., 15-minute intervals) 4. The Customer is not opted-out of the Energy Efficiency rider (only applies in NC, OH and SC) 5. Existing building automation system (BAS) in good working order, but no Building EMIS yet 6. Equipment and systems not at the end of life 7. Have no imminent plans for major retrofits 8. Some system design information available for review. 	50 percent of upfront funding for initial set up of the Building EMIS software; annual EMIS software-as-a-service (SaaS) license fees for up to four years; on-site building energy assessment; written assessment report/action plan quantifying the recommended measures; and quarterly monitoring and analysis. Customer will be responsible for the balance of the above costs plus pay for the measures identified in the energy assessment having a bundled simple payback (SPB) of 2 years or less. A maximum of \$0.10 per square foot is the Customer's ceiling to install those measures.	<ul style="list-style-type: none"> o Duke Energy creates a baseline energy model for the building in the Energy Management and Information System software o Duke Energy performs an on-site building energy assessment focused primarily on the building automation system/controls, HVAC system and lighting control system (if one exists) o Customer installs a bundle of operational and maintenance-based energy efficiency measures (EEMs) identified by the Building EMIS software and/or the energy analyst that has a combined simple payback (SPB) of two years or fewer (please note that some of the individual EEMs in the bundle may have a simple payback greater than two years). 	Program documentation: http://www.duke-energy.com/pdfs/NCemis.pdf



6. Evaluation Results—Benchmarking

The detailed findings below are presented by program design, program delivery, and emerging and advanced technologies.

6.3.1 Program design

The benchmarking research was able to identify relatively few programs targeting energy management systems or technologies specifically. Several of the researched utilities offered multiple EMS offerings through different programs or incentive mechanisms, which will be discussed in more detail below. During secondary research into programs offering these types of technologies, most often, EMS projects are rebated through an overarching C&I custom program. Most interviewees also reported that their EMS offerings are rolled up into an umbrella program, at least for formal reporting purposes.

A. Program scope

PG&E offers an automated demand response program to its commercial and industrial customers in California, which is implemented through adding functionality to allow customer energy management systems to shed load as needed as well as directly communicate with PG&E when demand response events are called. This program has two components—fully automated demand response and semi-automated demand response. For both of these program tracks, PG&E provides incentives for incorporating demand response capabilities into energy management or building automation systems; any measure, equipment, or additional programming that achieves this goal may be eligible for incentives through this program. The program defines the fully-automated track as one that does not require human intervention to operate—once an event is called, the participant's EMS system receives a signal directly from PG&E and automatically initiates the pre-programmed load shedding strategies. The program also offers incentives for a semi-automated track, which is similar to the fully automated track except that when an event is called, facility staff must initiate the load shedding operations manually. Participants in the semi-automated track must also implement at least one energy efficiency project that is eligible for incentives through PG&E's energy efficiency program (this is not a requirement of the fully automated track). PG&E utilizes a third-party firm to implement the program.

SMUD offers incentives for EMS through their C&I custom program. EMS incentives were piloted beginning in 2012 alongside energy management system performance incentives for implementing performance measures or strategies to save energy. SMUD also offers an advanced lighting controls offering as a subset of their C&I custom program, which is focused specifically on implementing energy management solutions for lighting equipment. This offering, also piloted in 2012, focuses on stand-alone lighting management systems. These lighting control systems have their own graphical user interface, with a map that allows users to centrally control their lighting in very small groups of fixtures, and sometimes even down to the unique fixture. Eligible systems also provide live-time tracking, monitoring, and feedback on energy usage and equipment issues. To be eligible for the program, systems must also be capable of automated demand response, although participants are not currently required to participate in a demand response program. The impetus for both the EMS and advanced lighting controls pilots stemmed from a grant received by SMUD to promote “smart” technologies.

The National Grid EMS offering includes both a custom and a prescriptive component. Their custom EMS offering provides incentives for the installation of a new building automation or



6. Evaluation Results—Benchmarking

energy management system. However, National Grid also offers prescriptive incentives for customers who are interested in implementing additional or optimized control strategies. This prescriptive track focuses on adding low-cost/no-cost system strategies and programming improvements to an existing EMS system, rebated using a “point” system (discussed in more detail below). This prescriptive component is offered through National Grid’s prescriptive C&I HVAC program.

Duke Energy also offers EMS incentives through several different mechanisms. Currently, the utility offers incentives for EMS projects through their custom program but is exploring the possibility of adding a stand-alone EMS offering or program. Additionally, in 2014 Duke Energy piloted a building EMIS program, for which Duke Energy assists customers in monitoring and assessing building performance. This EMIS system is implemented separately from the building automation or energy management system. Finally, Duke Energy also provides a non-regulated service separate from their energy efficiency programs, in which they act as a vendor or service partner in providing management services for customer energy systems. Program staff stated that they currently tend to use third-party implementers to provide their programs to the market.

Alliant Energy offers incentives for building automation or energy management systems through their custom program, and their retrocommissioning program also focuses on recalibrating or optimizing control systems. Alliant Energy is also currently considering adding a stand-alone HVAC automation system offering to their C&I portfolio.

While the evaluation team was not able to speak with a program manager from the remaining researched utilities, secondary research was gathered where available to inform program structure and design. Table 6-1 above lists the detailed information gathered. Some notable programs researched include ConEdison (ConEd) in New York, which offers incentives for the installation of direct-digital control EMS. Commonwealth Edison (ComEd) in Illinois also offers incentives for the installation of new EMS; this program also requires the implementation of optimized control strategies in conjunction with the end-use system. Also, Connecticut Light and Power (CL&P) offers an operations and maintenance program that includes improving and maintaining existing EMS systems through reprogramming and proactive replacement of defective sensors or equipment.

B. Program goals and achievement

Most interviewed program staff noted that they did not have stand-alone goals for their EMS offerings specifically. As noted above, for most programs these offerings roll up into umbrella custom or prescriptive programs, and goals and metrics are also formally reported at this higher level. However, PG&E does have a separate goal for their automated demand response program, which in 2014 was 72 MW of demand reduction. Interviewed program staff stated that they felt this goal was optimistic, especially after recent program changes resulting in tighter eligibility screening. This interviewee also noted that the program changed its incentive structure in 2013, moving from an upfront incentive to a 60/40 split described in the next section, which they felt discouraged some participants. Program staff stated that the program had achieved approximately half of their 72 MW goal to date.

Across researched programs, participation levels varied but tended to be relatively low. SMUD estimated that they had approximately 20 participants in the past two years. Notably, SMUD program staff stated that they have not had much success with large commercial buildings implementing advanced lighting controls, and instead have focused the program on



6. Evaluation Results—Benchmarking

large industrial facilities, which have yielded much better savings. Program staff gave several reasons behind this, one being that industrial facilities tend to have different occupancy schedules from commercial office buildings, which lend themselves more easily to advanced lighting controls. This interviewee also reported that while they have seen interest from the commercial segment, they have found the savings potential in industrial settings to be higher than in office buildings due to the typical baseline lighting equipment seen in each respective segment.

National Grid program staff stated that their prescriptive EMS offering did not make a large contribution to the overall portfolio, estimating that it comprised approximately 5 percent of the C&I prescriptive program overall. Staff were able to provide actual savings for their custom EMS offering, which represented 2 percent of the larger electric C&I savings overall. However, staff felt that participation was higher in the EMS custom offering and that the savings may be understated. Staff stated that within the custom program they often saw EMS projects come through bundled with other projects, such as updates to an HVAC unit or adding VFDs. Duke Energy noted that there had been relatively little pick-up of the building EMIS pilot to date but that their standard EMS projects represented a relatively strong portion of their general custom offerings, at 13 percent. In terms of consumption, Xcel Energy's Energy Management Systems program goal represents approximately 3 percent of the overall C&I savings goal.

C. *Measures and incentives*

Xcel Energy offers custom incentives of \$600/kW saved and \$4/therm saved for EMS projects. Most other researched programs offer custom-calculated incentives for their standard end-use EMS offerings. However, several utilities had unique offerings and/or incentive structures in addition to standard energy management or building automation systems.

National Grid's custom incentive for installation of EMS is capped at either \$0.40/kWh or a two-year payback, whichever is lower. As noted above, in addition to their custom EMS incentives, National Grid also offers prescriptive incentives for implementing or improving control strategies or programming. National Grid structures these prescriptive incentives through a point system with a rebate of \$225 per point based on the building's square footage. The incentive structure has three tiers, which range between 5,000 and 200,000 sq. ft. (Table 6-2).



6. Evaluation Results—Benchmarking

Table 6-2. National Grid Massachusetts Incentive Structure³

Conditioned Space Controlled	Maximum Number of Points	Maximum Unit Incentive for Eligible Points
5,000-40,000 sq. ft.	Up to 20 pts (16 electric, 4 gas)	\$225/pt.
>40,000 - 80,000 sq. ft.	Up to 60 pts (48 electric, 12 gas)	
>80,000 - <200,000 sq. ft.	Up to 160 pts (128 electric, 32 gas)	

This program is targeted at facilities with existing EMS who may not be operating their systems as effectively as possible. Eligible optimization strategies vary by building structure, size, and system setup, but strategies listed on the rebate form include chiller resets, night setback, and programming optimized equipment start and stop times. An example listed on the rebate form includes a rooftop unit for which the fan is currently operated 24/7. The optimized strategy is to only operate the fan between 7:00 a.m. and 5:00 p.m. five days a week, and to set the temperature back by five degrees at night. Customers typically work in conjunction with an EMS vendor to determine the eligible strategies and complete the program application. National Grid program staff noted the prescriptive offering is intended for EMS optimization or “tune-ups.” If a customer needs significant upgrades or changes to their EMS, they would need to go through the custom program.

SMUD offers both EMS and advanced lighting controls incentives through their umbrella C&I custom program. SMUD also offers a performance incentive, somewhat similar to National Grid’s strategy-based incentives discussed above, for businesses that implement performance-based improvements to their EMS. SMUD’s performance-based EMS incentive also has three tiers, shown in Table 6-3 below, but these are based on system/building size, previous performance, and percentage of energy saved. This percentage is based on savings assumptions developed by program staff for the typical percentage of energy saved by certain actions or strategies, and the incentive level is \$0.08/kWh estimated saved. Interviewed program staff noted that while this performance component is still under the custom program umbrella, these incentives are determined on more of a prescriptive-type basis using the percent-savings-per-strategy method: *“First you look at how poorly—or adequately—the building is operating compared to its peers, then you pick out these prescriptive metrics for each feature [measure/strategy].”* This program staff noted that SMUD has found this method of savings assumptions simpler and generally quite conservative, and it has allowed them to serve a need in the market that they previously had not been able to.

³ Information from program rebate application:
http://www.nationalgridus.com/non_html/shared_energyeff_ei_ems_pif.pdf.



6. Evaluation Results—Benchmarking

Table 6-3. Levels of Participation in SMUD’s EMS Performance Incentive⁴

Level	Requirements
Level 1	Up to 4% of energy savings
	For small retail and office space with unitary, centralized air conditioning equipment (no large air handlers, pumping distribution or a central plant)
	Undertake an energy saving control strategy or numerous partial control strategies
Level 2	Up to 9% of energy savings
	For large retail stores, office buildings and hotels with large unitary air conditioning equipment or central plant, with limited use of large air handlers and pumping distribution systems
	Undertake 5 or more whole building approach control strategies or numerous partial control strategies
Level 3	Up to 14% of energy savings
	For large retail, office buildings and hotels with large unitary air conditioning equipment or a central plant, large air handlers and pumping distribution systems
	Undertake 10 or more whole building approach control strategies, or numerous partials, including control commissioning. The control system must be programmed, tested and validated.

SMUD’s advanced lighting controls offering is structured differently; currently the incentive levels are set at \$0.25/kWh, up to \$100,000 and 70 percent of project cost. This is considerably higher than most of SMUD’s other custom program offerings, including EMS installation, where the incentive level is set at \$0.25/kWh up to \$100,000 and 30 percent of project cost. Program staff stated that the advanced lighting controls incentives are higher due to the complexity and difficulty in implementing these types of projects. Additionally, while the advanced lighting controls program falls under the custom umbrella, program staff initially restricted participants to installing lighting products from a preapproved products list.

Similar to National Grid and SMUD, Duke Energy also offers several different types of incentives for EMS solutions. Duke Energy currently incentivizes EMS through their custom program, and in 2014 Duke Energy piloted a building EMIS program. As part of the EMIS program, Duke Energy performs an on-site assessment and baseline energy modeling for participants as well as software to track building and equipment performance. Participants then implement operational and maintenance-based strategies or measures identified in the assessment or by the software, and both the participant and Duke Energy can monitor building performance and savings persistence. As part of this pilot, Duke Energy provides 50 percent of the upfront cost of the software, license fees (up to four years), the on-site

⁴ Information from SMUD’s program website: <https://www.smud.org/en/business/save-energy/energy-management-solutions/control-systems/performance-incentive.htm>.



6. Evaluation Results—Benchmarking

assessment and action plan, and quarterly monitoring/analysis, up to a maximum of \$0.10/sq. ft.

Duke Energy also provides custom incentives for EMS installation, though the interviewed staff could not provide additional details on incentive amounts. However, the program website states that the incentive is tied to the impact the measures have on the customer's load profile, and typically range from 25 percent to 150 percent of the projected annual electrical savings. This staff member also stated that Duke Energy is currently researching changes to their EMS offerings, including whether to offer EMS as a stand-alone offering or within another program, and whether to offer a prescriptive or custom incentive.

For their automated and semi-automated demand response program, PG&E offers several different levels of incentives. Semi-automated demand response projects (which require human intervention to implement load shed) are rebated at \$125/kW; as noted above, participants in this track must also implement an energy efficiency project eligible for PG&E's energy efficiency programs. Participants in the automated demand response track, in which load shed events are fully programmed without human intervention, receive \$200/kW. In addition, customers that implement "advanced technology" projects are eligible for even higher incentives: \$350/kW for HVAC measures and \$400/kW for lighting measures. Program documents list several requirements for projects considered "advanced." Examples include measures that operate wirelessly and provide two-way, real time communications within a facility and have a high level of control over granular systems (examples provided in program overview documents include control over specific rooms or lighting fixtures). Incentives are paid out in a partial performance structure; 60 percent of the total incentive is provided after project installation and a test demand response event is called. The remaining 40 percent is provided after verification of the system's performance after the first full demand response season.

Program websites and documentation provided information on incentive structures for several other peer utility EMS offerings for which an interview was not completed. ConEd in New York State offers incentives for direct-digital controls; according to the program website the incentives are offered on a prescriptive basis. However, the website also noted that detailed savings calculations are required and incentive levels are set at \$2/therm and \$0.12/kWh. Additionally, Commonwealth Edison (ComEd)'s EMS offering for EMS and optimized strategies is structured in tiers based upon square footage and the number of energy savings strategies implemented, somewhat similar to National Grid's above. However, ComEd's incentives are also dependent on the baseline equipment in place and are provided based on a cents-per-square-footage basis that ranges from \$0.15–\$0.35/sq. ft.

D. Eligibility requirements

Eligibility requirements vary by program. National Grid's prescriptive program does not have strict eligibility requirements, but program staff noted that customers that fall within the square footage bounds detailed above (5,000 to 200,000 sq. ft.) are the best candidates for the program. SMUD's advanced lighting controls program is also open to both commercial and industrial customers, with the website noting it is targeted at medium- to large-sized customers. PG&E's automated demand response is open to all large nonresidential customers who currently are eligible to participate in their demand response program and have an interval meter installed at their site. Participants must also have a minimum of 12 months billing history, and 24 months if their load is intermittent (such as agriculture). Duke Energy's EMIS pilot has fairly narrow eligibility requirements, only allowing commercial



6. Evaluation Results—Benchmarking

customers from five segments to participate—office, universities, small hospitals, large retail, and K-12 schools. These buildings also must consume more than 850,000 kWh annually and have an interval meter installed, among other requirements.

6.3.2 Program delivery

A. Participation process

For almost all researched programs, preapproval is required before moving forward with an EMS project. As noted above, nearly all the researched program incentives are calculated on a custom basis and therefore require a detailed program application. Some utilities, such as Duke Energy for their custom EMS incentive, provide a worksheet on their website, and several others provided their application. Documented participation processes varied in detail but generally followed a typical custom incentive process—(1) preapproval application is submitted; (2) program reviews application, estimates energy saving and rebate levels, and approves project; (3) customer implements project; (4) program conducts necessary QC and verification; and (5) incentive is paid to the customer.

Several researched programs documented QC or verification processes post-installation. Xcel Energy verifies installation and EMS system settings for all projects, either via phone with the customer or through an in-person visit. SMUD stated that they typically inspect their advanced lighting controls projects before providing an incentive and also conduct more detailed M&V if savings calculations are less certain (although they noted they do not penalize participants if savings are found to be inaccurate). Additionally, Duke Energy's EMIS pilot requires program participants to provide notification if any significant changes are made to the system that would affect the energy profile of the building. This includes adding or removing equipment, occupancy changes, or changing EMS settings or set points.

B. Marketing and recruitment

Customer outreach strategies among benchmarked programs are generally similar to Xcel Energy's Energy Management Systems program. Customer outreach is primarily driven by account management or business representative staff and trade allies. One interviewee noted that they have relied on the "*enthusiasm*" of some account management staff members who were more comfortable than others in promoting their EMS technologies to go out and sell the program to customers. National Grid and Alliant Energy program staff also detailed additional marketing and outreach tactics—such as webinars, conferences, or TV ads—through which they promoted their programs.

C. Trade ally outreach

In general, programs did not have a formal trade ally network or program, but rather used contractors and vendors more informally reach out to customers. SMUD stated that while they do not have a formal trade ally network in place, due to the complex nature of the advanced lighting technologies and the requirement of having a preapproved products list, only a few contractors were capable of participating in the program. This resulted in those few contractors becoming "*de facto*" trade partners. The National Grid staff member stated that they feel that program awareness of their prescriptive EMS offering is high, but participation is lower because they have struggled to engage trade allies. This interviewee suspected that



6. Evaluation Results—Benchmarking

the prescriptive incentive levels may not be attractive enough for trade allies to go through the trouble of filling out an application.

D. *Measurement and verification of impacts*

In addition to verifying installation, Xcel Energy's Energy Management Systems program follows Xcel Energy's custom M&V protocols, requiring post-M&V (which may include metering) for all projects with 1 GWh or 20,000 Dth or higher estimated savings.

Like Xcel Energy, National Grid conducts post-M&V for custom projects that meet a certain savings and incentive threshold to mitigate risk. According to the National Grid representative, post-M&V is conducted for most custom EMS projects. M&V protocols are established during project approval and are typically carried out after the system is functioning to its design intent and may last longer to verify seasonal measure impacts.

To assess the reasonableness of their EMS estimates, SMUD reviews the customer's interval consumption data the following year after implementation to determine if there are substantial variances from the savings estimate. If there is a substantial variance, SMUD will confirm with the customer if there have been any changes to occupancy or system schedules and perform a "true-up" of the claimed savings using the customer's weather-corrected pre- and post-consumption data.

6.3.3 Emerging and advanced technologies

A. *Integrated lighting controls*

Of all interviewed programs, SMUD's advanced lighting controls program was the only program that currently focuses specifically on lighting EMS technologies. As noted above, the impetus for the program pilot, which began in 2012, stemmed from a "smart" technologies grant SMUD received. Interviewed program staff indicated that they wanted to provide a highly interactive, controllable, and leading-edge lighting technology to their customers. Program staff did note some challenges in offering the advanced lighting controls program, one of which being the limited customer market for these technologies. To date, the program has focused on large industrial customers with very inefficient existing systems, the replacement of which they felt resulted in very successful projects and saved a significant amount of energy. However, program staff noted that their participation has dropped off as of late, and they feel this is because they may have exhausted the high-savings potential projects in their territory. Program staff also indicated that this project had a very high dropout rate (approximately 50 percent of signed contracts did not move forward), and felt that the concept and technology was appealing to customers initially but budget constraints were still barriers, even with the relatively high incentive levels offered by the program.

Program staff from other utilities also discussed the integration of lighting controls into EMS systems. National Grid noted that they rarely saw lighting and EMS applications submitted together. Program staff stated that the focus tends to be solely on HVAC EMS systems while any lighting technologies would tend to be more basic, such as occupancy sensors. Staff from Duke Energy agreed; they stated that they looked at the two systems "quite differently" and analyzed EMS and lighting controls separately as part of their custom process.



6. Evaluation Results—Benchmarking

National Grid program staff echoed feedback from Xcel Energy staff and trade allies that one of the challenges in integrating lighting controls in EMS projects is that the firms that install HVAC and lighting EMS are often separate: EMS systems are most often installed by HVAC contractors, without involvement from lighting contractors. Staff added that they felt that much of the emphasis in the lighting industry currently was less on lighting controls and more on better lighting fixtures, such as LED lamps. This interviewee also noted customers may feel that basic lighting controls (like occupancy and daylight sensors) can often take care of a customer's lighting control needs as well as an integrated lighting EMS system, and the cost of the more advanced lighting controls is a barrier.

B. *EMIS and advanced technologies*

All interviewed program staff mentioned that they are either currently researching or currently offer incentives for “advanced” technologies relating to EMS, many of which provide monitoring or feedback technologies. Duke Energy is currently piloting a building EMIS program and National Grid will soon launch an advanced lighting controls program similar to SMUD's. SMUD also stated that they have seen interest in and are considering piloting an EMIS-type program. As discussed above, PG&E offers additional incentives for advanced technologies implemented as part of the automated demand response program, such as wireless or cloud-based technologies. Alliant Energy also noted that they are currently adding incentives for a wireless energy management technology specifically for rooftop units.

National Grid staff stated that they felt EMS systems are becoming more common, and with that the technologies are evolving and the costs coming down. One interviewee noted that even on the residential side, customers are seeing wireless thermostats they can control from their smart phone. This staff member stated, “*It is up to us as program administrators to be able to tap into it [the EMS market] to appropriately benefit from the savings, and to transform the market or speed up the market transformation.*” However, PG&E staff indicated that one concern they have seen from participants centers on security, and allowing the utility access and control of their systems. Duke Energy's EMIS pilot also currently allows the utility access to online energy monitoring of the system to assess any issues and energy savings persistence.

C. *Integrating demand response and EMS*

Both of the California program administrators (PG&E and SMUD) required that the systems installed through their programs are auto-demand response capable (although SMUD does not currently require customers to participate in demand response). PG&E's program staff stated that EMS and demand response fit well together, and it can be a “win-win” situation for both the utility and the customer when they are integrated. The interviewee noted that not only is payback increased when they are integrated, but the customer has the added benefit of both an upfront incentive for the equipment and/or demand response capabilities, as well as the continued incentive for participation in demand response events. National Grid's prescriptive EMS program does not specifically focus on demand response as a goal; however, when asked if they had seen peak demand reduction stemming from EMS technologies, interviewees agreed that the demand reduction tended to coincide with shoulder demand rather than peak demand, due to the fact that many of the strategies naturally happen during non-peak times (i.e., night setback).

PG&E program staff did note some challenges they had faced with their automated demand response program. As detailed above, the program has worked to employ stricter screening



6. Evaluation Results—Benchmarking

for potential customers, which has resulted in lowered participation. The reason for this screening was because program staff saw a higher percentage of participants—approximately 50 percent—who were not shedding load during events. Program staff felt that this relatively low event participation rate likely stemmed from customers who were not actually a good fit for the program, who perhaps had implemented a too-aggressive load-shed plan and therefore were unable or unwilling to continue to participate. Program staff hope that stricter screening will result in customers who are better candidates for the program and will therefore fully participate in the demand response events.



APPENDIX A: PROGRAM STAFF INTERVIEW GUIDE

The following topic guide was used for in-depth, semi-structured interviews with internal program staff. This topic guide is not a verbatim script. Instead, the guide is intended to outline key topics and provide open-ended questions as well as suggested probes or follow-up queries that interviewers use to elicit thorough, comprehensive answers to the issues. Interviewers were encouraged to pose additional questions if initial responses needed clarification or elaboration. Depending on each interviewee's individual experience, not all topics included in the guide may have been discussed, and interviewers could also pursue new lines of questioning not anticipated by the topic guide but that could yield insights into program processes.

ROLE WITHIN XCEL ENERGY AND WITH THE PROGRAM

- 1) Responsibilities or role regarding the program
 - when became involved
 - how have responsibilities/role changed over time
 - on average, what percent of your workload is spent on the program monthly?
- 2) Who do you interact with (others) regarding the program?
 - other Xcel Energy staff, implementation contractors, trade allies, customers, organizations, peer utilities
 - roles and responsibilities of these other persons
 - success of interactions; suggestions for improvements

PROGRAM DESIGN AND MARKETING

- 1) Who was involved in the program design? Was the program patterned after another program(s)? If so, were any modifications made to improve the program design? How long has the program been in existence in CO?
- 2) How has the program design changed in the past year? Why did you make these changes? How is the program design changing in 2014-2015?
- 3) What are the program goals? How are program goals communicated internally and externally? How well has the program been performing in relation to goals? Why?
- 4) Are there similarities between the projects or customers that participate in the program, or is each project/customer unique?
- 5) How does the type of equipment being purchased and installed through the program vary? Why do you think there is this variation?
- 6) How do you define your program participants? Are your participants typically new to Xcel Energy DSM programs?
- 7) How do you define non-participants? What seems to lead to lost opportunities?



A.: Program Staff Interview Guide

- 8) What are the target markets within the commercial sector for the program? How large are these markets in CO, and how well do you think the program has saturated them?
- 9) How do you identify prospective customers for the program?
- 10) *(For account managers and BSC reps)* How do you communicate program offerings to customers? What types of customers are typically interested in or good candidates for the program?
- 11) What marketing activities are being used to reach the different target markets? How have these activities changed in the past year? How effective have each of these methods been in identifying and enrolling potential participants?
- 12) What are major barriers to participation?
 - Why do you think customers choose to participate or not participate?
 - What are the comparative strengths of these motivations?
 - In your opinion, do the current marketing efforts adequately reinforce customers' reasons for participation and/or minimize reasons for nonparticipation?
- 13) How would you describe the program's trade ally infrastructure? What types of trade allies are involved with the program? What role(s) do they play in the program?
- 14) How are trade allies recruited into the program? What makes your trade allies unique in their offerings due to the program?
- 15) Do you feel there are sufficient program resources to meet the program's goals? Are any additional resources needed? *(Example of resources are staff resources, incentives, program partners support (co-op ads, spiffs), and marketing materials.)*

PROGRAM OPERATIONS

- 1) What are the participation steps from the customer's perspective? Can customers enter the program via various methods (i.e. study-driven)? Have these changed over time?
- 2) What is the overall quality/accuracy of the project applications that you receive? Who typically submits the project application (customer, trade ally, etc.)?
- 3) What is the level of customer satisfaction with the various aspects of the program (participation process, program application, preapproval, measure performance, rebate processing, etc.)? How can satisfaction be improved?
- 4) Describe your communications and working relationship with trade allies. What support is provided through the program to trade allies? Is this support systematic or ad-hoc/case-by-case? In what areas could this be improved?



A.: Program Staff Interview Guide

- 5) How are you seeing the market transform through your trade allies and customers?
- 6) What aspects of the program implementation are working well? Which are not working well?
- 7) Has there been any recent changes to program incentive levels? Do the program incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?
- 8) What do you see as future challenges for the program?
- 9) How are participants, nonparticipants and marketing leads tracked? Is the system used for tracking helpful or not? What would be helpful to track that is not currently available? How easy is it to use the tracking system?
- 10) How has the pre-approval process worked? Are there any improvements that could be made to the process?

EVALUATION

- 1) What do you hope to learn from the evaluation?
- 2) *(If not already mentioned)* Do you have any specific questions that you want to make sure are included in primary data collection activities with customers, trade allies, or the benchmarking study? Are there any program design changes that you are considering, that this evaluation could help to inform?
- 3) Do you have any energy efficiency programs you would like us to focus on when we begin the secondary benchmarking research? *(e.g., specific utilities, geographies, program delivery methods, custom vs. prescriptive)*

INPUTS FOR LOGIC MODEL

(Relevant for program managers) This next series of questions will be used to supplement the program documentation to develop the program logic model. The program logic model is a visual representation of the program's theory. The program theory articulates what the program is trying to achieve, through what interventions, and with respect to which market actors.

- 1) What are the primary activities the program is expecting to conduct? *(Include activities with trade allies, other stakeholders and customers as applicable. Examples may include recruitment and training of contractors, recruiting customers, installing high efficiency equipment, and performing energy audits and/or engineering assessments)*
- 2) For each of the activities we just discussed, what are the outputs of the activities? Outputs are direct, immediate results from the activity and often can be contract metrics for the program. Examples include number of trade allies participating, number of incentive equipment or marketing activities conducted.



A.: Program Staff Interview Guide

- 3) Now for each program activity and corresponding output, what are the expected outcomes? For example, how do you expect the program to influence trade allies business practices? How is the program expected to influence customer awareness and behaviors? (*Distinguish outcomes that are in the program's control from those that are not*)
- 4) Now for each of the outcomes we just discussed, can you tell me if you think this will be a near-term outcome of the program in the next 12 months or if this is a longer-term outcome of the program (2-3 years out)?
- 5) Now I would like to step back through each program activity with you and discuss the resources that are needed to support each program activity we talked about. (*Walk through each program activity.*) Examples of resources are staff resources, incentives, program partners and marketing materials.
- 6) What are other key outputs you have developed for the program that we have not already discussed? Examples include a tracking system or application materials.

PROCESS FLOW MAPS

(*Relevant for program managers*) This next series of questions will be used to supplement the program documentation to update or develop the program process flow map.

- 1) (*if process flow map exists*) In what ways have program processes changed since the existing program process flow map was created? Are there additional, or fewer, steps from the participant's viewpoint? Are there additional, or fewer, steps from a program staff viewpoint? Has the role of trade allies changed over time?
- 2) (*if no existing process flow map*) Please describe the program participation steps from project start to finish from the perspective of:
 - Participating customers
 - Participating contractors/trade allies
 - Implementation vendor (if applicable)
 - Xcel Energy staff (program management, BSC, account management, EEEs, rebate processing, etc.)
 - Other involved parties?

OTHER OPPORTUNITIES FOR IMPROVEMENT?

- marketing
- staffing
- resources
- training
- quality control
- program tracking system
- communication
- evaluation



APPENDIX B: TRADE ALLY INTERVIEW GUIDE

The following topic guide was used for in-depth, semi-structured interviews with participating trade allies. This topic guide is not a verbatim script. Instead, the guide is intended to outline key topics and provide open-ended questions as well as suggested probes or follow-up queries that interviewers use to elicit thorough, comprehensive answers to the issues. Interviewers were encouraged to pose additional questions if initial responses needed clarification or elaboration. Depending on each interviewee's individual experience, not all topics included in the guide may have been discussed, and interviewers could also pursue new lines of questioning not anticipated by the topic guide but that could yield insights into program processes.

COMPANY PROFILE

F1. What is your primary role(s) in the supply and delivery of energy management systems to the commercial and industrial customer market? (Examples include engineering firm, contractor, energy services/management firm, etc.) How many employees do you have in your company?

F2. Does your company offer other services in addition to scoping and implementing energy management systems? (*Probe for other types of equipment or services offered, including other types of equipment they install*).

F3. Of the EMS systems you install overall, what percentage of customers are A) replacing an existing EMS system or B) installing a new EMS system (where one had not previously existed)? Of those replacing an existing system, what percent of the old systems were pneumatic vs DDC?

PROGRAM AWARENESS AND INVOLVEMENT

P1. Could you describe for me your participation or involvement in the Energy Management Systems program? (*Probe for level of activity – including number of projects and date of most recent project*)

P2. (IF HAVEN'T COMPLETED A PROJECT/SOLD EQUIPMENT IN LAST YEAR) Why have you not completed a project through the program recently?

P3. How did you first learn about the program, and when did you first start participating? Why did you decide to participate?

P4. What are your impressions of the overall program design? Do you think it serves the customers well? Do you think it serves the equipment/service vendors well?

P5. Who do you typically interact with from the program? (Probe for: engineering, marketing staff/program manager, trade relations manager, BSC rep, account manager) How often and for what purposes? How would you describe your interactions with each of these program staff?

P6. Where is your first stop for program information? How would you prefer to receive program information (letter, email, seminar, website) from Xcel Energy? Do you feel there are



B.: Trade Ally Interview Guide

adequate program communications? Are any changes needed? What are the key message points you need to know about the program?

P7. What additional support could the program offer that you would find beneficial? Are there any additional tools that the program should offer? Specifically, is there additional support the program could be offering to help you maximize energy savings from EMS projects you install?

P8. Do you participate in other Xcel Energy programs? If so, which ones? How much time/effort do you spend on each program?

P9. Are there other utility energy efficiency programs that you participate in /are aware of? If yes, then which utility and what program? If yes, are their documents, processes, and project timelines better, the same, or worse than Xcel Energy's. If yes, do you think there are lessons learned for Xcel Energy from these other programs?

PROGRAM OPERATIONS

EC1. How well would you say you understand, or how familiar are you with Xcel Energy's Energy Management Systems program requirements? Are there any aspects of the program that are unclear to you? What is unclear (probe: preapproval process, documentation requirements, completed project process)?

EC2. How would you describe your experiences with submitting project proposals for pre-approval? Have you been aware of all of the information you need to include in your proposals to gain pre-approval? Has Xcel Energy ever followed-up with you requesting more information? Is there any additional information or resources that Xcel Energy could provide to clarify necessary information?

EC3. On a scale of 1 to 5 where 1 is 'very difficult' and 5 is 'not at all difficult', how would you rate the difficulty of completing Xcel Energy's commercial rebate program applications? Why do you give this ranking? How would you like to see the application process improved?

EC4. Have you ever had a project denied by Xcel Energy? If yes, did you understand why it was denied? Did you agree with Xcel Energy's conclusion? (if not, where did the difference reside?)

EC5. What has been your experience working with Xcel Energy account managers and Business Solutions Center staff? What has been your experience working with engineering staff through the program? How would you describe these interactions?

EC6. Do you feel that the customer rebates offered through the program are adequate? How would you like to see the rebate structure revised? (Probe for: rebate levels, prescriptive vs. custom rebates, approval process, etc).

EC7. What types of equipment is controlled by the automated control systems you typically implement? (*PROBE: lighting, heating, cooling, ventilation*)

EC8. What types of energy management equipment do you think present the highest energy saving opportunities for the EMS program?



B.: Trade Ally Interview Guide

EC9. Are there additional EMS technologies that the program doesn't currently rebate, but you think they should explore or consider including? (Probe on Energy Management Information Systems (EMIS) technologies)

EC10. (IF INSTALLS LIGHTING CONTROL SYSTEMS) The program has historically seen lower participation in comprehensive lighting control projects – do you have any ideas why participation in these types of projects has been limited? Do you have any recommendations for Xcel Energy on how to encourage more participation among both lighting contractors and business customers?

CUSTOMER INTERACTIONS

C1. Do you usually have an existing relationship with the customer(s) who participated in the Xcel Energy the program prior to your participation in the program? If yes, what types of work have you done for them?

C2. How aware are your customers of technologies for controlling their lighting, heating, cooling, or ventilation systems (through a centralized system vs. stand-alone controls)?

C3. Do you actively promote/introduce the Energy Management Systems program with your customers? If yes, how? What do you tell customers? (IF DON'T ACTIVELY PROMOTE: Do customers ever ask you about the program? What do they say about the program?)

C4. About what percent of your Xcel Energy customers already know about the program before you tell them about it? Has customer program awareness increased or decreased in the past 12 months? Why do you think this is?

C5. Who (title/position), within the customer's organization, do you need to work with in order to get interest and close the sale? What information do you need to provide for them (other than cost, timeframe, and equipment descriptions)? Do you provide them with equipment financial analysis (payback, ROI)? What info do they seek from you?

C6. What are the primary reasons customers typically want to install program-qualifying energy management systems?

C7. Based on your experiences, what types of customers do you feel have the highest savings potential from integrated building control systems and might be good candidates for the program. (Probe on hotels, health care, schools)

C8. What factors most influence customer project decision-making? Ask of mentioned factors: which are the one or two most important in influencing customers' decisions? (Probe for differences among customer segments).

If needed, examples of factors include the following:

Fits standard design

Overall cost of the project / financing options available

Availability of a rebate through utility program

Information and education provided by utility on the benefits of energy-efficient technologies or services

Saves energy costs



B.: Trade Ally Interview Guide

Helps the environment
Shows good corporate citizenship
Meets payback criteria
Impact on company financials
Recommendation of manufacturer, supplier, contractor, etc.

C9. On a scale of 1 to 5 where 1 is very difficult and 5 is not at all difficult, how difficult do you find it to sell energy management systems to your customers?

C10. And why do you say that? *(Probe to understand customer participation barriers and market barriers)*

C11a. In order of importance, what are the primary concerns/questions customers ask you about an EMS project they are trying to address (e.g., cost, timeline, warranty, vendor financing, financial savings, energy savings)?

C11b. What are the primary reasons customers typically do not want to participate in the program? Do these reasons vary across different customer segments or sizes?

C12. What do you think are the main benefits your customers receive by participating in program?

MARKET

MT1. How would you say Xcel Energy's program affects your sales or recommendations of EMS? Since the program began, would you say that your sales/installations have increased: significantly, somewhat, a little, hardly at all?

MT2. Of the EMS projects you do that would qualify for the program, approximately what percentage do not apply for the incentive? Why is that?

MT3. What direction do you see the commercial and industrial market taking in Colorado in the next 2 years? Do you see specific challenges for Xcel Energy or opportunities to promote efficient equipment or services? Please describe.

MT4. Do you expect your sales/specifications/installations of EMS to increase, decrease or stay the same in the next 12 months? Why?

MT5. What do you see as future of EMS and integrated control systems? Are there any emerging technologies or technological advances that you see becoming more important for conserving energy? *(Probe on Energy Management Information Systems (EMIS) technologies)*

MT6. What role do you see Xcel Energy's Energy Management Systems program playing in the market for energy efficiency going forward?

CONCLUSION

X1. What do you think is working best in Xcel Energy's the program?

X2. What do you think is most in need of improvement?



B.: Trade Ally Interview Guide

X3. Overall, how satisfied are you with the program? Would you say you are very satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, or very dissatisfied? (Why are you satisfied / How could your satisfaction be increased?)

X4. Is there anything else that you would like to share concerning the program?



APPENDIX C: PARTICIPANT INTERVIEW GUIDE

The following topic guide was used for in-depth, semi-structured interviews with participating customers. This topic guide is not a verbatim script. Instead, the guide is intended to outline key topics and provide open-ended questions as well as suggested probes or follow-up queries that interviewers use to elicit thorough, comprehensive answers to the issues. Interviewers were encouraged to pose additional questions if initial responses needed clarification or elaboration. Depending on each interviewee's individual experience, not all topics included in the guide may have been discussed, and interviewers could also pursue new lines of questioning not anticipated by the topic guide but that could yield insights into program processes.

SOURCE OF PROGRAM INFORMATION

- P1 Are the person at your firm who is most knowledgeable about your organizations' participation in Xcel Energy's Energy Management Systems program? (IF NO, COLLECT CONTACT INFORMATION AND COMPLETE INTERVIEW WITH NEW CONTACT)
- P2 How did you learn about Xcel Energy's Energy Management Systems Program? (*Probe: method and source*) Did you hear about the program from any other sources?
- P3 (IF MANAGED ACCOUNT AND DID NOT MENTION ACCOUNT MANAGER IN P2) Did you talk about the Energy Management Systems program with your Xcel Energy account representative?
- P4 (IF ACCOUNT MANAGER MENTIONED IN P2 OR P3=YES) What did you talk about with your account representative?
- P5 Prior to participating in the Energy Management Systems program, had you previously participated in any Xcel Energy energy efficiency programs? (IF YES) Which ones? What impact, if any, did this experience have on your decision to participate in the Energy Management Systems program?
- P6 How would you prefer to learn more about the Energy Management Systems program or other energy efficiency programs offered by Xcel Energy in the future? (*Probe: method and source*)

PROJECT AND INSTALLATION VERIFICATION

- I1 Our records indicate that your organization installed or upgraded an energy management system(s) at [LOCATION(s)] around [DATE] through Xcel Energy's program, is this correct?
- 1 Yes
 - 2 No (*Probe for what is incorrect*)
- I2 Are all of the energy management system components you implemented still in place and operating? (IF NOT) How so and why?



C.: Participant Interview Guide

- I3 What types of equipment are controlled by the energy management system you installed through the program? (SELECT ALL THAT APPLY)
- 1 Lighting equipment
 - 2 Heating equipment
 - 3 Cooling equipment
 - 4 Ventilation equipment
 - 5 Refrigeration equipment
 - 6 Motors/drives
 - 7 Other equipment (Specify)
 - D DON'T KNOW
 - R REFUSED
- I4 (IF LIGHTING IS NOT CONTROLLED) Did you consider integrating lighting controls into your energy management system? (IF YES) Why haven't you? (IF NO) Why not? What can Xcel Energy do to help you implement lighting controls, if anything?
- I5 Since installing the energy management system(s) at your facility(ies), have you changed any of the system settings or set points? (IF YES) What did you change and why?
- I6 Since installing the energy management system(s) at your facility(ies), have you added or removed any equipment (i.e., lighting, HVAC, etc.) controlled by energy management system? (IF YES) What did you add/remove and why?
- I7 Please describe your role in deciding to implement a project through the Energy Management Systems program. Was anybody else in or outside your organization involved in the decision to participate? (Note to interviewer: Record names of other decision-makers, examples could be colleagues in other departments such as facility maintenance staff, site engineer, upper management, board of directors, etc. Could also include "outside" decision-makers such as staff at property management firm, third-party consultant, or tenant, depending on role. Probe as needed to clarify.)
- I8 Did you already have an energy management system in place when you participated in the program (i.e., did you replace or upgrade an existing energy management system)?

DECISION-MAKING PROCESSES AND PARTICIPATION EXPERIENCE

- D1 Why did your organization decide to install an energy management system in your facility? What benefits were you looking to receive from an energy management system?



C.: Participant Interview Guide

- D2 Why did your organization decide to participate in Xcel Energy's Energy Management Systems program? (Probe: Any other reasons?)
- D3 Were you aware that you could get rebates from Xcel Energy before or after deciding to implement the same project(s) you eventually implemented through the program? Were you aware of the Energy Management Systems Program, specifically? (IF LEARNED ABOUT AVAILABLE REBATES AFTER DECISION) Were you planning to implement the exact same project(s)?
- D4 (IF NOT INDICATED IN TRACKING DATA) Did you receive a feasibility study, energy audit, facility assessment or technical assistance from Xcel Energy prior to implementing the energy management system project?
- D5 Using a 0 to 10 scale, where 0 is not at all likely and 10 is extremely likely, how likely is it that you would have implemented the exact same energy management system if the rebate or other assistance from Xcel Energy had not been available? Would you have done any differently? Would the timing of the project changed?
- D6 What barriers did you face, either inside or outside of your company, when deciding whether or not to implement this/these project(s) through the program? (Probe: initial barriers (capital, financing, management, staff resources, economy, etc.) as well as any barriers faced moving through the participation process)
- D7 How did the Energy Management Systems program help you overcome these barriers?
- D8 Did you experience any challenges or difficulties in progressing through the participation process, from start to finish? (Probe on each of the following participation steps)
- a. Project application
 - b. Preapproval process/letter
 - c. Project verification and rebate payment
- D9 Did you interact with anyone from Xcel Energy regarding the project application(s)? (IF YES) Who? What did you discuss? How would you describe those interactions?
- D10 Who completed the program paperwork, including the preapproval application and project worksheet? Was it you, someone else at your organization, your contractor, someone at Xcel Energy, or someone else? (IF CUSTOMER) Did you require any assistance? From who?
- D11 Did you consider implementing this/these project(s) through a different Xcel Energy program? (IF YES) Which one(s)? Why did you ultimately decide to pursue this project through the Energy Management Systems program versus another Xcel Energy program?

PROGRAM SATISFACTION

Next I want to ask you a few questions about your satisfaction with your experiences with Xcel Energy's Energy Management Systems program.



C.: Participant Interview Guide

- S1 How satisfied are you overall with the program? Would you say you are very satisfied, satisfied, dissatisfied, very dissatisfied, or neutral? Why do you say that?
- S2 Next, I'd like you to tell me how satisfied you are with specific aspects of the Energy Management Systems program using those same categories from very satisfied to very dissatisfied. (Probe: if dissatisfied or neutral, why?)
- a. The preapproval process
 - b. The length of time it took from project start to end
 - c. The amount of the rebate
 - d. Xcel Energy's handling of your questions or complaints
 - e. The support you received from Xcel Energy throughout the program process
 - f. The amount of energy savings you've seen since the project completed
- S3 What benefits, if any, has your company realized as a result of your participation in the Energy Management Systems program?
- S4 Which aspects of the Energy Management Systems program, if any, would you change? Why do you say that? (Probe: anything else?)
- S5 I would like you to think in terms of your satisfaction with Xcel Energy overall. On a 0-to-10 scale where 0 means very dissatisfied and 10 means very satisfied, how would you rate your satisfaction with Xcel Energy?
- S6 Has your experiences with the Energy Management Systems program impacted your satisfaction with Xcel Energy overall? (IF YES) How so?
- S7 Considering the price you pay relative to the quality of the products and services you receive, how would you rate Xcel Energy's overall value, this time using a 0-to-10 scale where "10" means VERY GOOD VALUE and "0" means VERY POOR VALUE?

CUSTOMER PROFILE

- C1 What actions other than the ones we have already discussed has your business taken at this location within the past five years in order to reduce your energy use. Did you make any of these improvements through any Xcel Energy programs? Why or why not?
- C2 Do you have plans for implementing any other energy efficiency projects within the next two years at your facilities? What types of projects?
- C3 Does your business currently have an energy conservation or sustainability policy in place, with goals for reducing energy use? (IF YES) What is your policy and how are goals determined?
- C4 What business activity accounts for most of the floor space covered by your Xcel Energy bill at [LOCATION]?
- 1 Office/professional
 - 2 Data center/computer server farm



C.: Participant Interview Guide

- 3 Warehouse or distribution center.
- 4 Food sales or service
- 5 Retail
- 6 Education
- 7 Religious worship
- 8 Public assembly
- 9 Health care
- 10 Service
- 11 Lodging
- 12 Public order and safety
- 13 Industrial/Manufacturing (SPECIFY)
- 14 Agricultural (SPECIFY)
- 15 Vacant (SPECIFY)
- 16 Municipal/Governmental
- 17 Other (SPECIFY)

C5 Do you own, rent, or manage the space at this location?

C6 How big is your facility/office space in terms of square footage?

C7 Can we have your permission to release your company's answers to Xcel Energy on an individual basis and possibly have a representative from Xcel Energy follow up with you to discuss issues that are of particular concern to you?

- 1 Yes
- 2 No

C8 As part of our evaluation, we may need to follow-up on some of this information. Would it be all right if someone called you if needed?

- 1 Yes
- 2 No

COM Those are all of the questions I have for you. Do you have any other comments you'd like us to share with Xcel Energy?



APPENDIX D: BENCHMARKING INTERVIEW GUIDE

The following topic guide was used for in-depth, semi-structured interviews with representatives of peer utility programs included in the benchmarking research. This topic guide is not a verbatim script. Instead, the guide is intended to outline key topics and provide open-ended questions as well as suggested probes or follow-up queries that interviewers use to elicit thorough, comprehensive answers to the issues. Interviewers were encouraged to pose additional questions if initial responses needed clarification or elaboration. Depending on each interviewee's individual experience, not all topics included in the guide may have been discussed, and interviewers could also pursue new lines of questioning not anticipated by the topic guide but that could yield insights into program processes.

PROGRAM SCOPE AND GOALS

- 1) (IF NOT CLEAR FROM SECONDARY RESEARCH) Does your company offer a stand-alone energy management system (EMS) or controls program, or is an EMS component included in your other business conservation program(s)?
- 2) How are your plan and program goals derived?
 - a) Are they a subset of some long range plan (integrated resource plan)?
 - b) What is the life of a plan that you present to external stakeholder (1, 2, 3 or more year plans)?
- 3) How long has the program been offered?
- 4) What are your program's goals (participation, electric demand, energy and/or natural gas savings? Which of these goals is most critical to achieve (for cost recovery or incentive)? *Probe for both written and informal)*
 - a) (IF EMS COMPONENT INCLUDED IN LARGER PROGRAM) Do you have separate goals for the EMS component of your program? How much or little do EMS projects contribute to your overall program goals?
 - b) Who sets the goals? Are they annual goals or multi-year goals?
 - c) How does the program fit within your overall business portfolio goals?
 - d) How much of your overall energy savings for businesses is contributed by the program?
 - e) Does your company receive any financial incentives for programs exceeding performance? Do specific staff (e.g., sales) receive any incentives? Does your company face any penalties for not meeting goals?
- 5) Overall, how effective has your program been in achieving these goals and objectives (*Probe for actual or estimated savings, number of participants*)?
 - a) Are there ways you think your program could be more effective in achieving its goals?



D.: Benchmarking Interview Guide

- b) (If has peak demand savings goals) What strategies have you implemented, if any, to capture peak demand savings? How effective have these strategies been?
- 6) Has your program's contribution to the overall portfolio increased, decreased or maintained since its inception?
 - a) (If changed) What has caused the change? (*Probe: the economy, program redesign, overlap with other program offerings*)
- 7) What are your roles and responsibilities for the program? How long have you been involved with this program?
- 8) Is the program delivered internally or by a third-party implementer?
- 9) What types of internal staff are used to administer the program? What are the roles of each of these types of staff?
 - a) What kind of internal support do you have for the program? (i.e. marketing assistants)

MEASURES AND INCENTIVES

- 10) What types of energy management or controls measures/technologies are offered by your program (*Probe for similarities and differences to Xcel Energy's program*)?
 - a) Of those measures/technologies, which comprise the bulk of the program participation in terms of participation numbers? In terms of energy/demand savings goals?
 - b) How have these measure offerings changed over the last few years? (*Probe specifically if they have added any measures to their prescriptive offerings*)
 - c) Did you add or eliminate any measures in the past year? If yes, discuss why (*Probe: no longer cost effective, migrated to prescriptive or is the previous measure now a standalone product offer?*)
 - d) Where do you see the direction of integrated controls technologies heading in the near future? Do you see any particular measure or technology becoming more popular in the future (*Probe on continuous commissioning measures, etc.*)?
- 11) Does the program offer a study or energy assessment component?
 - a) If no, do you see the program come out as a result of other program study offerings? (i.e. recommissioning)
- 12) How are the incentive levels for your measure offerings determined? Specifically, do you offer prescriptive and/or custom rebates for energy management systems?
 - a) What are your current rebate levels?
 - b) What percentage of the customer's project costs do you fund? Is the rebate funded by project cost, incremental project cost, or some other mechanism?



D.: Benchmarking Interview Guide

- c) Please identify the situations, if any, which would exclude the customer from receiving a rebate if initially pre-approved?
 - d) *(If custom incentives offered)* Do you have any payback period, caps to rebate amounts, incremental cost thresholds, or cost-effectiveness criteria for rebate approval?
- 13) Have incentive levels changed over time? If yes...
- a) How have they changed?
 - b) Why did you make these changes?
- 14) What documentation or approvals are required to receive a rebate?
- a) Is preapproval required? If yes, under what circumstances would a rebate be denied for a project or customer that was initially pre-approved?
 - b) What type/s of verification or documentation are needed to close the project? Signatures? Pictures? Receipts? Any other forms of documentation? Who is responsible for providing this information (e.g., customer, trade, account management)?

PROGRAM RECRUITMENT, OUTREACH, AND PARTICIPATION

- 15) What are your customer eligibility requirements for the program? Do you have eligibility requirements relating to customer energy consumption or building size? If so, what are those thresholds, and how did you determine them?
- 16) How do you identify potential candidates for the program? Do you have a market or markets that you target for participation in the program, or that typically participate often? In your experience, what customer segments have the highest savings potential for integrated controls or EMS?
- 17) Are there other market segments that have historically not participated, but you would like to include in the program in the future?
- 18) Have you undertaken any strategies to target medium-sized non-managed accounts? Which strategies have been most successful and why?
- 19) What is the process for recruiting customers for the program, and who does this?
- a) Do you use any outside contractors for customer recruitment or providing other services to customers related to the program? How successful was it?
 - b) What types of customer marketing efforts do you use? What is the relative success of different marketing activities?
 - c) What strategies do you use to engage hard-to-reach or historically nonparticipating customer segments?



D.: Benchmarking Interview Guide

- 20) What are the major barriers to participation? Do these vary by customer types (or segments)?
- 21) Are customers able to implement projects eligible for your EMS/Controls program through any of your other programs? What factors go into customers choosing one program over another? How does this affect your marketing strategy, both at the program and portfolio level (*Probe how they avoid 'competing' with their other program offerings*)? How does this affect setting program-level participation and energy savings goals?
- 22) What external influences are impacting your program? (*Probe: regulatory requirements, external stakeholders and interveners, economy, etc.*). How are you addressing them?

TRADE ALLY OUTREACH

- 23) How does the program leverage the trade ally market infrastructure?
- a) (*If allies utilized*) How do you conduct outreach to trade allies? Has it been effective?
 - b) What do trade allies have to do to participate in the program (e.g. attend training, register, etc.)
 - c) What tools or information do you provide to the trades to inform their customers about program offerings and requirements?
 - d) What types of trade allies typically participate in the program (e.g. study providers, installation contractors, distributors, ESCOs, engineering consultants, etc.)? Do they typically specialize in EMS and integrated control systems, or do they perform other types of efficiency work in addition?
 - e) Do trade allies receive incentives from your program?
 - i) (*If yes*) What are the incentive levels, and what is required of the trade allies to get them? Are the incentives offered always or periodically? Why?
 - ii) (*If no*) Have you ever offered these incentives? (*If yes*) Why did you eliminate the incentives?

PROGRAM IMPACTS

- 24) How are savings calculated for EMS or other integrated controls projects?
- 25) Do you have any measurement and verification (M&V) protocols for EMS or other integrated controls projects? What are these protocols? What criteria are used to identify projects requiring pre- and/or post-M&V?

PROGRAM SUCCESSES AND CHALLENGES

- 26) What has worked particularly well with the program?
- 27) What are primary challenges you have faced (real or perceived)? (*Probe: internal processes, customer recruitment, interactions with trade allies and contractors*)



D.: Benchmarking Interview Guide

- 28) What are the key lessons you have learned from your experiences administering the program?
- 29) What do you see as future challenges for the program?
- 30) Do you have any specific growth strategies you are pursuing in the market? (Probe: measure offerings, customer market segments)?

CONCLUSION

- 31) Are there any other topics that we have not covered in this interview that we should be aware of about this program?
- 32) Do you provide/produce annual status reports regarding your plan and program performance? Where might I find a public copy on your website or state website?
- 33) Do you have any other program information (e.g., FAQ sheets, evaluation results) that you would be willing to share with us?

Thank you for your time.

[INTERVIEWER] Verify name, title and email address for receiving the summary of results (if a summary of the results is desired).

Name: _____

Title: _____

Email: _____