

Xcel Energy

Comprehensive Process and Impact Evaluation of the Recommissioning Program - Colorado

FINAL

March 25, 2011





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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 efficiency of its program operations so that they can successfully meet program goals and objectives. To assist Xcel Energy in this aim, in May 2010, Xcel Energy selected through a competitive Request for Proposals (RFP) process a third party vendor (comprised of Tetra Tech, ECONorthwest and Michaels Energy—hereafter the “Tetra Tech team”) to conduct objective evaluations of their demand side management (DSM) business programs in Colorado.

This Executive Summary provides an overview of the 2010 process and impact evaluations of the Recommissioning Program in Colorado.

PROGRAM OVERVIEW

As described in the 2010 Recommissioning Product Plan, the Recommissioning (RCx) program is “designed to assist Xcel Energy’s large commercial and industrial customers improve the efficiency of a building’s existing operating systems.” *Recommissioning* (or *retrocommissioning* for buildings that have not been commissioned previously) refers to the process of “tuning up” existing equipment to ensure that it is functioning as efficiently as possible.

Typically, a recommissioning project consists of two stages. In the first stage, the customer, working with a recommissioning provider, completes a study that identifies recommissioning opportunities within a facility. These opportunities include, but are not limited to, air handling unit air-leak reductions, chilled water supply temperature set point adjustments, and lighting run time reductions. After completing the study, the customer (again working with a recommissioning provider) implements the opportunities identified.

The program uses a two-stage rebate process to encourage both stages in the project. First, the program offers rebates to offset the cost of successfully completed studies. Second, the program offers rebates to offset the cost of the implementation.

EVALUATION METHODOLOGY

The Tetra Tech team conducted a comprehensive evaluation of the program. The evaluation scope of work included: 20 Xcel Energy staff internal review interviews (29 total covering all four programs), 24 participant surveys, 70 nonparticipant surveys (94 overall in Colorado), ten qualitative trade ally interviews and one survey with influential vendors, a benchmarking study of ten other utility programs including six program manager interviews, and five on-site measurement and verification visits.

The evaluation activities that directly address the process evaluation objectives are the internal review, participant and nonparticipant surveys, trade ally interviews, and peer utility benchmarking study. The tasks that directly support the impact evaluation are developing net-to-gross ratios through a triangulation method (participant surveys, nonparticipant surveys, trade ally surveys and interviews, and benchmarking study results) and verifying baseline and technical assumptions through a thorough engineering and documentation review and on-site measurement and verification. The completion of these impact tasks support gross and net savings findings.

SUMMARY OF KEY FINDINGS

The key findings are the result of multiple research activities conducted for this project. The evaluation of Xcel Energy’s Colorado Recommissioning program indicates that the program is running well,



resulting in both electric and natural gas savings for Colorado customers. The program exceeded its electric savings goal for 2010 and came close to meeting its natural gas savings goal.

In addition, program staff have been implementing progressive measures in 2010 to improve the program's performance. They have recently implemented a robust savings calculation tool that is available to providers engaged in the Recommissioning program. Providers can use this tool to calculate energy savings for various common recommissioning opportunities. This has two benefits. First, by reducing the amount of effort required to calculate savings, providers are less likely to skip opportunities that are difficult to document. In addition, it helps ensure that savings calculations are consistent across different providers, reducing the amount of time required for program staff to approve studies.

Likewise, for 2011, program staff plan to distribute a checklist of recommissioning opportunities that providers will be required to review during the pre-approval process. If the opportunities on this list are not included in the recommissioning study, the provider is expected to provide an explanation of why those measures are not applicable to that facility. This checklist has two benefits. First, it will push providers to conduct comprehensive recommissioning investigations. In addition, it may also serve as an educational tool for customers by informing them of all the possible areas for improvement in a Recommissioning project.

Next, key findings are presented in the areas of program impacts, program design, program outreach, program implementation and delivery, and satisfaction.

PROGRAM IMPACTS

Measure persistence is very high. All of the surveyed participants that had implemented opportunities identified in the RCx study stated that the measures were installed and still operating as recommended in their study.

The program's identification of the baseline condition for projects is reasonable and consistent with best industry practice. The program uses the existing building condition as the baseline. To determine that condition, an engineering study is completed to determine the operation of the existing equipment. This is a best industry practice and should be continued.

The Recommissioning (RCx) calculator should increase both the consistency and accuracy of the program's claimed savings. Because the RCx calculator was newly developed in 2010, no projects included in the evaluation used the calculator. However, evaluators' conducted a thorough review of the calculator and found it to be an extremely well-thought out and appropriate tool that will increase the uniformity of the savings estimates for the program.

Based on the impact evaluation's reviewed sample, the Ex-Post to Ex-Ante Gross Savings Ratio for electrical and natural gas savings are 87% and 105%, respectively. The Ex-Post to Ex-Ante Gross Savings Ratio was defined as the sum of the sample verified savings (ex post) divided by the claimed (ex ante) savings. For several projects reviewed, it was difficult to obtain the level of documentation needed to verify the claimed savings. However, when documentation was available, the majority of the analyses reviewed were reasonable and acceptable.

The assumption of an expected useful life of seven years for all measures is reasonable when compared to other programs. Defining measure life for specific measures may lead to more accurate results. Some measures, such as control setting changes, have a lower expected useful life than other measures, such as new hardware installations or hardware repairs. However, it is possible that this increased accuracy would not affect the cost-effectiveness tests in any significant manner.



The program's recommended net-to-gross ratio is .90. The evaluation research found high program attribution, or the percentage of the energy impacts that can be confidently attributed to program efforts. The program currently uses a deemed estimate of zero free-ridership, implying that none of the participants would conduct recommissioning studies in the absence of the program. Based on surveys with participants, recommissioning providers, and nonparticipants, the evaluation research found low levels of free-ridership. This finding is corroborated by benchmarking results from similar programs across the country. The recommended net-to-gross ratio (NTGR) based on a triangulation approach is .90.

PROGRAM DESIGN

The program's rebate levels are needed to encourage customers to conduct recommissioning studies. As reported during the recommissioning provider interviews, participating providers believe the program is effective in convincing customers to conduct recommissioning when they otherwise would not have. In addition, the net-to-gross analysis indicates that without the financial assistance provided for the study, a majority of participants would be unlikely to conduct a recommissioning study.

The main barrier to participation is external market barriers such as lack of capital. When deciding on whether to conduct a recommissioning study, participants reported that the major barriers included a lack of funds available for investment, a lack of available financing, and other priorities for capital investment. External market barriers were also, by far, the primary barrier reported by nonparticipants (74 percent).

Participants reported similar barriers when deciding whether to implement the opportunities identified during the study. Similarly, providers reported that a lack of funding or capital is the main reason why customers do not move forward with the program. Although benchmarking and provider interviews indicate that the program rebates in Colorado are adequate, overcoming these barriers will remain difficult for the program in the current economic downturn.

Customers find the list of participating providers useful, although they do not use it often. Xcel Energy's list of participating providers is seen as useful by many of the participants: 11 of the 21 customers with recommissioning studies reported preferring a participating provider list. However, only two of the 23 participants reported that they used Xcel Energy's list of participating providers to select their contractor. Most participants used a competitive bid process or used a contractor with whom they have worked in the past when selecting their recommissioning provider.

The current program design makes it difficult to cost-effectively engage smaller to medium sized customers in the program. Providers felt that recommissioning could benefit smaller to medium facilities given that these facilities often have many opportunities for energy savings. However, one of the challenges providers reported was that conducting a study to meet Xcel Energy's requirements requires additional work and often diminishes the cost-effectiveness of recommissioning in smaller facilities. Providers suggested that the program could include an option for smaller businesses that reduces the program's administrative burden through a more focused investigation of the facility and a list of associated prescriptive rebates.

PROGRAM OUTREACH

Account Managers have been the most effective program marketing tool to-date, although providers can be another important source of program outreach. Participants most frequently reported that they learned of the program from their account managers and that they preferred to learn about additional program information from them as well. In addition, providers stated that Xcel Energy's account managers are the most effective means of reaching potential recommissioning customers. They reported that several of the account managers in Colorado are respected and any communication from them is well received by customers. Other providers mentioned trade shows as an effective



marketing opportunity, although government agencies and schools are less likely to attend than other business sectors.

Nonparticipants primarily reported learning of the program equally through a workshop or trade show and through Xcel Energy. While nonparticipants reported that they primarily like to receive information from contractors, only one of the 24 interviewed participants reported first learning of the program through a contractor. Contractors could be an important program outreach tool that could be better leveraged in the future.

There is general customer awareness of recommissioning, but room to improve understanding of all it entails. Nearly half of nonparticipants (49 percent) said they were familiar with recommissioning. Of those, the majority had also heard of Xcel Energy's Recommissioning program (64 percent). However, nonparticipants' responses about the recommissioning process indicate there is some misunderstanding of its comprehensiveness. For example, several respondents were vague in their knowledge of recommissioning, indicating that they had "tuned up" building systems themselves; had recommissioned one specific system, such as their boiler; had installed motion sensors; or had replaced old equipment.

The program is engaging an experienced stock of recommissioning providers in Colorado. Based on interviews with providers, the program has engaged a group of high quality firms that concentrate on recommissioning. Experienced firms can mitigate a number of frustrations participants might face during participation including low quality studies, incorrectly completed applications, and unrealistic expectations in regards to rebates levels or energy savings.

All of the firms interviewed were consulting firms that work with their customers to provide solutions to energy consumption, with recommissioning being one of the services offered. In addition, recommissioning accounted for a large percentage of these firms total revenue.

Participants' high satisfaction ratings with providers support the quality of providers engaged through the program.

The program's support to providers is beneficial, especially for new providers. Xcel Energy provides program support such as the participating provider list and the savings calculator. Providers report that this program support is especially helpful for smaller, newer firms that may not have the tools to market recommissioning projects possessed by experienced firms. In addition, newer firms interviewed requested additional guidance and feedback during the early stages of their first projects as they become familiar with the program requirements.

PROGRAM IMPLEMENTATION AND DELIVERY

The program's administrative burden is reasonable. The evaluation found that the program requirements do not present a major "stumbling block" to participation (except for smaller facilities as discussed above). In general, providers thought the program's administrative burden is reasonable, and only a few participants reported dissatisfaction with the application process (only 5 of the 24 interviewed). Those who did report dissatisfaction thought that the amount of information required was the most difficult part of the application process. Specifically, some participants reported difficulty with providing the technical specifications required (to both their providers and the program).

Leadership in Energy and Environmental Design for Existing Building (LEED EB) certification is generating program activity in Colorado. Several providers mentioned that many clients come to them seeking LEED certification. These providers reported that organizations can score certification points and reduce energy costs by conducting recommissioning.



Provider screening and training is crucial to success. Benchmarking interviews with other recommissioning program managers found that almost all of the programs have a qualification process that recommissioning providers must go through before they can participate in the program. Program managers found this process very useful in ensuring that unqualified providers do not participate in the program and that under performing providers are removed from the list of participating firms.

The savings calculator will assist in the identification of “deep” savings. Though only recently introduced at the time of evaluation interviews, providers praised the introduction of the energy savings calculator that Xcel Energy offers participating contractors. However, interviews indicate that this calculator will be more beneficial to smaller providers or providers that are new to commissioning existing buildings. Only one firm expressed dissatisfaction with the training that was provided for the savings calculator tool, stating that the trainer did not explain the software adequately.

Customers are most dissatisfied with the time to receive application approvals. Participants reported that long approval turn-around times are the most frustrating program component. Qualitative responses suggest that participants would be less frustrated by the delays if there was consistent communication from the program regarding estimated turn-around times.

Participants are likely to implement measures identified in the study. Ten of the 24 surveyed participants had already implemented measures identified in the study at the time of the evaluation surveys. When those participants that had only conducted a study at the time of the interview were asked about their future plans, nine of 14 had either already started to implement some of the recommended measures or intended to start in the next 6 months. While four participants were unsure about their implementation plans, only one participant was not planning on implementing any measures identified through the study.

PROGRAM SATISFACTION

Customers are highly satisfied with the program. Participants reported high levels of satisfaction with the program overall and with most aspects of the program. In addition, participants requested few changes to the overall program design; 14 of the 24 interviewed would not change anything with the program. Among those who suggested changes, the most frequently requested changes were a more streamlined application process or simplified application form and additional coverage for different types of equipment. None of the respondents mentioned Xcel Energy or the program staff as a barrier in conducting the studies or implementing the opportunities identified. Overall satisfaction rankings with Xcel Energy show that participants are significantly more satisfied with Xcel Energy than nonparticipants. This indicates that the program may have resulted in increased customer satisfaction with Xcel Energy.

Providers are highly satisfied with the program. All of the providers interviewed stated that they were either satisfied or very satisfied with the current program. In addition, they believe the program is effective in convincing customers to conduct recommissioning when they otherwise would not have.

Participants are pleased with program results. Participants reported very high levels of satisfaction with the opportunities covered by the program, the study conducted by their chosen provider, and the amount of energy savings identified in the program study.

RECOMMENDATIONS

With few exceptions, both participants and the providers that operate within the program are satisfied with the way in which the program is currently implemented and are happy with the results they see from participation. In addition, program staff have foreseen some of the issues identified in this evaluation and have already taken steps to improve program performance as overviewed in the key



findings. This type of proactive action is indicative of the program staff's commitment to evolving the Recommissioning program to meet changing market demands.

Within that context, we offer the following recommendations to improve the program and/or maintain the high quality at which it operates for Xcel Energy's consideration:

Recommendation #1: Educate providers about the recent program changes such as the study checklist.

By the end of 2010, program staff are planning on requiring providers to review a 38 point checklist when submitting any recommissioning project for approval. The intent of this checklist to clearly communicate what opportunities Xcel Energy expects to be investigated during the study phase and, therefore, encourage studies that identify "deep" savings. Previously, providers may have focused on opportunities that are readily apparent during a cursory review, that are limited to that provider's area of focus (e.g. HVAC contractors only identifying improvements with HVAC systems), or that do not require complex savings calculations.

We believe this addition to the program will positively affect program performance by increasing the total savings per project and limiting the amount of unqualified participating providers through self-selection (i.e., providers that are not qualified to address the checklist will choose not to participate). In order to maximize its effectiveness, program staff should plan to conduct some level of outreach to providers so that the intent of the checklist is understood. In addition, any educational materials regarding the opportunities listed will ease the adoption of and compliance with the new checklist. Possible educational materials include example situations where opportunities could be implemented or reports from facilities where "deeper" savings were found. Providers reported positive experience with program trainings in the past and the new checklist may warrant an additional training in 2011 that focuses on the checklist and other recent program changes.

Recommendation #2: Continue to support and provide training on the savings calculator tool.

Recently implemented, the savings calculator tool supports the goal of the provider study checklist mentioned above. By reducing the savings calculation burden on providers, this calculator mitigates one of the barriers providers mentioned about conducting comprehensive studies, namely the amount of effort required to calculate savings for relatively minor opportunities. By maintaining support for this tool and working to increase its scope over time, program staff can work to mitigate lost opportunities in recommissioning studies. In addition, continued training will minimize potential provider error in any inputs and ensure that the savings calculated are accurate and robust. A 2011 provider training, suggested above, could cover the savings calculator tool as well as the study checklist.

Recommendation #3: Maintain internal staffing levels to ensure timely study review and application approval.

Both participants and providers mentioned lengthy approval times as a source of frustration within the program. This is not an issue only mentioned for the Recommissioning program. Xcel Energy is fully aware of this issue and has been working to improve turn-around times. Providers did report that this problem has largely been addressed in recent years. Program staff should continue to monitor approval and review turn-around times to ensure that program operations remain timely. In addition, any staffing changes that will affect turn-around times should be carefully considered. Finally, we recommend customers are kept informed of expected approval times as we have found this to increase customer satisfaction in other similar situations.

**Recommendation #4: Consider developing an attenuated study checklist for facilities under 50,000 square feet.**

Interviews with providers suggested that recommissioning could be conducted with smaller facilities if the scope of the study is reduced and the amount of documentation required is minimized. While program staff reported that the 50,000 square footage requirement is waived when smaller facilities can demonstrate potential energy savings, a formalized recommissioning “light” offering could open additional opportunities. This program could be modeled after the Refrigeration Recommissioning program. It was reported the Refrigeration program has successfully engaged smaller business as it concentrates on one high saving opportunity: the optimization of refrigeration. A recommissioning “light” offering could mimic this approach by focusing on a limited number of other high saving opportunities.

Recommendation #5: Create sector-specific direct mailing marketing materials for any future marketing that also include education about what is meant by recommissioning.

Many of the providers requested that Xcel Energy conduct additional marketing targeted at non-managed accounts and specific customer segments. They perceived the lack of awareness regarding recommissioning among these customers as a major barrier to increasing program participation. Indeed, the nonparticipant survey showed that while almost half of nonparticipating customers report they know what recommissioning is, a review of their open-ended comments show a large amount of misunderstanding about what recommissioning entails. Therefore, we recommend not only continued marketing pieces, but marketing pieces that provide customer education on what is meant by recommissioning. While the providers stated that face-to-face meetings at trade shows are very effective in reaching customers, these opportunities typically do not reach as wide an audience as targeted marketing.

We recommend that, if Xcel Energy does conduct additional targeted marketing to non-managed accounts and specific segments, marketing staff craft tailored messages for specific sectors (e.g. health, education, office) with case studies on the possible energy and cost savings and types of recommissioning opportunities identified. In addition, both the participant and nonparticipant survey showed a strong customer preference for receiving information via email; therefore, case studies could be distributed via a cost-effective email format.

Recommendation #6: Continue to leverage the provider infrastructure to provide program marketing.

The nonparticipant survey showed customers’ receptivity to receiving program information from contractors and vendors. Colorado participant results show that program providers are not a major source for customers learning of the program. This is most likely a result of the Colorado program being less mature and providers having less experience with the program. In Colorado, program staff should continue to work with providers to educate them about the program and also to provide the necessary information to help them effectively market the program to their customers.

Recommendation #7: We recommend no changes in the technical or baseline assumptions used in savings calculations or in the savings calculator.

Using the existing condition of the building as the baseline (as identified by an engineering study) is a reasonable and appropriate methodology for calculating savings realized through a recommissioning program. In addition, the assumptions within the calculator are reasonable and accurate. Finally, many of the minor errors identified by the team’s review of the calculator have already been addressed by Xcel Energy (or are addressed in the next version).



Recommendation #8: Net-to-Gross Ratio is 0.90.

The program's recommended net-to-gross ratio is .90. The evaluation research found high program attribution, or the percentage of the energy impacts that can be confidently attributed to program efforts. The program currently uses a deemed estimate of zero free-ridership, implying that none of the participants would conduct recommissioning studies in the absence of the program. Based on surveys with participants, recommissioning providers, and nonparticipants, the evaluation research found low levels of free-ridership. This finding is corroborated by benchmarking results from similar programs across the country. The recommended net-to-gross ratio (NTGR) based on a triangulation approach is .90.



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1. INTRODUCTION

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The program uses a two-stage rebate process to encourage both steps. First, the program offers rebates to offset the cost of successfully completed studies. Second, the program offers rebates to offset the cost of the implementation.

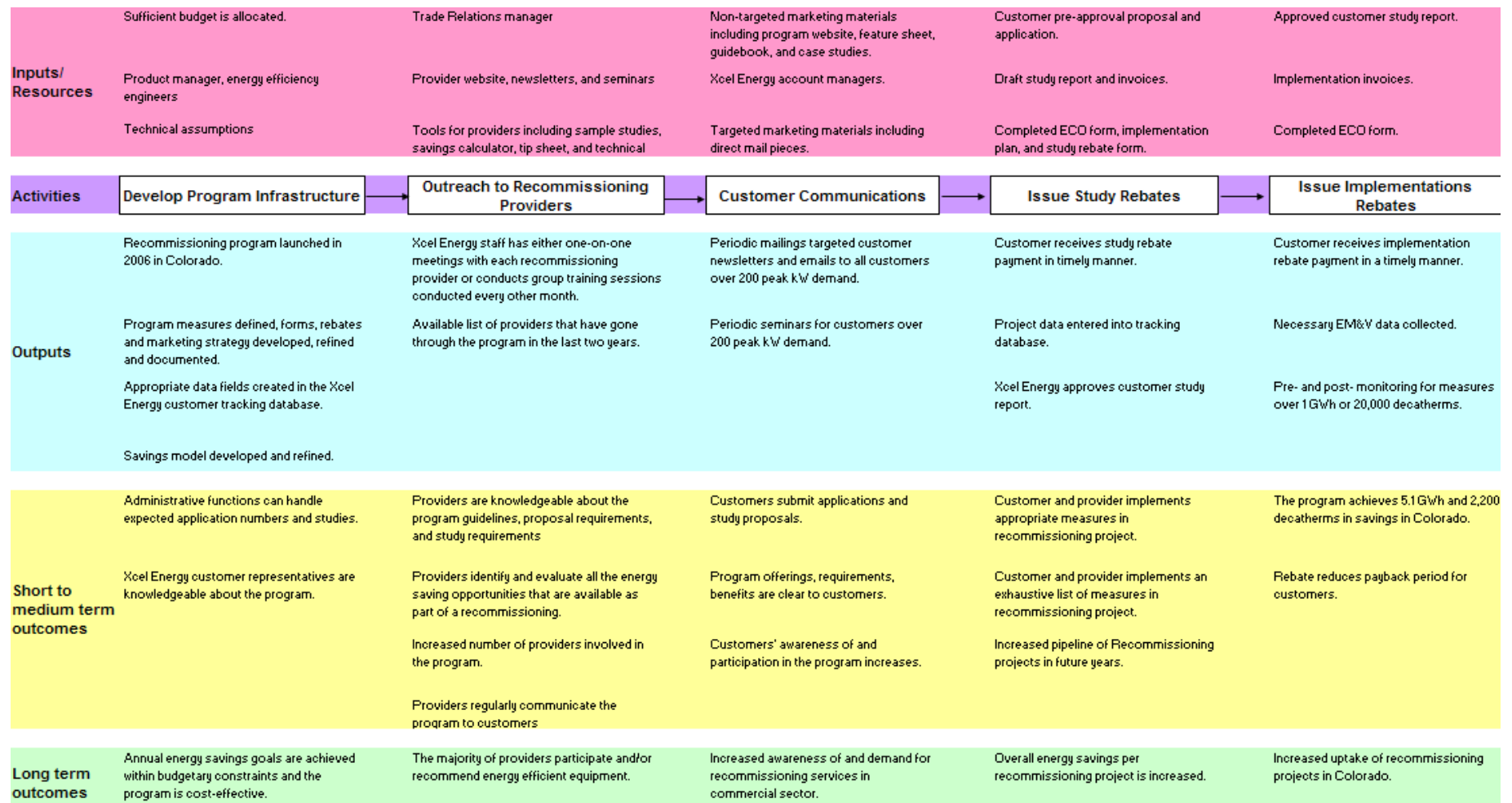
1.2 PROGRAM LOGIC MODEL

Evaluators drafted the Recommissioning logic model at the beginning of the evaluation process 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.

There are two main activities the program uses to drive participation: outreach to recommissioning providers and customer communications. The program heavily leverages the account management structure to bring customers into the program and convince them of the program benefits. Once involved, the program issues a rebate based on the successful completion of a study (and the associated paperwork). After the study is approved, the program issues a second rebate once it receives documentation that the study recommendations have been implemented (usually in the form of invoices).



Figure 1-1. Recommissioning Program Logic Model





1.3 EVALUATION METHODOLOGY

The Tetra Tech team conducted a comprehensive evaluation of the program. The process evaluation provides Xcel Energy with a thorough understanding of participating and nonparticipating commercial customer and trade ally awareness, attitudes and behaviors. The impact evaluation ensures that the estimated energy savings resulting from the evaluation are sound and defensible. In addition, the impact evaluation's net-to-gross calculations used to estimate net energy savings employ triangulation methods for best estimates of program attribution.

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

- Task 1: Start-up meeting and evaluation plan
- Task 2: Internal review/development of logic model (included interviews with 20 Xcel Energy staff (29 total covering all four programs))
- Task 3: Customer surveys (included 24 participant surveys and 70 nonparticipant surveys (94 overall in Colorado))
- Task 4: Trade ally interviews (included ten qualitative trade ally interviews and one influential vendor survey)
- Task 5a: Gross and net savings (included five on-site measurement and verification visits)
- Task 5b. Net to gross recommendations
- Task 5c: Verify technical and baseline assumptions
- Task 6: Peer utility benchmarking (included secondary research on ten other utility programs and in-depth interviews with six program managers)
- Task 7: Progress reporting
- Task 8: Reporting and results presentation.

The evaluation activities that directly address the process evaluation objectives are the internal review, participant and nonparticipant surveys, trade ally interviews, and peer utility benchmarking studies. The tasks that directly support the impact evaluation are: 1) developing net-to-gross ratios through a triangulation method (participant surveys, nonparticipant surveys, trade ally surveys and interviews, and benchmarking study results) and, 2) verifying baseline and technical assumptions through engineering and documentation review and on-site inspections and metering. These impact evaluation tasks resulted in the development of gross and net savings findings.

1.4 REPORT ORGANIZATION

Section 2 of the report synthesizes overall key findings across all of the evaluation activities. Sections 3 through 10 detail results from each of the evaluation activities as follows: internal review, trade ally interviews, participant surveys, nonparticipant surveys, peer utility benchmarking, and the impact evaluation including gross and net savings, net-to-gross analysis and verification of technical and baseline assumptions. Section 11 discusses the recommendations resulting from the evaluation research. A detailed technical appendix contains all data collection instruments used for the evaluation as well as survey response rates.



2. SUMMARY OF KEY FINDINGS

The key findings presented in this section are the result of multiple research activities conducted for this project. Findings are presented in the areas of program impacts, design, outreach, implementation and delivery, and satisfaction.

The evaluation of Xcel Energy's Colorado Recommissioning program indicates that the program is running well, resulting in both electric and natural gas savings for Colorado customers. The program exceeded its electric savings goals for 2010 and came close to meeting its natural gas savings goal.

In addition, program staff have been implementing progressive measures in 2010 to improve the program's performance. They have recently implemented a robust savings calculation tool that is available to providers engaged in the Recommissioning program. Providers can use this tool to calculate energy savings for various common recommissioning opportunities. This has two benefits. First, by reducing the amount of effort required to calculate savings, providers are less likely to skip opportunities that are difficult to document. In addition, it helps ensure that savings calculations are consistent across different providers, reducing the amount of time required for program staff to approve studies.

Likewise, for 2011, program staff plan to distribute a checklist of recommissioning opportunities that providers will be required to review during the pre-approval process. If the opportunities on this list are not included in the recommissioning study, the provider is expected to provide an explanation of why those measures are not applicable to that facility. This checklist has two benefits. First, it will encourage providers to conduct comprehensive recommissioning investigations. In addition, it may also serve as an educational tool for customers by informing them of all the possible areas for improvement in a recommissioning project.

2.1 PROGRAM IMPACTS

2.1.1 Gross and Net savings

Measure persistence is very high. All of the surveyed participants that had implemented opportunities identified in the RCx study stated that the measures were installed and still operating as recommended in their study.

Based on the impact evaluation's reviewed sample, the Ex-Post to Ex-Ante Gross Savings Ratio for electrical and natural gas savings are 87% and 105%, respectively. The Ex-Post to Ex-Ante Gross Savings Ratio was defined as the sum of the sample verified savings (ex post) divided by the claimed (ex ante) savings. For several projects reviewed, it was difficult to obtain the level of documentation needed to verify the claimed savings. However, when documentation was available, the majority of the analyses reviewed were reasonable and acceptable.

2.1.2 Net to Gross

The program's recommended net-to-gross ratio is .90. The evaluation research found high program attribution, or the percentage of the energy impacts that can be confidently attributed to program efforts. The program currently uses a deemed estimate of zero free-ridership, implying that none of the participants would conduct recommissioning studies in the absence of the program. Based on surveys with participants, recommissioning providers, and nonparticipants, the evaluation research found low levels of free-ridership. This finding is corroborated by benchmarking results from similar programs across the country. The recommended net-to-gross ratio (NTGR) based on a triangulation approach is .90.



2.1.3 Baseline and Technical Assumptions

The assumption of an expected useful life of seven years for all measures is reasonable when compared to other programs. Defining measure life for specific measures may lead to more accurate results. Some measures, such as control setting changes, have a lower expected useful life than other measures, such as new hardware installations or hardware repairs. However, it is possible that this increased accuracy would not affect the cost-effectiveness tests in any significant manner.

The program's identification of the baseline condition for projects is reasonable and consistent with best industry practice. The program uses the existing building condition as the baseline. To determine that condition, an engineering study is completed to determine the operation of the existing equipment. This is a best industry practice and should be continued.

The Recommissioning (RCx) calculator should increase both the consistency and accuracy of the program's claimed savings. Because the RCx calculator was newly developed in 2010, no projects included in the evaluation used the calculator. However, evaluators' conducted a thorough review of the calculator and found it to be an extremely well-thought out and appropriate tool that will increase the uniformity of the savings estimates for the program.

2.2 PROGRAM DESIGN

The program's rebate levels are needed to encourage customers to conduct recommissioning studies. As reported during the recommissioning provider interviews, participating providers believe the program is effective in convincing customers to conduct recommissioning when they otherwise would not have. In addition, the net-to-gross analysis indicates that without the financial assistance provided for the study, a majority of participants would be unlikely to conduct a recommissioning study.

The main barrier to participation are external market barriers such as lack of capital. When deciding on whether to conduct a recommissioning study, participants reported that the major barriers included a lack of funds available for investment, a lack of available financing, and other priorities for capital investment. External market barriers were also, by far, the primary barrier reported by nonparticipants (74%).

Participants reported similar barriers when deciding whether to implement the opportunities identified during the study. Similarly, providers reported that a lack of funding or capital as a main reason that customers do not move forward with the program. Although benchmarking and provider interviews indicate that the program rebates in Colorado are already adequate as discussed above, overcoming these barriers will remain difficult for the program in the current economic downturn.

Customers find the list of participating providers useful, although they do not use it often. Xcel Energy's list of participating providers is seen as useful by many of the participants: eleven of the 21 customers with recommissioning studies reported preferring a participating provider list. However, only two of the 23 participants reported that they used Xcel Energy's list of participating providers to select their contractor. Most participants used a competitive bid process or a contractor with whom they have worked in the past when selecting their recommissioning provider.

The current program design makes it difficult to cost-effectively engage smaller to medium sized customers in the program. Providers felt that recommissioning could benefit smaller to medium facilities given that these facilities often have many opportunities for energy savings. However, one of the challenges providers reported was that conducting a study that meets Xcel Energy's requirements requires additional work and often diminishes the cost-effectiveness of recommissioning in smaller facilities. Providers suggested that the program could include an option for smaller businesses that reduces the program's administrative burden through a more focused investigation of facilities and a list of associated prescriptive rebates.



2.3 PROGRAM OUTREACH

Account Managers have been the most effective program marketing tool to-date, although providers can be another important source of program outreach. Participants most frequently reported that they learned of the program from their account managers and that they preferred to learn about additional program information from them as well. In addition, providers stated that Xcel Energy's account managers are the most effective means of reaching potential recommissioning customers. They reported that several of the account managers in Colorado are respected and any communication from them is well received by customers. Other providers mentioned trade shows as an effective marketing opportunity, though government agencies and schools are less likely to attend than other business sectors.

Nonparticipants primarily reported learning of the program equally through a workshop or trade show and through Xcel Energy. While nonparticipants reported that they primarily like to receive information from contractors, only one of the 24 interviewed participants reported first learning of the program through a contractor. Providers could be an important program outreach tool that could be better leveraged in the future.

There is general customer awareness of recommissioning, but room to improve understanding of all it entails. Nearly half of nonparticipants (49 percent) said they were familiar with recommissioning. Of those, the majority had also heard of Xcel Energy's Recommissioning program (64 percent). However, nonparticipants' responses about the recommissioning process indicate there is some misunderstanding of its comprehensiveness. For example, several respondents were vague in their knowledge of recommissioning, indicating that they had "tuned up" building systems themselves; had recommissioned one specific system, such as their boiler; had installed motion sensors; or had replaced old equipment.

The program is engaging an experienced stock of recommissioning providers in Colorado.

Based on interviews with providers, the program has engaged a group of high quality firms that concentrate on recommissioning. Experienced firms mitigate a number of frustrations participants might face during participation including low quality studies, incorrectly completed applications, and unrealistic expectations in regards to rebates levels or energy savings.

All of the firms interviewed were consulting firms that work with their customers to provide solutions to energy consumption, with recommissioning being one of the services offered. In addition, recommissioning accounted for a large percentage of these firms total revenue.

Participants' high satisfaction ratings of providers support the quality of providers engaged through the program.

The program's support to providers is beneficial, especially for new providers. Xcel Energy provides program support such as the participating provider list and the savings calculator. Providers report that this program support is especially helpful for smaller, newer firms that may not have the tools to market recommissioning projects possessed by experienced firms. In addition, newer firms interviewed requested additional guidance and feedback during the early stages of their first projects as they become familiar with the program requirements.

2.4 PROGRAM IMPLEMENTATION AND DELIVERY

The program's administrative burden is reasonable. The evaluation found that the program requirements do not present a major "stumbling block" to participation (except for smaller facilities as discussed above). In general, providers thought the program's administrative burden is reasonable, and only a few participants reported dissatisfaction with the application process (only 5 of the 24 interviewed). Those who did report dissatisfaction thought that the amount of information required was



the most difficult part of the application process. Specifically, some participants reported difficulty with providing the technical specifications required (to both their providers and the program).

Leadership in Energy and Environmental Design (LEED EB) certification is generating program activity in Colorado. Several providers mentioned that many clients come to them seeking LEED certification. These providers reported that organizations can score certification points and reduce energy costs by conducting recommissioning.

Provider screening and training is crucial to success. Benchmarking interviews with other recommissioning program managers found that almost all of the programs have a qualification process that recommissioning providers must go through before they can participate in the program. Program managers found this process very useful in ensuring that unqualified providers do not participate in the program and that under performing providers are removed from the list of participating firms.

The savings calculator will assist in the identification of “deep” savings. Though only recently introduced at the time of evaluation interviews, providers praised the introduction of the energy savings calculator that Xcel Energy offers participating contractors. However, interviews indicate that this calculator will be more beneficial to smaller providers or providers that are new to commissioning existing buildings. Only one firm expressed dissatisfaction with the training that was provided for the savings calculator tool stating that the trainer did not explain the software adequately.

Customers are most dissatisfied with the time to receive application approvals. Participants reported that long approval turn-around times are the most frustrating program component. Qualitative responses suggest that participants would be less frustrated by the delays if there was consistent communication from the program regarding estimated turn-around times.

Participants are likely to implement measures identified in the study. Ten of the 24 surveyed participants had already implemented measures identified in the study at the time of the evaluation surveys. When those participants that had only conducted a study at the time of the interview were asked about their future plans, nine of 14 had either already started to implement some of the recommended measures or intended to start in the next 6 months. While four participants were unsure about their implementation plans, only one participant was not planning on implementing any measures identified through the study.

2.5 PROGRAM SATISFACTION

Customers are highly satisfied with the program. Participants reported high levels of satisfaction with the program overall and with most aspects of the program. In addition, participants requested few changes to the overall program design; 14 of the 24 interviewed would not change anything with the program. Among those who suggested changes, the most frequently requested changes were a more streamlined application process or simplified application form and additional coverage for different types of equipment. None of the respondents mentioned Xcel Energy or the program staff as a barrier in conducting the studies or implementing the opportunities identified. Overall satisfaction rankings with Xcel Energy show that participants are significantly more satisfied with Xcel Energy than nonparticipants. This indicates that the program may have resulted in increased customer satisfaction with Xcel Energy.

Providers are highly satisfied with the program. All of the providers interviewed stated that they were either satisfied or very satisfied with the current program. In addition, they believe the program is effective in convincing customers to conduct recommissioning when they otherwise would not have.

Participants are pleased with program results. Participants reported very high levels of satisfaction with the opportunities covered by the program, the study conducted by their chosen provider, and the amount of energy savings identified in the program study.



2.6 CONCLUSION

The Recommissioning Program appears to be working relatively well as evidenced by high satisfaction among participants and providers and favorable comparisons to benchmarked programs. However some areas for improvement were identified. Specific recommendations for program improvements are presented at the end of this report.



3. EVALUATION RESULTS—INTERNAL REVIEW

This section of the report provides high-level key findings and recommendations resulting from internal review interviews with 20 Xcel Energy staff (29 total covering all four programs).

3.1 INTRODUCTION

Evaluators interviewed a range of Xcel Energy staff that are involved in the design and delivery of the Business DSM programs. Interviewees included: product managers (1), marketing assistants (2), rebate processors (2), Business Solutions Center (BSC) representatives (3), trade relations managers (2), account managers (4), energy efficiency engineers (2), regulatory affairs (2) and marketing managers (2).

Evaluators conducted these interviews over a six week period from the end of May through early July 2010. The interviews discussed a variety of issues, including:

- Roles and responsibilities of the staff
- Communication and interaction with others in the program
- Program design
- Resources to do their job
- Program marketing efforts
- Issues unique to the groups they interact with (e.g., customers and trade allies)
- Program operations
- Customer and trade ally satisfaction with the program
- Areas where the program is working well
- Past, current, and future challenges of the program(s)
- Issues they would like the evaluation to research further.

3.2 INTERNAL REVIEW OVERVIEW

Multiple internal staff positions support Xcel Energy's DSM programs: product managers, marketing managers, regulatory affairs staff, marketing assistants, energy efficiency engineers, trade relations managers, account managers, BSC representatives and rebate processors. Product managers oversee each program ("product") and are ultimately responsible for the program design and goals, monitoring goals and developing contingency plans, pursuing effective marketing and communication strategies and reporting to the marketing managers in each state. Marketing managers monitor overall program performance and make adjustments as needed to ensure the overall DSM portfolio meets its goals by state. Marketing managers also work with two directors on strategy and policy directions for the DSM programs. There is one marketing manager for Colorado. Marketing managers also interact with regulatory affairs staff. Regulatory affairs staff interface with the State's Public Utility Commission and related stakeholders to ensure that the programs are in compliance with the regulatory framework in Colorado.



Marketing assistants support product managers, and interact with engineers, account managers and the BSC, and customers during the project pre-approval and approval processes. Energy efficiency engineers are responsible for technical reviews, pre-approvals of custom measures and program energy savings calculations. Account Managers are the first point of contact for managed accounts, as well as a conduit between managed customers and the marketing and product teams. BSC representatives handle a wide variety of customer service tasks and are a key point to which customers can be funneled into the program; BSC representatives have also recently taken on the new role of energy-efficiency and rebate advisors. Trade relations managers oversee the relationships between the DSM products and trade allies or vendors. Trade relations managers both identify and train new vendors as well as work with established vendors to market Xcel Energy's DSM products. Trade relations managers also engage trade allies in Advisory Councils that meet periodically to provide advice and input on Xcel Energy's DSM products. Rebate processors complete program documentation to ensure the participant receives their rebate.

Communication is important to the success of any program. It is especially important for the business programs given the dispersion of program staff across states and many staff working across multiple programs. Currently the programs employ several methods of communication to staff working on the programs. The company maintains an intranet that provides documentation and information for all programs administered by Xcel Energy. The company also communicates program updates and information via email to relevant parties. Last, the company distributes quarterly Energy Exchange newsletters which provide program-specific updates. Several individuals interviewed commented on the need to receive information regarding program changes more formally. In addition, it was mentioned that periodic conference calls or group meetings for all those involved with the programs would be helpful.

Xcel Energy has standard marketing materials that they use for all business customers. The marketing materials provide an overview of the program offerings and discuss the benefits of energy efficiency. Examples of marketing materials include the Summer Cooling Savings Guidebook and 7 Steps to Lower Summer Energy Bills. Xcel Energy also provides information about their programs on their website as well as through email communications such as Xcel Energy's Product Update. Interviewees indicate the marketing materials distributed to customers and available to program staff are fairly generic and there may be a need for more specific materials to be distributed to targeted customer groups. Interviews with program staff confirm that the customer sectors they each serve are unique from each other. In addition, interviewees also indicated that active marketing (e.g., calling or visiting customers) is much more effective than more passive marketing efforts (e.g., bill inserts).

There are established tracking systems that assist in the effective tracking and monitoring of the programs. The Siebel system tracks all programs from project leads to completions. There are also project specific tracking systems. Most staff indicated that the tracking systems they use, Siebel in particular, works well and serves their needs. At the beginning of the process, leads are tracked in Siebel, which carries them all the way through the programs to the rebate processors.

3.3 KEY FINDINGS

3.3.1 Areas that are working well

- In general, it is thought that the programs are a positive opportunity and touch point for customers. Staff find customers are generally satisfied and appreciative of Xcel Energy's DSM programs, including both incentives and technical information.
- In general, staff report that relationships with other internal staff supporting the DSM programs are functioning well.



- Dedicated trade relations managers are an important part of Xcel Energy's DSM programs and their inclusion in staffing plans recognizes this. These positions greatly facilitate trade ally engagement in the programs.
- Account managers are an extremely effective vehicle to promote program participation for larger customers. In many cases, they not only promote the program but provide "handholding" throughout the application process.
- The BSC's recent re-organization to include dedicated energy efficiency specialists is viewed as a positive change that should increase the DSM programs' ability to market to and engage small-to-medium customers. This has been a difficult sector for the programs to reach in the past. In addition, interviewees believe this change is greatly increasing trade ally and customer satisfaction with Xcel Energy. BSC representatives are also helping customers complete the application process.
- Program incentives available to customers are generally viewed as effective, especially recent increases in incentive levels.

3.3.2 Opportunities for improvement

- The interviews indicate an overall sense of understaffing to support the programs. This feeling permeates across different positions that work with the programs from marketing to engineering to rebate processing. A suggestion from the interviews was to limit the number of programs that staff support. This seemed to be particularly true for energy efficiency engineers who are needed for the pre-approval process for custom projects.
- The consensus of internal staff is that the application and pre-approval processes are not working well for the programs being evaluated in 2010.
- Some internal staff reported that the tracking systems could be streamlined and that redundant or unnecessary information could be eliminated. Similarly, several staff pointed out the importance of increased focus on quality control during the application process.
- There are some areas of the program design that may be confusing customers and limiting participation and satisfaction. Customer confusion regarding rebate levels (i.e., they receive a smaller rebate than expected) was reported. Program eligibility was also identified as an area of confusion because of frequent changes in program plans and eligible equipment.
- While there are multiple general marketing campaigns to support the business programs, some interviewees thought more program-specific marketing may be needed.
- The current economic down-turn presents a participation barrier across the board. Internal staff would like evaluation feedback on the effectiveness of increased incentive levels to overcome participation barriers in the current economic state as well as any other strategies that may assist.
- While internal staff generally reported positive relationships with other internal staff as noted above, some interviewees felt that collaboration between staff could be strengthened, by gaining a better understanding of the responsibilities and day-to-day processes of staff in different roles and developing a more formalized process for collaboration.

3.3.3 Program-specific findings

Overall, internal staff reported that the Recommissioning program provides a valuable service to Xcel Energy customers and was operating effectively. They reported that the program has "great potential" and "a lot to offer to customers". Customers often see recommissioning as an opportunity to "right the



ship,” but staff report that convincing them to participate initially is difficult. Once they see the results, interviewees report customers are generally very satisfied.

Most customers are currently coming into the Recommissioning program through relationships with Account Managers. Interviews with BSC staff reveal a familiarity with the program but little experience working with unmanaged customers regarding recommissioning. Account Managers have the close working relationships with large customers that are needed to identify opportunities for the program.

As reported by program staff, possible future barriers to meeting savings goals are low quality Recommissioning studies, customers’ unwillingness to approve capital expenses during an economic downturn, and a lack of awareness among smaller customers. In addition, increasing the stock of experienced Recommissioning providers participating with the program was reported as a need by staff. The program is currently taking steps to overcome these barriers. It was noted that the Colorado Recommissioning program has made more progress towards its goals to-date.

Issues identified by internal staff, which were explored in other evaluation data collection activities, were:

- *Understaffing.* One problem for the Recommissioning program lies specifically with limited engineering staff resources. Not only are there too few engineers, but the turn-over rate for this position has been high and the learning curve is steep, creating a high application-to-engineer ratio. These problems bog down the application process and frustrate staff and customers alike.
- *Program turn-around time.* Long delays from pre-approval to implementation are caused by multiple factors, including delays on the customer’s end, inadequately documented studies, and the previously-mentioned engineer staffing. One step Xcel Energy has taken to solve this problem is to standardize the savings calculator, which will hopefully result in less time spent reviewing each application.
- *Quality and standardization of recommissioning studies.* Several internal staff presented concerns that opportunities are being lost due to a lack of familiarity or interest in different types of systems by study providers. When large facilities conduct Recommissioning studies that result in only three or four opportunities, program staff suspect that systems are being skipped as part of the study. For example, a lighting contractor may be less familiar with HVAC systems and less likely to identify changes to the building’s HVAC system. Another example would be providers that are using Recommissioning studies as a first step towards additional work. These providers are less likely to recommend low- or no-cost opportunities that could be conducted by existing customer personnel. To encourage exhaustive Recommissioning studies, the program is implementing a pre-approval checklist that providers will reference during study pre-approval. This checklist contains a comprehensive list of opportunities that are expected to be reviewed during the study.



4. EVALUATION RESULTS—TRADE ALLY FINDINGS

This section of the report presents results from 10 qualitative interviews conducted with trade allies for the Recommissioning program.

4.1 INTRODUCTION

The evaluation team conducted interviews with trade allies that have participated within the last two years in the program. This sample includes both trade allies that have been active in the program as well as ‘informed’ non-participants. Informed non-participants are trade allies that have completed a project through the program, but have had very limited involvement. An example would be a trade ally who has done one or two projects through the program or who completed projects in 2009, but not 2010 to-date.

Evaluators conducted 10 interviews representing nine firms that provide recommissioning services — seven active and two informed nonparticipating trade allies – using a semi-structured in-depth interview guide approved by Xcel Energy¹. The evaluation team conducted interviews with trade allies in August through September 2010. This research with the trade allies provided meaningful process insights into the program’s operations, their interactions with the program, the customers the program is serving, and barriers to customers’ participation in the program. In summary, the research focused on gathering the following types of information: provider interactions with Xcel Energy, the application and preapproval processes, rebate levels, marketing, and customer awareness and barriers to participation.

Xcel Energy provided sample information from the program’s participant database. The data for the trade ally sample included contact information such as phone number, email address and contact name. We used this information to identify individuals that focus on building commissioning. This sample also identified both participating and non-participating contractors.

Next, this memorandum summarizes the key findings from the trade ally interviews. These are followed by detailed findings.

4.2 KEY FINDINGS

Our sample of recommissioning providers (i.e., trade allies) included engineering firms and energy services companies (ESCOs). The firms ranged in size from large, national firms to small, local operations with one or two staff. All of the firms interviewed were consulting firms that work with their customers to provide solutions to energy consumption with recommissioning being one of the services offered. Six of the nine firms interviewed only conducted the recommissioning study and did not implement any of the measures identified. The remaining firms conducted both the study and performed as much of the implementation as they were able. None of the firms interviewed only conducted implementations.

In general, recommissioning accounted for a large percentage of these firms total revenue. Five firms reported that recommissioning projects typically makes up at least 50 percent of their overall work with two firms stating that makes up over 90 percent of their work. Other firms classified between 10 and 25 percent of their work as recommissioning projects.

¹ We interviewed two employees at one firm to understand the perspective of both the engineer and sales manager.



Recommissioning generally makes up a larger portion of the Colorado providers overall work. In addition, the providers tended to focus more on recommissioning investigations only and do not implement the identified opportunities.

These interviews identified the following key findings:

- *Recommissioning providers are satisfied with the program and feel it is effective.* All of the providers interviewed stated that they were either satisfied or very satisfied with the current program. In addition, they believe it is effective in convincing customers to conduct recommissioning when they otherwise would not have.
- *Recommissioning providers stated mixed levels of satisfaction with the current level of support offered by Xcel Energy.* While providers praised the savings calculator they said ideally it would be expanded to include additional measures. In addition, providers that were new to or unfamiliar with the program requested additional guidance and faster feedback during the pre-approval process.
- *Xcel Energy's account managers and presence at conferences are the two most effective means of reaching potential recommissioning customers.* Providers reported that several of the account managers in Colorado are well respected and any communication from them is well received.
- *Leadership in Energy and Environmental Design for Existing Building (LEED EB) certification is an effective way to raise interest in recommissioning in Colorado.* Several providers mentioned that many of the clients come to them seeking LEED certification. As organizations can score certification points and reduce energy costs by conducting recommissioning, it is an attractive part of the certification process.
- *The Recommissioning program can serve small business with some alterations.* Many of the providers interviewed had successfully conducted recommissioning projects in smaller facilities but stated that it requires a different approach than large facilities. Simplifying the application and documentation process along with encouraging providers to focus their studies would make the program more feasible in smaller facilities.

4.3 DETAILED FINDINGS

Detailed findings are presented in the following topic areas: program awareness and involvement; customer interactions; program procedures, engaging small businesses, and commercial market.

4.3.1 Program awareness and involvement

Overall, the Colorado Recommissioning program is successfully bringing new providers into the program while supporting firms that have been around for many years. Providers feel the program offers them many tangible benefits and a satisfactory level of support, especially for firms just starting out in the market or field. These attitudes reinforce the providers' overall opinion of the program and Xcel Energy; providers reported that they are happy with the program and look forward to working with program staff in the future.

The providers varied in their level of experience with the program. Several of the providers have been involved with the program since its inception while three of the providers have been involved for less than 12 months. Four of the providers reported that they first heard of the program through communication from Xcel Energy staff. Others became aware of the program through colleagues and clients who brought the program to them. The firms mentioned that while they were aware of other programs offered by Xcel Energy, they only reported participating in the EMS and New Construction programs.



The decreased customer cost was the most frequently mentioned benefit that Colorado providers saw from program participation; all of the providers listed it as a positive aspect of participation. It not only was used as a sales tool but it allowed them to “dig deeper” and identify additional opportunities as the rebate allowed “more breathing room” in the project budgets. Other benefits mentioned included additional customers identified through Xcel Energy contacts, the participating provider list, and the savings calculator. One provider mentioned that many of the benefits are targeted towards firms that are new to the program and are not as useful for experienced recommissioning providers.

Colorado providers, with exceptions, were satisfied with the current level of tools and training that Xcel Energy provides. Three of the nine firms reported that there was nothing additional that they would like to see the program provide in terms of support or training. One firm expressed dissatisfaction with the training that was provided for the savings calculator tool stating that the trainer did not explain the software adequately. Providers again mentioned that much of the support that Xcel Energy offers seems targeted to smaller, newer firms that may not have the tools to market recommissioning projects that experienced firms possess. However, newer firms requested additional guidance and feedback during the early stages of their first projects.

Other possible support included:

- A provider handbook that explains technical details of typical recommissioning studies
- Additional measures in the savings calculator
- Information about the cost of implementing frequently identified opportunities
- More Xcel Energy-sponsored seminars for potential customers on the benefits of recommissioning.

4.3.2 Customer interactions

Providers frequently mentioned that the program greatly assists their ability to sell recommissioning projects to customers both old and new as they can tout the many benefits participation offers them. However, they would like to see Xcel Energy do additional marketing to increase overall demand for their services and therefore, drive participation in the program.

Typically, the Colorado providers were actively seeking new customers to supplement repeat business. Their target markets were health care, government agencies, schools, and any building seeking LEED certification. However, one provider mentioned that any commercial building of substantial size could really benefit from recommissioning.

However, providers also agreed that more marketing is needed to raise awareness of both the benefits of recommissioning and the benefits of participating in Xcel Energy’s program. Several providers stated that account managers in Colorado are the most effective method as they are well known and respected within the local business community. Other providers mentioned trade shows as an effective marketing opportunity though government agencies and schools are less likely to attend than other sectors. One provider was particularly impressed with an energy expo where Xcel Energy gave away bags of tools with program information.

Providers listed several possible motivations that customers have for participating in the program. The most frequently mentioned motivation was the program incentive; five of the nine providers mentioned it or the effect those funds have on payback periods. Another motivation frequently mentioned was the LEED EB certification process. Three of the nine firms say that a percentage (providers could not provide estimates of how many) of their clients come to them looking for recommissioning services as part of the LEED certification process. One provider stated that recommissioning is an attractive way to score points during LEED certification because it also cuts costs as part of the process. Providers listed



other motivations including tenant comfort issues and a desire to market themselves as “green” (but not specifically LEED certified).

Providers reported that a majority of eligible customers that are knowledgeable about recommissioning and are aware of the program’s benefits move forward with recommissioning projects. Those customers that do not are usually unwilling due to lack of funding or a program schedule that does not fit into their budget cycle. Other potential barriers include the fear that changes as a result of the recommissioning will increase tenant complaints, the lack of available staff to commit to the project, and the desire to implement the project without delays caused by third-party approvals. A provider mentioned that he felt that program involved a lot of “red tape” and it was challenging convincing customers that the amount of planning required was worthwhile.

Providers agreed that reduced energy costs were the main benefit customers see from the program though providers mentioned other benefits. These ancillary benefits included:

- Xcel Energy’s sponsorship of the work
- Increased training for maintenance staff
- Increased documentation of control systems and sequence of operations mechanical systems
- Preventative maintenance
- Quality assurance
- Overall increased tenant comfort.

4.3.3 Program procedures

Overall, Colorado providers are satisfied with Xcel Energy’s Recommissioning program; all of the providers interviewed rated the program positively when asked about their satisfaction. One provider stated, “It’s a good program. It seems to work well.” Another provider felt it was “a win-win for our customers, for us, and for Xcel Energy”. Providers were pleased with the incentive levels (though most were only familiar with the rebates available for the study). They also praised how smoothly the program currently operates, its well-defined scope, and the savings calculator tool. In addition, a majority of the providers (eight of the nine) believed that the program was effective in encouraging customers to conduct recommissioning studies when they otherwise would not (i.e., there is a low incidence of free-ridership).

Though satisfied with the program, several providers had suggestions for ways to improve program operation and effectiveness. The suggestions included increasing the consistency of program documentation requirements, adding program staff, making the list of energy conservation opportunities more inclusive, and increasing implementation incentives. Additionally, one provider mentioned that new firms could have difficulty accurately estimating implementation costs. This firm, which only conducted studies, did not want to understate the implementation costs and therefore, often estimated costs that might have been too high. They did not have a recommissioning project go forward until the customer hired a maintenance firm that provided more realistic implementation costs.

Providers had several suggestions about how implementation incentives could be structured. For example, one provider suggested incentives for measures that could be immediately implemented. Other providers believed that a performance or “on-going commissioning” bonus incentive paid out after implementation would encourage timely and proper implementation. Likewise, though most providers thought that the program’s administrative burden was slight after their first project, two thought the amount of paperwork should be reduced especially for smaller facilities.



In addition to the application paperwork, study documentation is another critical step in the recommissioning process. A majority of Colorado providers thought they conducted comprehensive recommissioning studies that identified all opportunities in a building. Two providers mentioned that they would not include a measure in their report if they were skeptical of the cost-effectiveness or if the savings calculations would take too long for minimal savings. Another provider mentioned that while they conducted comprehensive studies, they have been hired by clients that previously used firms that focused on one measure (i.e., the “*low hanging fruit*”) and missed many other opportunities.

Similarly, three firms mentioned that they would sometimes mention opportunities to building owners that do not get included in their reports. One firm went so far as to produce two reports: one for Xcel Energy and another for the customer to use as a legacy document. These opportunities are often ones that are not eligible for program rebates (e.g., broken components), perceived as ineligible (e.g., incorrect staging of cooling towers) or as mentioned previously, too complex to estimate savings.

4.3.4 Engaging small businesses

Five of the providers had experience working with smaller facilities (under the program’s eligibility requirement of a minimum of 50,000 square feet). These providers felt that recommissioning could be cost-effective given that these facilities had many opportunities for energy savings. One of the challenges providers reported was that conducting a study that met Xcel Energy’s requirements requires additional work and often diminishes the cost-effectiveness of recommissioning in smaller facilities. Also, the administrative and travel costs are the same for small businesses as they are for large businesses resulting in an increased cost per square foot for smaller facilities.

Despite these challenges, the providers were eager to work with smaller business and had suggestions for how Xcel Energy could alter the Recommissioning program in order to encourage the participation of smaller businesses. The one suggestion was to lower the 50,000 square foot eligibility requirement. Other suggestions included reducing the program’s administrative burden, encouraging a more focused investigation of facilities, and providing a list of prescriptive rebates for smaller facilities. One provider requested that the program allow providers to group together campuses that are made up of smaller buildings into one larger project. This change would be particularly helpful for K-12 schools that often are comprised of multiple buildings with similar systems, according to the provider.

4.3.5 Commercial market

Providers are optimistic about the future of recommissioning in Colorado. Eight of the nine firms interviewed believed that the market for recommissioning would grow in the next several years especially as the economy recovers from recent downturns.

Providers speculated that there were several different drivers of the recommissioning demand. Several hoped that as the economy improves, there would be additional funds for recommissioning in program budgets. Until the economy does fully recover, providers believed that customers are less likely to look at major upgrades of systems or new construction and instead look to optimize existing systems. Again, providers believe that recommissioning is an ideal way to cut costs without large capital expenditures.

Providers also noted that customers are increasingly facing mandates to save energy at the corporate level and that recommissioning is often a cost-effective way to quickly cut energy consumption. Another provider mentioned that the market in Colorado is far from saturated. He believed that 90 percent of the eligible buildings in Colorado have not been recommissioned.



4.4 CONCLUSION

In summary, the Colorado providers involved with Xcel Energy's Recommissioning program are satisfied with the program though providers would like additional support during their initial project. They feel the program is effective in encouraging new recommissioning projects for customers that might not have otherwise conducted an investigation. Many of the Colorado providers are deeply invested in recommissioning and are optimistic about the future of recommissioning in the Colorado market. They expect demand to grow as the economy improves and corporations increase their environmental stewardship.

The providers did suggest some improvements to the program including additional marketing efforts, increased consistency in documentation review, and increased implementation incentives. These increased implementation incentives might be structured as performance or persistence bonuses. They also were interested in working with smaller facilities and thought that a more focused approach to recommissioning with lowered requirements would be worthwhile for Xcel Energy with the first step being a modification to the square footage requirement.



5. EVALUATION RESULTS—PARTICIPANT FINDINGS

This section presents the results of 24 quantitative surveys of participants in the Colorado Recommissioning Program.

5.1 INTRODUCTION

The participant surveys collected information to inform program design, program administration, program implementation and delivery, market response, and program attribution (note: net-to-gross impact results are reported in a separate report section). Tetra Tech conducted this research using telephone surveys implemented between August 9, 2010 and September 17, 2010. These 24 surveys represent 16 unique businesses that participated in the Recommissioning Program (“participants”) from January 1, 2009 to July 1, 2010².

The participant surveys included questions regarding participant characteristics and firmographics, decision-making processes, sources of and preferences for program information, satisfaction with key aspects of the program and the application process, barriers to participation, the effect of the program on their decision to install qualifying equipment, and suggestions for program improvements.

First, we highlight key findings from the participant surveys. Then we present detailed findings in the following categories: Program Awareness, Program Design and Procedures, Participation Barriers, Program Satisfaction, and Firmographics.

5.2 KEY FINDINGS

The 24 Colorado participants interviewed included facilities supervisors, energy management engineers, and resource conversation managers at medical facilities, school districts, grocery stores, and office complexes. Twenty of the participants interviewed had only completed the recommissioning study and had not completed implementing the recommended measures. We asked follow-up questions regarding future plans of 14 of those 20 participants³. Of those 14, nine reported that they had either started or were planning to complete some of the recommended measures.

An additional three participants had conducted the study *and* completed the implementation of the opportunities identified and one had only implemented measures as part of the Fast Track program. Due to the small number of surveys with participants that have implemented measures, findings regarding implementation, satisfaction, and barriers are qualitative in nature.

Program satisfaction is high with a majority of participants rating their experience with the program satisfactorily. Financial factors (including lack of financing and investment funds) are the key barriers to moving forward with recommissioning projects. A large percentage of participants in Colorado reported that they filled out the program paperwork themselves without the aid of Xcel Energy or their provider. In Colorado, 12 participants filled out the pre-approval application themselves and 14 Colorado participants completed the study rebate application themselves.

² Some businesses participated in the program at multiple locations. Additionally, some cases were flagged as multiples across additional programs.

³ Questions regarding future plans for those that had only implemented measures were not included in the original CATI survey. Analysts re-contacted participants to discuss their future plans regarding implementation.



Key findings from the participant survey include:

- **Colorado participants are generally satisfied with results they have seen from participating in the program.** Participants reported very high levels of satisfaction with the opportunities covered by the program, the study conducted by their chosen provider, and the amount of energy savings identified in that study. In addition, participants requested few changes to the overall program design; 14 of the 24 interviewed would not change anything with the program.
- **Colorado participants, with a few exceptions, are satisfied with Xcel Energy and the program overall.** Participants reported high levels of satisfaction with both the program operations and Xcel Energy overall. In addition, none of the respondents mentioned Xcel Energy or the program staff as a barrier in conducting the studies or implementing the opportunities identified.
- **Long approval turn-around times are the most frustrating program component.** Qualitative responses suggest that participants would be less frustrated by the delays if there were consistent communication regarding estimated turn-around times. Participants report few other problems with any frequency.
- **Account managers are an effective way to raise program awareness among managed accounts.** Participants most frequently reported that they learned of the program from their account managers and that they preferred to learn about program information from their account managers. Participants preferred emails to direct telephone calls. In addition, direct mailings were frequently listed as a preferred method for learning about recommissioning or other programs. None of the participants learned about the program via social media (e.g., Facebook, Twitter) or preferred to use social media for new information.
- **Key barriers to program participation are financial in nature.** These barriers included a lack of available financing and funds for investment and other internal priorities for capital investment. Similar barriers, including the economic downturn, exist for those participants that have implemented or where planning on implementing the recommended opportunities. In addition, a small percentage of the participants rent their facility, providing a disincentive to invest in their location.

5.3 DETAILED FINDINGS

Detailed findings are presented in the following topic areas: Program Awareness, Program Design and Procedures, Participation Barriers, Program Satisfaction, and Customer Profile.

5.3.1 Program awareness

As recommissioning is a relatively new process in the energy efficiency portfolio and does not offer incentives for new equipment, raising awareness among potential customers is a challenge facing recommissioning programs throughout the country as found in the benchmarking task. When asked about how they learned about the assistance offered through the program, participants in the Colorado program most frequently reported communication with Xcel Energy directly. This communication, most often with their account managers (10 of 24 participants) took the form of phone conversation, in-person meetings, and previous experience with other programs. Participants also frequently reported that they searched for program information themselves (seven of 24 participants) either by referencing the Xcel Energy website or by placing a telephone call to their account manager. Other sources reported were online advertising campaigns, recommissioning providers, tenants, and trade association events or conferences. Table 5-1 details the frequency of the reported channel from which the participant heard about the program.

**Table 5-1. How Respondent Heard of Program**

How respondent heard of program	Responses (n=24)
Through account representative	10
Respondent searched for information	7
Online advertisement	2
Vendor or contractor	1
Tenants	1
Organizations to which respondent belongs	1
Other	3
Don't know	2

Source: Participant Survey, questions PA1 to PA1E

When asked about how they preferred to receive information about new programs or updates to existing programs, participants most frequently reported that they preferred emails or phone calls from their Xcel Energy account managers (10 participants) or via direct mail from Xcel Energy (six participants). Two participants reported that they prefer to visit Xcel Energy's website when looking for additional information. Other preferences included recommendations from vendors and Xcel Energy-sponsored events.

5.3.2 Program design and procedures

The Colorado Recommissioning Program is not a simple prescriptive, retrofit program nor does it offer turn-key solutions for potential participants. Participation requires that customers select recommissioning providers, fill out multiple applications (pre-approval, study, and implementation), and participate in the actual investigation by allowing providers to access their building. Therefore, how participants interact with the many "moving parts" of the program is critical to its success. In general, participants see themselves as very involved with the process with many of them selecting their own contractor (versus using the participating provider list) and filling out much of the paperwork (versus having the provider complete most of the applications). Despite the fact that customers report doing much of the work, they report very little dissatisfaction with the program's administrative burden.

Most participants used a competitive bid process (six participants) or a contractor with whom they have worked in the past (five participants) when selecting their recommissioning provider. Only two of the 23 participants reported that they used Xcel Energy's list of participating providers to select their contractor. Other participants used an Internet or White Pages search, a recommendation from a friend, or could not recall how they selected the contractor. Of those that had implemented identified measures, three of the four used an external contractor. One respondent used the same firm that conducted the study. Another used a competitive bid process while the remaining firm used a provider with which they had previous experience. Table 5-2 lists the frequency of provider selection methods.

**Table 5-2. Previous Method of Selecting Recommissioning Provider**

Method of selecting recommissioning provider	Responses (n=23)
Obtained competitive bid from providers	6
Used previous providers	5
From list of participating providers	2
Recommendation from friend or colleague	2
White pages or internet search	2
Other	2
Don't know	5

Source: Participant Survey, question IO1A

Xcel Energy's participating provider list is seen as useful by many of the participants: eleven of the 21 customers with recommissioning studies reported preferring a participating provider list.

A majority of participants stated that they filled out the program paperwork without the aid of Xcel Energy or provider staff. When filling out the pre-approval paperwork, 12 participants stated that either they or someone within their organization filled out the paperwork without mentioning Xcel Energy or the provider. Another three participants stated that the vendors completed the pre-approval application themselves while three additional participants stated that they filled it out with the help of the vendor. Participants also mentioned that a combination of Xcel Energy, vendor, and internal staff completed the pre-approval application as part of two projects.

Similarly, 13 of the 23 participants with completed studies reported that they completed the study rebate application without mentioning either Xcel Energy staff or their provider. Participants reported that the provider completed the study rebate application for six projects while Xcel Energy filled it out for another two. Implementation rebate applications were completed by combinations of the provider and Xcel Energy, the provider and internal staff, and the internal staff with assistance from Xcel Energy staff.

Though few participants reported dissatisfaction with the application process (only 5 of the 24 interviewed), several of those who did report dissatisfaction thought that the amount of information required was the most difficult part of the application process. They also reported difficulty with providing the technical specifications required (to both their providers and the program) and the time lapse between completing the application and getting approval from Xcel Energy.

A majority of participants reported that an Xcel Energy representative informed them of the rebate amount for the recommissioning study (16 of the 23 participants with studies). The remaining participants were informed by the recommissioning study provider (six participants) or they reported they calculated the amount themselves (only one participant). Likewise, three of the four participants reported that an Xcel Energy representative informed them of the rebate amount for implementation. Participants also reported that their provider informed them of the amount or they calculated it themselves. All participants reported that the study rebate amount they received was the same as the one that was determined initially (three participants reported that they did not know). Additionally, three of the participants that implemented measures reported that the implementation rebate was also the same as initially determined. Only one respondent reported that it was less, though he or she could not specify why it was less. Table 5-3 presents the findings regarding rebate levels.

**Table 5-3. Study and Implementation Rebate Information**

Who informed respondent of study rebate amount	Responses (n=23)
Xcel Energy rep	16
Study vendor	5
No one- figured it out themselves	1
Other	1
Don't know	1
Who informed respondent of implementation rebate amount	Responses (n=4)
Xcel energy rep	3
Contractor/vendor	1
No one- figured it out themselves	1
Actual study rebate in relation to estimate	Responses (n=23)
The same	20
Don't know	3
Actual implementation rebate in relation to estimate	Responses (n=4)
The same	3
Less	1

Source: Participant Survey, questions SA2A to SA3B

5.3.3 Participation barriers

Participants most often reported that they faced financial barriers when deciding on whether to conduct a recommissioning study. These barriers included a lack of available financing (seven participants), a lack of funds available for investment (three participants), and other internal priorities for capital investment (one participant). Another three participants reported that their internal staff, including engineers and their assistants, did not have the time available to participate in the study and implementation. However, ten participants reported no barriers to conducting the recommissioning study.

Of those participants that had only conducted a study at the time of the interview, when asked about their future plans, nine of 14 were either in the process of implementing some of the recommended measures or were going to start in the next 6 months. While four participants were unsure about their implementation plans (rating their likelihood of implementing the recommended measures between a 5 and a 7 out of 10), only one was not planning on implementing the measure. This participant reported that payback period was too long to make the implementation cost-effective. Other participants reported that a lack of financing, the economy, and the lack of funds were all barriers to implementing the measures. Four participants mentioned no barriers.

Similarly, participants that had implemented measures reported that they also faced financial barriers when deciding whether to implement the opportunities identified during the study. These financial barriers included a lack of financing (reported by two participants), other priorities for capital investment (reported by one participant). Only one respondent of the four who had implemented measures



reported that they face no barriers. Table 5-4 presents the findings on both the barriers to conducting the study and implementing the measures.

Table 5-4. Barriers to conducting studies and implementing measures

Barriers to conducting study	Responses (n=24)
None	10
Lack of financing	7
Lack of funds for investment	3
No time to participate	3
Other priorities for capital spending	1
Barriers to implementing measures	Responses (n=4)
Lack of financing	2
None	1
Other priorities for capital spending	1

Source: Participant Survey, questions SA7A and SA7B

5.3.4 Program satisfaction

In general, participants reported a satisfactory experience with the Recommissioning Program, Xcel Energy staff, and the various program components. All of the participants were satisfied with Xcel Energy as an organization. Every respondent rated Xcel Energy a “7” or above on a 10-point scale where zero was “very dissatisfied” and 10 was “very satisfied”. The average rating was 8.6 points. Likewise, a vast majority of the participants reported that they were satisfied with the Recommissioning Program overall; 23 of the 24 participants rated their satisfaction with the program positively with an average rating of 8.8 on a 0-10 point scale. Only one respondent did not rate his or her satisfaction with the program positively. This respondent reported that “[Xcel Energy was] very unclear that this was just a study. The separation between implementation and a report was unclear.” The respondent felt that the cost of the study was too great for just a report with no implementation included.

Participants were also very satisfied with many of the individual program components including the type of equipment that was eligible, the requirements for eligibility, their providers, and the results of the study including the report itself and the amount of energy savings identified in the report (all participants rated their satisfaction with those components positively). Participants also reported high levels of satisfaction with specific program components. Responses of 6 or higher were coded as “Satisfied”. The components with the highest satisfaction included:

- The support from Xcel Energy (22 participants satisfied)
- The implementation rebate amount (23 participants satisfied)
- The application process including pre-approval (22 participants satisfied with the pre-approval and 23 participants satisfied with the rebate application)
- The length of time it took from study start to end (22 participants satisfied)
- The program’s handling of questions and complaints (21 participants satisfied).

Two participants reported frustration with their account manager not returning calls or emails about rebates. Other participants were unsatisfied with the amount of effort required for the pre-approval



stating it was “*time consuming*” and that there is “*so much work involved to [complete the pre-approval paperwork].*”

Though still generally positive, participants were comparatively less satisfied with other components. When asked about the study rebate amount, four participants rated it unsatisfactorily. One participant reported that there was not a “*clear understanding of how they get the number for the rebate [amount]. [Xcel Energy] advertise more and it comes in at 30 percent.*” Though they had not all completed the implementation process, five participants were not satisfied with the length of time providers took to implement the measures identified from start to end. One respondent responsible for three projects stated that it was time consuming and that “*they had to go into every space and into the ceiling*”. Another respondent that was unsatisfied with the implementation timeframe reported that it was probably because of his or her chosen provider and not Xcel Energy. Finally, seven participants were unsatisfied with the amount of time it took to receive the rebates. When asked why the participants reported that it seemed like the money was delayed by approval and verification processes. Some of their responses were:

- “*I had to call several times. It took a couple of months. I had to provide a lot more information. Our [Xcel Energy] representative had to help me get them to release the money.*”
- “*It seems there was a lot of back and forth between the recommissioning agent and the [Xcel Energy] reviewer.*”
- “*I had to go over the account representative’s head to get the rebate to us. I had to go to Minnesota to get it. It took 2 months.*”

When asked what aspects of the program they would change (if any), 14 participants reported that they would not make any changes. This finding supports the generally high level of satisfaction reported by the program participants. Those participants that did request a change wanted a more streamlined application process or simplified application form (five of the 24 participants). One respondent suggested additional electronic forms that could be filled out online. Other requests were: additional types of equipment (though the participant did not specify what they wanted to see included); increasing the implementation rebate amount proportionate to the installation costs; and including additional Colorado companies on the participating provider list. Table 5-5 lists the suggestions for program improvement and the percentage of participants that requested it.

Table 5-5. Suggestions for program improvement

Suggestions to improve the program	Responses (n=24)
No change	14
Simplify program application process/form	5
Other	4
Include additional type of equipment	2
Increase rebate level	1

Source: Participant Survey, question SA8

5.3.5 Participant Customer Profile

As mentioned in the Key Findings, the participants interviewed include medical facilities, school districts, grocery stores, and office complexes. A majority of the participants owned the location where the recommissioning was conducted (17 of the 24 participants). The other participants either rented (three participants) or managed the facility (four participants). Many of these participants had performed additional actions to reduce their energy consumption at their facility in addition to recommissioning - only three participants had not conducted any additional actions. Most frequently, those participants



that had taken additional actions to reduce their energy consumption had installed lighting controls including occupancy sensors and time clocks (16 participants) and high efficiency lighting equipment (14 participants). Additionally, seven participants each had installed high efficiency heating, cooling, and ventilation equipment and five participants added controls to their HVAC equipment. Other actions the participants took included making improvements to the building envelope, conducting facility-wide energy awareness training, and upgrading their data centers so it was more energy efficient. Program influence on these actions and any associated savings are addressed in the Net-to-Gross section.

Of those three participants that had not taken any additional actions, they reported that either there was no need or that they were faced with budget constraints. Table 5-6 presents the findings on business characteristics including ownership and other actions taken at that location.

Table 5-6. Business Characteristics

Ownership status of space at location	Responses (n=24)
Own	17
Rent/lease	3
Manage property	4
Other energy efficient actions at location	Responses (n=24)
High efficiency lighting equipment	14
Lighting controls/occupancy sensors/time clocks	16
Other	12
High efficiency cooling equipment	7
High efficiency heating equipment	7
High efficiency ventilation equipment	7
Controls to HVAC systems	5
None	3
Change to HVAC schedule	2
Changes to building envelope	2
Facility-wide energy awareness training	2
Participated in other Xcel programs	1

Source: Participant Survey, questions F1 and F2

5.4 CONCLUSION

Overall, from the participants' perspective, Xcel Energy's Recommissioning Program is running well in Colorado. They are satisfied with the program and Xcel Energy overall. In addition, they are happy with their providers and, despite some desire to see larger incentives (a common request from program participants), they are satisfied with the opportunities identified during the facility investigation. Financial concerns, including the lack of financing and capital funds and the economic downturn, are the greatest barriers faced when deciding to conduct the study or implement the opportunities identified.

There is little evidence to suggest that the program's administrative burden is too great. A majority of the participants were satisfied with the application process overall. Those participants that did suggest changes acknowledged that they understood why the data were required. The most effective method



for increasing program satisfaction among participants would be to continue to work to reduce the amount of time program staff take to verify and approve projects. However, further research with potential nonparticipating customers may reveal additional opportunities for increasing program enrollment.



6. EVALUATION RESULTS—NONPARTICIPANT FINDINGS

This section presents the results of 94 quantitative surveys with program nonparticipants in Colorado. Of those, 70 were eligible for participation in the Recommissioning Program, but had not yet participated. We first present specific results pertaining to only Recommissioning Program nonparticipants, and then we present results detailing overarching issues affecting all Colorado Program nonparticipants.

6.1 INTRODUCTION

The objectives of nonparticipant survey were to understand program awareness, measure installation, decision-making factors, satisfaction with Xcel Energy, operating hours, and firmographics among customers who are eligible to participate in the Colorado Recommissioning program or the Colorado Motors and Drives program, but have not yet done so. The research was conducted using telephone surveys implemented from September 24, 2010 to November 1, 2010. The surveys averaged 15.5 minutes in length.

Respondents were first asked a series of questions to screen out those who were ineligible to participate in either the Recommissioning program or the Motors and Drives program. These screening questions included building size in square feet to screen out those who fall below the 50,000 square foot requirement for the Recommissioning program and whether they are current or recent participants in either program.

Seventy respondents were eligible for the Recommissioning program and had not yet participated ("Recommissioning nonparticipants"). Forty-four percent of the participants surveyed were managed Xcel Energy accounts (41 of 94). Fifty-three percent of Recommissioning nonparticipants were managed accounts. This higher level of managed accounts in recommissioning nonparticipants is likely due to the 50,000 square foot minimum requirement for the Recommissioning program as larger businesses are often more likely to be assigned an account representative.

In this section, we first highlight key findings from the nonparticipant surveys. This is followed by more detailed findings in the following categories: Program Awareness, Decision-Making Factors, Satisfaction, and Customer Profile.

6.2 KEY FINDINGS

Key findings from the nonparticipant survey include:

- For recommissioning nonparticipants, there is evidence to support the net-to-gross findings that some business customers are willing to conduct recommissioning without participating in a utility program. Twenty-seven percent of Recommissioning nonparticipants reported conducting recommissioning in the past two years (although when asked to specify what these activities entailed, some respondents referred to measures or activities which would not be considered recommissioning).
- Nonparticipants who had implemented or considered implementing recommissioning most frequently mentioned not being aware of the program's existence as their reason for not participating. As mentioned above, some recommissioning nonparticipants seemed confused as to what measures or actions are actually considered to be recommissioning. These two findings highlight the importance of thorough marketing and education specifically for recommissioning. While it was not a systematic issue, several respondents did mention that they did not participate because they felt the program was confusing or the application process



too long or burdensome. In addition, lack of capital was the number one external market barrier reported by a majority of respondents.

- While there may be some confusion in the customer base as far as what recommissioning actually entails, nearly half of recommissioning nonparticipants indicated that they were familiar with recommissioning. Therefore it is at least a term that is gaining recognition in the marketplace.
- Satisfaction with Xcel Energy among nonparticipants is high, especially among managed accounts. Most respondents (74 percent) stated that they were satisfied with Xcel Energy as their energy provider. Eighty-five percent of managed accounts and sixty-six percent of unmanaged accounts reported they were satisfied or very satisfied with Xcel Energy.
- Respondents reported that they most frequently refer to vendors or contractors when looking for more information on energy-efficient equipment (38 percent). If they were to implement energy-efficient equipment, 57 percent said they would contact a vendor or contractor. This indicates that trade ally participation is a key factor in funneling participants into the programs.
- Most respondents indicate that they have taken some type of action to reduce their energy use at their facility. Those who have not most frequently indicated that they did not feel that their facility currently needed to reduce energy.

When these findings are compared with the participant survey findings, there are several similarities and differences that are made clear. Satisfaction with Xcel Energy amongst Recommissioning program participants in Colorado is higher than Colorado nonparticipants; all Recommissioning program participants rated their satisfaction with Xcel Energy as a 7 or higher on a zero to ten scale. Comparatively, only 74 percent of Colorado nonparticipants rated their satisfaction with Xcel Energy as a 7 or higher. Also, similar to Recommissioning program participants, emails and mailings from Xcel Energy are the most frequently reported preferred methods of receiving program information amongst program nonparticipants. Finally, the most frequently reported barrier to installing new energy efficient equipment is a lack of capital or financing amongst nonparticipants - Recommissioning program participants reported the same when it comes to participating in the Recommissioning program. This may reflect the current economic climate, resulting in companies placing a lower priority on spending money on energy-efficiency.

6.3 DETAILED FINDINGS

6.3.1 Program Awareness

Regardless of program eligibility, most Colorado respondents indicated that they preferred to learn more about Xcel Energy programs through an email from Xcel Energy (37 percent), a direct mailing from Xcel Energy (20 percent), or a bill insert (12 percent) (Table 6-1). No respondents indicated that they preferred to receive information via social media (i.e. blogs, Facebook, Twitter).

**Table 6-1. How Respondent Prefers to Learn About Xcel Energy Programs.**

How respondent prefers to learn about Xcel Energy programs	Responses (n=94)	Percent
Email from Xcel Energy	35	37%
Stand-alone direct mail piece from Xcel Energy	19	20%
A flyer in your Xcel Energy bill	11	12%
Receiving a phone call from Xcel Account Manager	8	9%
Xcel Energy's website	6	6%
Workshop or Expo for customers	6	6%
Other (Specify)	9	10%

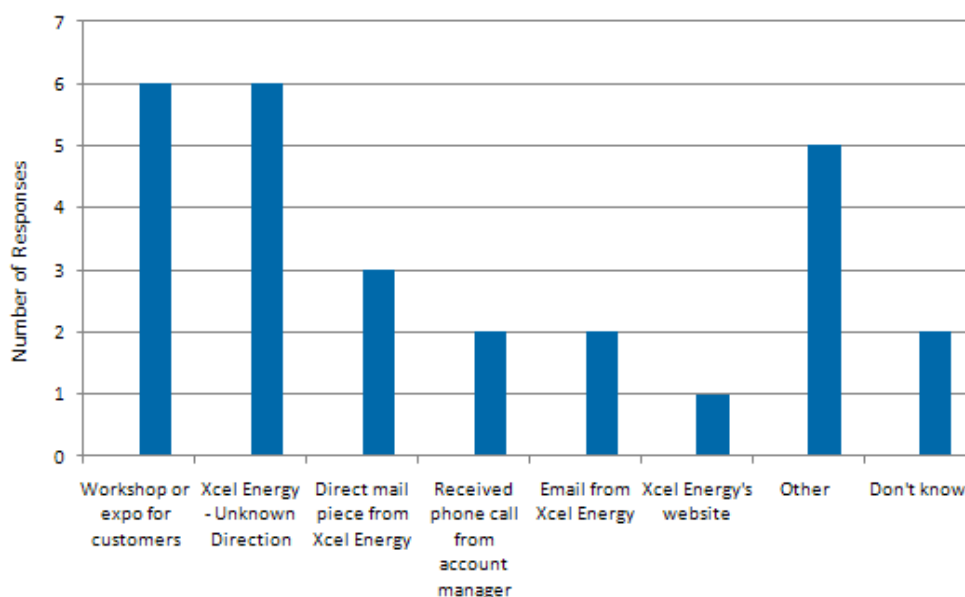
Source: Nonparticipant Survey, questions PA3-PA3E

The following presents findings specifically relating to recommissioning nonparticipants.

Recommissioning

Nearly half of Recommissioning nonparticipants (49 percent) in Colorado said they were familiar with recommissioning. Of those who were familiar with recommissioning, twenty-one had heard of the Xcel Energy Recommissioning program (64 percent). One additional respondent indicated that they were not familiar with recommissioning, but they had heard of the Recommissioning program. Of those who had heard of the Recommissioning program, 6 were unmanaged and 16 were managed accounts.

Of those Recommissioning nonparticipants who had heard of the program, nearly all heard of the program from a source at Xcel Energy (Figure 6-1). Furthermore, of those who had heard of the program, most stated that their source provided enough information to know how to participate in the program (18 of the 22).

**Figure 6-1. How Respondent Heard of Recommissioning Program (n=22).⁴**

Source: Nonparticipant Survey, questions PA1_2 to PA1E_2

All Recommissioning nonparticipants were asked whether they had considered or actually implemented recommissioning in the past two years (those who were unaware of what recommissioning is were provided with an explanation prior to asking this question). Twenty-seven percent of Recommissioning nonparticipants indicated that they had implemented a building recommissioning study or implemented recommissioning in the past two years, and another 16 percent indicated that they had considered implementing building recommissioning during that time (Table 6-2). Fifty-seven percent of Recommissioning nonparticipants reported that they had not considered conducting recommissioning at their facility in the past two years. Overall, these findings support the recommendations made in the net-to-gross memo for the Recommissioning program; there is evidence that some customers are willing to conduct recommissioning without the help or guidance of an Xcel Energy program, indicating at least some level of free-ridership.

Table 6-2. Considered or Has Implemented Recommissioning in Past 2 Years

Respondent considered or has implemented recommissioning in past 2 years	Responses (n = 70)	Percent
Yes, implemented	19	27%
Yes, considered	11	16%
No	40	57%

Source: Nonparticipant Survey, question PA4_2

⁴ “Unknown direction” refers to customers who indicated “Xcel Energy” in an open-ended response, but did not indicate which communication method was used (i.e. placing a phone call, receiving a phone call, receiving an email, etc).

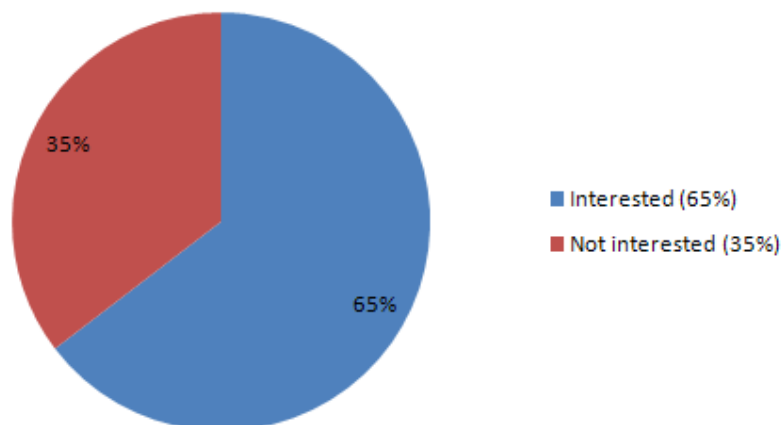


Respondents who indicated they considered or had implemented recommissioning in the past 2 years were asked to specify exactly what they had done or considered having done. Of the nineteen respondents who indicated that they had implemented recommissioning, five specifically mentioned that they had conducted a recommissioning study in the past 2 years, and six mentioned that they had implemented recommissioning in the past 2 years, indicating knowledge of what recommissioning entails. Additionally, of the eleven who indicated that they had considered implementing recommissioning, eight stated that they had specifically considered conducting a recommissioning study, again indicating an understanding of the recommissioning process. However, upon review of the “Other” responses, several respondents gave responses which would not be considered to be recommissioning (such as installing motion sensors or replacing old equipment). Other respondents indicated that they “tuned-up” their systems themselves or indicated that they have “recommissioned” one specific system, such as the HVAC system. This indicates that there is still confusion in the business sector as to what the recommissioning process truly is.

Nine respondents indicated that they considered participating in the Recommissioning program, while only one noted that they actually applied to participate. When those who had implemented or considered implementing recommissioning were asked why they decided not to go through the Recommissioning program, six of the thirty respondents replied that they did not know of the Recommissioning program at the time, and three mentioned that the program was not available to them. Three mentioned the long approval process, while another two mentioned that overall cost was a barrier. Of those who indicated “Other,” several indicated that they either did not feel the need to recommission their building at the moment, or they just were not able to do it yet because of priority levels or corporate approval. Other responses include:

- *“Just complexity, and working with people who were very familiar with the design and our operational requirements.”*
- *“It was done through an independent consultant” and “We’re already doing it with another company.”*

Nearly two-thirds (65 percent) of Recommissioning nonparticipants indicated that they would be interested in participating in the Recommissioning program in the future (rating of seven or above on a ten point scale) (Figure 6-2). Of those who gave a score of less than seven, four indicated that they needed the equipment immediately, and two indicated that the approval process would take too long. Three respondents indicated that the program requirements were difficult to understand. One respondent mentioned the rebate amount not being important, and one respondent mentioned the application process being too burdensome. Responses collected in the “Other” category include: all energy efficiency work is being done internally, the building is new or is being rebuilt, corporate or management makes those decisions, and the company feels they are already up-to-date on energy efficiency.

**Figure 6-2. Interest in Participating in Recommissioning in the Future (n=65).**

Source: Nonparticipant Survey, question PA8_2

Next, we present overarching findings affecting all program nonparticipants in Colorado.

6.3.2 Decision Making Factors

Most frequently, respondents reported that they look to contractors or vendors when they want to gather more information on energy-efficient equipment and processes (38 percent). Nineteen percent stated that they would reference Xcel Energy, either through their website, or by contacting their account manager or the Business Solutions Center.

When asked who they would contact if they wanted to implement energy efficient equipment, fifty-seven percent said they would contact a contractor or a vendor. Another twenty-one percent stated that they would refer to internal staff, and ten percent would contact Xcel Energy (Table 6-3).

Table 6-3. Who Respondent Would Contact to Implement Energy Efficient Equipment

Who would contact to implement equipment/process	Responses (n = 94)	Percent
Contractor/vendor	54	57%
Internal staff	20	21%
Engineer	10	11%
Xcel Energy	9	10%
Manufacturer	6	6%
Other	8	9%
Don't know	5	5%

Source: Nonparticipant Survey, question I0b

When asked to rate the importance of several factors on their decision to install energy-efficiency equipment (on a scale where zero is not at all important and ten is very important), respondents rated compatibility with existing equipment the highest (9.1), followed closely by the efficiency level of equipment (9.0). Life of equipment, initial purchase cost, and operating cost all were given a rating of



8.9. Lowest in importance were the recommendation of a utility and a recommendation of a vendor or supplier, given ratings of 7.5 and 7.2 respectively (Table 6-4).

Table 6-4. Factors Influential to Installing Energy-Efficient Equipment

Influencing factors	Mean	n
Compatibility with existing equipment	9.1	91
Efficiency level of equipment	9.0	94
Life of equipment	8.9	93
Initial purchase cost	8.9	93
Operating cost	8.9	94
Length of payback period	8.7	91
Environmental concerns	8.2	94
Availability of a program rebate	8.1	94
Age or condition of existing equipment	7.9	92
If equipment is readily available	7.8	92
Recommendation of utility	7.5	92
Recommendation of contractor or supplier	7.2	94

Source: Nonparticipant Survey, questions I1a to I1m

Twenty-four percent of respondents mentioned that their company has policies in place which mandate the use of energy efficient equipment. As shown in Table 6-5, when asked what barriers are in the way of installing new equipment, a majority of respondents (74 percent) mentioned a lack of capital. Other barriers mentioned include compatibility with existing equipment (10 percent), concerns about return on investment (7 percent), conflicts with the long-term budget (6 percent), and issues with the approval of decision-makers (5 percent).

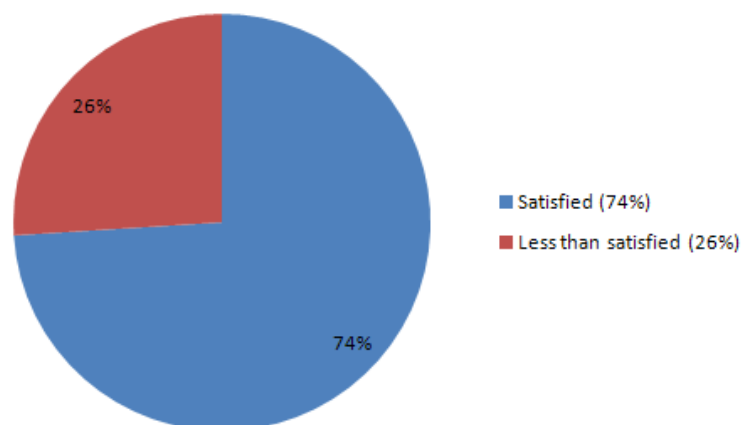
**Table 6-5. Barriers to Installing New Equipment (n = 94).**

Barriers to installing new equipment	Responses (n=94)	Percent
Lack of capital	70	74%
Compatibility with existing equipment	9	10%
Uncertain of return on investment	7	7%
Longer term budget	6	6%
Approval by decision-makers	5	5%
None	4	4%
Time constraints	2	2%
Lack of resources to implement	2	2%
Availability	2	2%
Contractors not familiar with measures	1	1%
Other	12	13%
Don't know	3	3%

Source: Nonparticipant Survey, question I4.

6.3.3 Satisfaction

Overall, program nonparticipants reported high levels of satisfaction with Xcel Energy as their energy provider. Nearly three-quarters of respondents (74 percent) rated their satisfaction with Xcel Energy as a seven or higher on a ten-point scale, where zero is not at all satisfied and ten is very satisfied (Figure 6-3). Eighty-five percent of managed accounts and sixty-six percent of unmanaged accounts reported they were satisfied or very satisfied with Xcel Energy. The mean of all responses was 7.2.

Figure 6-3. Satisfaction with Xcel Energy

Source: Nonparticipant Survey, question SA8



6.3.4 Nonparticipant Customer Profile

Most respondents own their facility (75 percent) with twenty-one percent renting, and two percent managing the property. Two percent mentioned that they own some of their property and lease other parts.

When asked if they had taken any additional actions to reduce their energy use at their facility in the past few years, fifty-three percent of respondents reported installing high-efficiency lighting equipment. Respondents also frequently mentioned installing lighting controls (22 percent) and high-efficiency heating equipment (15 percent).

Nineteen percent of respondents reported not taking any actions within the past few years to reduce their energy use. When asked why they had not taken action to reduce their energy use, ten respondents said that there was no need for them to do so at the time. Respondents also mentioned disruption to business operations, high initial cost and budget constraints, uncertainty about which equipment to install, and aesthetics as reasons for not taking action to reduce their energy use (Table 6-6).

Table 6-6. Reason No Other Actions Taken

Reason no other actions taken	Responses (n=18)
No need	10
Disruption to business operations	3
High initial cost	2
Budget constraints	2
Don't know what to do	1
Need for certain look/feel (aesthetics)	1
Other	3

Source: Nonparticipant Survey, question F7

6.4 CONCLUSION

Overall, program nonparticipants indicated a high level of satisfaction with Xcel Energy, and most would be interested in participating in the program at some point in the future. A major barrier to measure installation is a lack of capital. The findings in this memorandum indicate that while program information is reaching some customers, there are still marketing opportunities within the target markets. These findings also support the recommendations made in the net-to-gross memo, as a small group of respondents indicate that they have considered or have already implemented energy-efficient measures or actions without participating in a utility program.



7. EVALUATION RESULTS—BENCHMARKING

This section presents the results of a benchmarking study of Recommissioning⁵ programs.

7.1 INTRODUCTION

The benchmarking study identified and characterized other utility programs of particular interest to Xcel Energy. The research focused on gathering the following types of information:

- Program goals, objectives, and scope: Are the goals, objectives, and program scope consistent with Xcel Energy's program?
- Effectiveness of the program in meeting goals and objectives: What has worked well and what has been a problem? What external influences may be influencing their programs and how are they addressing them?
- Key elements of program design: What are the structure, amount and type of incentive, and eligibility requirements?
- Recommissioning providers: How does the program leverage the trade ally market infrastructure? What technical, sales support or incentives are provided to trade allies?
- Quantification of program impacts: How do they determine their baseline and technical assumptions and net-to-gross calculations?
- Marketing and recruitment of customers: How do they market and recruit customers? How do you engage small business in recommissioning? Is social media marketing effective in reaching these customers?

We conducted our benchmarking research using a combination of Internet searches and telephone interviews with utility program managers. The Internet research provided program background information for 10 programs. The evaluation team created a summary table of the Internet research, which the Xcel Energy product manager reviewed to identify programs of most interest for follow-up interviews. Evaluators next conducted six in-depth interviews with program managers to obtain further insight into program design and implementation.

As we included programs from across the United States and Canada in our benchmarking, this report section applies to Xcel Energy's Recommissioning program in Colorado.

7.2 KEY FINDINGS

Recommissioning programs are fairly new additions to utilities' business energy efficiency portfolios—all of the benchmarked programs were added within the last five years. However, most programs, while new, are successful in meeting set savings targets despite, and in some cases, because of, the recent economic downturn. Several program managers speculated that the decline in new construction as a result of the slow economy has made recommissioning existing buildings more attractive for both trade allies and customers.

⁵ Programs included in our benchmarking research used several different terms to refer to the process of commissioning an existing building including "recommissioning", "retro-commissioning", "commercial building optimization", and "commissioning of existing buildings". For clarity, we will use the term "recommissioning".

In general, Xcel Energy's Recommissioning programs are similar in design to the other recommissioning programs included in the study. A majority of the programs use a phased approach to encouraging recommissioning, offering incentives to customers as portions of the project are completed. These incentives are often a percentage of the cost incurred with upper limits. All of the programs also have minimum eligibility requirements in terms of a facility's square footage or an energy consumption floor.

Nine of the ten benchmarked programs have some type of provider screening process to provide customers with recommended or pre-qualified providers. Some of the programs require customers use one of these providers, while others do not. Most of the utilities regularly monitor the performance of program providers.

In terms of evaluating program impacts, all programs stated that they verified the implementation of the opportunities identified for all projects that completed participation. For most utilities, this verification documented that a measure was performed and that was still operating as intended by the recommissioning study. Only three of the ten programs included in the benchmarking study apply net-to-gross savings (NTG) ratios to verified gross savings. In all three cases, the NTG was not specifically determined for the recommissioning programs, but was instead the NTG for a larger business portfolio of programs⁶. The reported NTG ratios applied for the three programs ranged from 60 to 70 percent. Programs apply different NTG to natural gas and electric gross savings.

The benchmarking study identified the following best practices:

- **Utilizing a list of participating, preferred, or pre-approved providers gives program managers more control over the recommissioning process.** Almost all of the programs have a qualification process that recommissioning providers must go through before they can participate in the program. Program managers found this screening very useful in ensuring that unqualified providers do not get into the program and that under-performing providers are removed from the list.
- **Recommissioning providers and account managers are the most effective means of reaching new customers.** While programs did market their recommissioning offerings via websites and direct mail campaigns and at trade shows and conventions, managers stated that many of their leads come from established relationships that either recommissioning providers or account managers have developed with customers. None of the program managers have found social media marketing to be an effective way of reaching potential recommissioning customers.
- **With some exceptions, small businesses are not good candidates for this type of program.** Program managers stated that, as a rule of thumb, including small businesses in a conventional recommissioning program is not cost effective. Most programs had a minimum energy-use or facility size requirement for program participation. Programs that had effectively engaged smaller customers use a "recommissioning-light" model in which providers use a systematic or "checklist" approach to facility investigation. This model is similar to the Refrigeration Recommissioning program that Xcel Energy offers.

⁶ An SBW report for the CPUC investor-owned utilities specifies NTG ratios based on primary research. However, conversations with California RCx program managers suggest that portfolio-level NTG ratios are used for their programs.



7.3 DETAILED FINDINGS

This section first includes a summary table of the benchmarking results. Detailed findings are then presented in the following topic areas: program scope and goals, program design and incentives, engagement with recommissioning providers, program impacts, and program recruitment and participation.

Table 7-1 summarizes study information from the Internet research as well as general information from the program manager interviews. Utility programs covered only in the Internet research include Pacific Gas & Electric (PG&E), Southern California Edison (SCE), New York State ERDA, and Rocky Mountain Power. Utility programs with both Internet research and program manager interviews include Wisconsin's Focus on Energy, Puget Sound Energy, Efficiency Vermont, Center Point Energy, Manitoba Hydro, and ComEd.



Table 7-1. Summary Information from Internet Research and Program Manager Interviews

Organization Name	Program Name	Territory	Launched	Goals	Incentive Structure	Incentive amount	Eligibility Requirements	Calculation methods	Net-to-gross applied?	Trade Ally engagement	Tools provided to trade allies
Focus on Energy	Large Commercial Building Initiative	State of Wisconsin	2008	Set by sq. ft. served.	Paid after study and again after implementation. Bonus incentive for completion in 1 year.	Up to 100% w/ \$7500 cap for planning, 85% for study. \$5000 bonus (currently suspended).	Minimum \$300,000 in energy consumption annually. "Tune-ups" for smaller buildings.	Bin data or calibrated models depending on the amount of savings identified.	Yes	Has recommended vendors.	Manual, references, self-assessment form, testing and diagnostic plan, and report guide.
Puget Sound Energy	Building Energy Optimization	Puget Sound area in Washington state	2009	10,000 MWhs & 120,000 therms in 2010-11	No-cost scoping study. Investigation & implementation rebates based on sq. ft.	Scoping study covered 100% up to \$2 or 3K. Implementation @ \$.10 per sq. ft. Bonus for fast implementation.	Targets only buildings with 50,000 sq. ft. or more	Bin calculations and simple formulas. Discourage modeling.	No	Have pre-qualified allies. Comprehensive application process for providers (individuals, not firms).	Guidelines; training and shadowing on first job.
Efficiency Vermont	Commissioning for Existing Buildings	State of Vermont	2008	None	Project by project. Goal is to create positive cash flow in first 12 months.	Custom incentives to give customer profit in 1 yr: generally \$60-70/MWh.	None.	Modeling software: eQuest or Carrier's HAP.	No	Knows five firms that do RCx in Vermont; no formal screening process.	RFP template to use with customers.



Organization Name	Program Name	Territory	Launched	Goals	Incentive Structure	Incentive amount	Eligibility Requirements	Calculation methods	Net-to-gross applied?	Trade Ally engagement	Tools provided to trade allies
Center Point Energy	Retro-commissioning	Houston metropolitan area	2005	Unknown. Set by mgmt.	No-cost study & implementation incentive based on savings.	Measures implemented in <1 yr. get \$.017 per kWh, up to \$10K. Early implementation bonus.	Minimum of 400,000 sq. ft. facility.	Subcontractor verifies savings from providers.	No	Has pre-qualified allies who have gone through an application and interview.	Measure-based spreadsheet that estimates savings for building owners.
Manitoba Hydro	Commercial Building Optimization	Province of Manitoba	2006	492,120 therms and 6.34 GWh over next 5 years.	Customer obligated to implement all measures with <2 yr. payback. Persistence bonus.	\$2500 for scoping. Incentive of \$.014 per sq. ft. for investigation & \$.05 per sq. ft. for measures w/ >2 yr. payback. Up to \$5000 for persistence training.	Targets only commercial facilities over 50,000 sq. ft.	Done by external consultants, then reviewed by utility's engineers.	No	Has six trade allies. Must complete RFQ to be listed but customer does not have to use pre-qualified provider.	Training.
ComEd	Retro-commissioning	Northern Illinois	2007	Unknown. Set by mgmt.	No-cost study. Customer pays study cost if measures not implemented.	The no-cost study is the incentive.	Peak demand floor of 500 kW or 150,000 sq ft.	No modeling. Providers must use spreadsheet tools and calculators.	Evaluated but not applied.	Must be a pre-approved RCx service provider to participate. Allies are evaluated on ComEd \$/kWh.	A few spreadsheet tools, not described.



Organization Name	Program Name	Territory	Launched	Goals	Incentive Structure	Incentive amount	Eligibility Requirements	Calculation methods	Net-to-gross applied?	Trade Ally engagement	Tools provided to trade allies
PG&E	Retro-commissioning	Northern California	Unknown	Unknown	Paid directly to customer for implementation.	\$0.09/kWh, \$1.00/therm, and \$100/on-peak kW, capped at 50% of the measure cost.	At least 100,000 conditioned sq. ft. or 2,000,000 kWh or 50,000 therms annually	Existing facility serves as baseline	Yes. Evaluated between .76 and .86.	Has recommended vendors	Guidelines, investigation & verification handbook, case studies.
SCE	Commercial RCx	Southern California	Unknown	Unknown	Paid directly to customer for implementation.	Unknown	Targets only customers with at least 25,000 sq. ft. of conditioned space	Unknown	Yes. Evaluated between .78 and .91.	Has recommended vendors	Unknown
NYSERDA	FlexTech	New York state	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Has recommended vendors.	Guideline handbook, sample RCx plans, reports, and testing documents.
Rocky Mountain Power	Retro-commissioning	Portions of Utah, Wyoming, and Idaho	Unknown	Unknown	Unknown	Unknown	Targets only customers with summer peak demand of 300 kW or more	Unknown	Unknown	Has recommended vendors.	Unknown



7.3.1 Program scope and goals

All of the programs included in our research had recently launched. The most mature program was Manitoba Hydro's, which first launched in 2006. In other situations, prior to an official program offering, recommissioning services were offered as part of a broader program (usually a "custom" commercial and industrial program).

With only one exception, recommissioning program goals are set by regulatory bodies at the sector level with program-specific goals assigned by utility management staff. Only one program, Efficiency Vermont's Commissioning for Existing Buildings, did not have formal savings or participation goals. For those programs that did have goals, they most often took the form of kW, kWh, and therm savings goals on an annual basis. In addition, most programs reported that they were successful in reaching those goals; five of six programs interviewed reported good progress to reaching 2010 goals (both formal and informal).

When asked about future challenges and program barriers, the programs mentioned the economic downturn, a lack of qualified providers, and a lack of awareness about recommissioning as major issues. However, several of the utilities mentioned an indirect benefit of the economic downturn: as the willingness to invest in new construction has decreased, customers are looking for ways to cut costs in existing buildings. Therefore, a customer that may have previously passed on recommissioning in favor of a new building is now participating in the program as construction plans have been delayed. In addition, many engineering firms are turning to recommissioning as a new source of revenue in the economic downturn adding to the pool of qualified recommissioning providers. One program manager predicted that as the economy improves and new construction projects increase, these new providers would move back into new construction, as those projects are typically more profitable than recommissioning work. This shift would again limit the number of qualified providers available in a given market in the future.

7.3.2 Program design and incentives

Based on our research, recommissioning programs generally fall into two models. The first model, employed by Xcel Energy, incentivizes a portion of the cost for individual phases. These phases are typically some variation of scoping, investigation, and implementation. The incentives are often a fixed percentage of the cost of that phase with an upper limit. The incentives are paid either at the end of each phase or at the end of the entire project. A majority of the programs included in our research use this model. A benefit of this model is that incentives for each step create cash flow for the customer and make the return-on-investment more attractive. In addition, the customer has "*some skin in the game*" and keeps a stake in participation. The problem, however, is that a program may fund an investigation that identifies opportunities that are never implemented.

The second model provides no-cost recommissioning investigation to the customer. All other costs, except any costs associated with verification, are paid by the customer. In addition, if identified opportunities are not implemented within a certain timeframe, the customer is then responsible for the entire cost of the investigation. This model is employed by ComEd in Illinois and Center Point Energy in Texas (though Center Point also has a performance incentive based on implemented savings). ComEd's program administrator (a subcontractor employed by the utility) stated that the main benefit of this model is that customers are comfortable with the straight-forward approach. A customer does not have a commitment to implement any measures until they see the results of the investigation. However, the administrator acknowledges that the inherent risk that customers face with this model is that the recommissioning study may not identify any measures worth implementing during the investigation. To mitigate this risk, the program includes an application phase with on-site or telephone interviews to determine the potential for recommissioning activities and any associated savings.



Programs encouraged the implementation of identified opportunities in different manners. Several programs included a bonus or performance incentive for implementing identified opportunities in a timely fashion or achieving a certain percentage of savings in the first year. Focus on Energy pays a bonus of \$5000 if the project is completed within nine months⁷. The manager stated that while it has decreased the implementation timeframe, it has also decreased savings as investigations are cut short and do not have the desired depth or breadth. Puget Sound Energy pays the remaining portion of the investigation cost (30 percent of the cost for customer with electric and natural gas service) if a customer achieves 10 percent verified savings within the first year. Other programs required that the measures be implemented in a certain timeframe to receive any incentive. Center Point Energy required that the measures be implemented within 18 months to receive any incentive. ComEd (which doesn't offer implementation incentives) requires the customer to pay the study provider's fees in full if they do not implement the measures in a specific timeframe. ComEd reported a high degree of success with this method; an estimated 90 percent of projects implemented measures within the agreed upon timeframe.

7.3.3 Engagement with recommissioning providers

Programs interacted with trade allies in a variety of ways, with the level of engagement ranging from exhaustive to informal. Three of the six programs interviewed discussed a formal RFQ process in which potential recommissioning providers submitted qualifications including examples of resumes and examples of past work. One program reported a lengthy application process that included personal interviews, background checks, and a probationary period during which the provider was closely shadowed. Another program did not require a qualification process but instead had developed close relationships with all of the providers in the relevant market.

Programs also consistently provided recommissioning providers with guidelines about what was expected as part of the recommissioning process. These guidelines took the form of training, sample reports, RFP templates and checklists. Program managers stated that these steps along with periodic review of providers' performance (based on savings per dollar spent and customer satisfaction) were effective in maintaining a high level of quality amongst the providers.

In general, programs reported few problems with providers submitting studies with poor documentation or non-comprehensive evaluations though some managers reported experiencing these difficulties in the past. Managers credited this success to several different processes. Some programs credit the clear documentation they provide to the providers. Efficiency Vermont, which has developed an RFP template with the five firms in its territory, states that this document provides a scope of work that, when shared with customers, clearly defines what will be included in the studies. Other programs, including Puget Sound Energy, Focus on Energy, and ComEd, regularly review the performance of recommissioning providers on their pre-approved list. If a provider is under-performing, managers can remove them from the list.

7.3.4 Program impacts

All programs stated that they verified the implementation of the opportunities identified for all projects that completed participation. For most utilities, this verification documented that a measure was performed and that it was still operating as intended as documented in the recommissioning study. Several programs performed detailed verification in situations that required greater rigor. For example, if a building was scheduled to receive a capital replacement or renovation shortly after the recommissioning but the recommissioning was still deemed appropriate, metering would need to be

⁷ This bonus was suspended for the remainder of 2010 due to budget constraints.



conducted to “back out” the impact of the new equipment. No program mentioned a savings threshold for ex-post metering.

Savings are estimated using a variety of methods, the most common being temperature bin calculations and energy modeling. Some of the energy models that program managers listed as being used by providers were eQuest and Carrier’s Hourly Analysis Program (HAP). However, several of the programs stated that they discouraged the use of modeling in favor of spreadsheets and simple formulas. Using unlocked Excel sheets allows for easier review of the individual measures and what inputs the providers used in calculating the savings estimates.

Five of the six programs interviewed did not use any net-to-gross or spillover adjustments in their savings assumptions. That is, these programs used gross verified savings for program reporting and planning. Three of the ten programs reviewed did use net-to-gross ratios when calculating their verified gross savings: Wisconsin’s Focus on Energy and the California IOU’s PG&E and SCE. According to our interview with Focus on Energy staff, the overall Business Programs ratio is applied to the recommissioning program. That ratio, evaluated in 2009, is calculated for kWh savings, kW savings, and therms savings and is 66.6 percent, 59.1 percent, and 59.5 percent respectively⁸. California’s ratio is 70 percent determined as part of the 2006-2008 evaluation. In both situations, the recommissioning program was not evaluated separately, instead being evaluated in tandem with the portfolio of DSM program for large customers. Though they would not expand, both program managers expressed dissatisfaction with this methodology.

7.3.5 Program recruitment and participation

All of the programs stated that the providers were the most effective method for bringing in new recommissioning customers. As it is often in their interest to increase the level of recommissioning in their market, the providers are often the best at educating the customer on the program and the process in general. In addition, they may already have existing relationships with key stakeholders at an organization.

Some programs mentioned concerns with a heavy reliance on recommissioning providers marketing their programs. First, some providers are only using it as “a foot in the door” to sell capital renovation projects. Program managers are concerned that providers that are only interested in equipment sales provide less comprehensive recommissioning services. Second, providers will follow the market. As mentioned earlier, if some providers work in both new construction and existing buildings, as new construction work increases, they will leave recommissioning programs in favor of the more profitable new construction work. Finally, if a provider only conducts recommissioning, they do not often bring existing customers to the program. A contractor that conducts recommissioning and other work (e.g., building maintenance) brings their existing stock of clients to the program when they join.

The other effective method mentioned for recruiting new customers was a utility’s account management team. Again, these staff are knowledgeable of the program and often have existing relationships with key stakeholders within an organization. However, they only work with high-energy use customers. No program reported systematic use of social media (e.g. Facebook, YouTube, Twitter) in reaching potential recommissioning customers and were skeptical that such channels would be an effective way to reach decision-makers in large facilities.

All programs except one had either energy consumption floors or facility size requirements for participation (though in most cases, these requirements could be ignored for unique situations). While

⁸ Miriam L. Goldberg, J. Ryan Barry, Tammy Kuiken, Nicole Buccitelli, John Dendy, and Ben Jones; KEMA Inc. *Business Programs Impact Evaluation Report: Last Quarter of the 18-month Contract Period and First Three Quarters of Calendar Year 2009*.



several programs mentioned that working with small businesses was an interest, no one had established methods as to how to cost-effectively engage them; the payback period of conducting a comprehensive recommissioning of a smaller facility was simply too great. Those that had worked with small businesses stated that a “toned-down” version of recommissioning was needed. This version would use a far more systematic approach to the investigation, checking common problems found in smaller buildings while ignoring more labor-intensive measures. The goal of a reduced recommissioning effort is to decrease the cost of the study and the time from start to finish.

7.4 CONCLUSION

The benchmarking research finds that Xcel Energy is consistent with many of the recommissioning programs available throughout the United States and Canada. In addition, by choosing to estimate any free-ridership and spillover in the Recommissioning program separately from other business programs, Xcel Energy is taking a progressive step forward in program evaluation.

Our benchmarking identified that most programs set goals at the sector-level (i.e., commercial, residential, etc.) and we were unable to obtain data on specific goals for recommissioning program. Likewise, comparing program goals across territories is difficult due to different markets and varying levels of program maturity.

At this point, possible recommendations include a more stringent provider application process to allow product managers more control over the process and a bonus or performance based incentive to encourage faster implementation. However, these recommendations should be considered preliminary until the benchmarking findings are compared with data gathered during the trade ally, participant, and non-participant interviews.



8. EVALUATION RESULTS—GROSS AND NET SAVINGS

This section presents the results of the gross savings evaluation conducted as a part of the Xcel Energy Business Demand-Side Management program evaluation of the Recommissioning program.

8.1 INTRODUCTION

This section provides high-level key findings and detailed results from the engineering review of Xcel Energy's Recommissioning Program for Colorado.

Recommissioning is a systematic process of reviewing the operation of a building's HVAC, electrical, and control systems to locate and identify equipment that, due to performance degradation, controls change, or sensor failure, is operating in a manner inconsistent with the design intent or in an inefficient manner. Recommissioning typically involves modifications to existing systems rather than replacement of existing equipment or systems.

To determine the accuracy of the savings estimates, 19 projects for Colorado were reviewed. For each project, the report was reviewed along with the supplied calculations. The calculations were reviewed for technical accuracy, input errors, and consistency with the report. For a subset of five projects, an onsite inspection was performed. For the onsite inspection, the customer was interviewed, the equipment was inspected, and when possible, metered data from the customer EMS system was collected. In addition, the billed usage history for the facility was reviewed to verify savings. The collected information was then used to modify the calculations.

8.2 KEY FINDINGS

- None of the projects reviewed for the current program year utilize the recommissioning calculator. It is expected that the use of the calculator will increase the consistency and potentially increase the accuracy of the claimed savings.
- The level of documentation supplied for the reviewed projects varied significantly. In many cases, the level of documentation found was insufficient to verify the claimed savings.
- The depth and accuracy of the analysis varied significantly. However, the majority of the analyses reviewed were reasonable and acceptable.
- Based on the sample reviewed, the Ex-Post to Ex-Ante Gross Savings Ratio for electrical savings is 87% and gas savings is 105%.

8.3 DETAILED FINDINGS

To evaluate the Colorado Recommissioning program, a total of 19 projects were desk reviewed. The desk reviews included a review of the supplied report and calculations, a review of the bill histories, as well as a review of the inputs used to determine the savings. Within the 19 projects that were desk reviewed, an onsite inspection and in-depth evaluation was completed for 5 selected projects. The projects were selected based on a combination of the savings that were associated with the project as well as the uncertainty in the savings estimates. Backup projects were selected to replace projects where a selected onsite could not be completed due customer unwillingness or scheduling considerations.

To evaluate the Colorado Recommissioning program, a total of 19 projects were desk reviewed. None of the reviewed projects utilized the recommissioning calculator. All 19 projects were completed using custom calculations. Five projects had onsites completed. During the onsite inspection, the project



scope was verified through customer interviews, equipment inspection, control setpoint checks, and collection of metered data from the customer EMS system, when available.

The savings for each project were then modified based on the results of the evaluation to create an Ex-Post to Ex-Ante Gross Savings Ratio for the sample. The Ex-Post to Ex-Ante Gross Savings Ratio was defined as the sum of the sample verified savings (ex post) divided by the claimed (ex ante) savings. As shown in Table 8-1 below, the realized savings for peak demand reduction (kW) and natural gas (therms) were higher than the claimed savings. The realized savings for electrical energy (kWh) was less than the claimed savings.

Table 8-1. Sample Savings and Savings Ratios

Project ID	Ex Ante				Ex Post				Savings Ratio		
	kW-Peak	kW-M	kWh	therms	kW-Peak	kW-M	kWh	therms	kW-Peak	kWh	therms
RCO-1	2.23	6.99	61,273		2.23	6.99	61,273		100.0%	100.0%	
RCO-2	3.04	8.11	71,019		3.04	8.11	71,019		100.0%	100.0%	
RCO-3	0.19	0.60	5,234		0.19	0.60	5,234		100.0%	100.0%	
RCO-4	1.55	4.78	41,855		1.55	4.78	41,855		100.0%	100.0%	
RCO-5	0.66	1.72	15,061		0.66	1.72	15,061		100.0%	100.0%	
RCO-6	0.78	2.46	21,550		0.78	2.46	21,550		100.0%	100.0%	
RCO-7	3.12	8.86	77,582		3.12	8.86	77,582		100.0%	100.0%	
RCO-8	3.31	8.82	74,698		3.31	8.82	74,698		100.0%	100.0%	
RCO-9	3.66	7.66	49,168		3.66	7.66	49,168		100.0%	100.0%	
RCO-10		20.38	232,133			25.29	221,569			95.4%	
RCO-11	64.00	88.00	280,390		64.00	88.00	280,390		100.0%	100.0%	
RCO-12	178.73	222.55	533,056		210.27	220.77	485,213		117.6%	91.0%	
RCO-13	33.15	78.13	541,032			28.26	255,816		0.0%	47.3%	
RCO-14	19.55	89.19	816,997		23.09	88.22	629,988		118.1%	77.1%	
RCO-15	80.38	247.82	2,085,755		80.38	247.82	2,085,755		100.0%	100.0%	
RCO-16											
RCO-17	67.41	86.77	252,768	2,700	67.41	86.77	277,352	2,700	100.0%	109.7%	100.0%
RCO-18		55.33	609,807	18,530	5.55	41.58	364,276	17,164		59.7%	92.6%
RCO-19	28.22	45.88	168,208	25,820	5.97	10.98	96,176	29,510	21.2%	57.2%	114.3%
RCO-20		33.14	377,359			33.14	377,359			100.0%	
Total	489.98	1,017.19	6,314,945	47,050	475.21	920.84	5,491,334	49,374	97.0%	87.0%	104.9%

The Ex-Post to Ex-Ante Gross Savings Ratios for projects evaluated with an onsite inspection are given in Table 8-2 below. It should be noted that projects where an onsite inspection is completed are more likely to be adjusted as the onsite inspection allows additional data collection to either support or refute assumptions used in the original analysis. The natural gas savings Ex-Post to Ex-Ante Gross Savings Ratio for projects with an onsite inspection is approximately the same as projects where no onsite was completed. The electrical energy Ex-Post to Ex-Ante Gross Savings Ratio is significantly lower for projects with an onsite inspection than for projects where no onsite was complete.

**Table 8-2. Savings and Savings Ratios for Projects with Onsite Inspection**

MEI Project #	Ex Ante				Ex Post				Savings Ratio		
	kW-P	kW-M	kWh	therms	kW-Peak	kW	kWh	therms	kW-Peak	kWh	therms
RCO-7	3.12	8.86	77,582		3.12	8.86	77,582		100.0%	100.0%	
RCO-13	33.15	78.13	541,032			28.26	255,816		0.0%	47.3%	
RCO-14	19.55	89.19	816,997		23.09	88.22	629,988		118.1%	77.1%	
RCO-18		55.33	609,807	18,530	5.55	41.58	364,276	17,164		59.7%	92.6%
RCO-19	28.22	45.88	168,208	25,820	5.97	10.98	96,176	29,510	21.2%	57.2%	114.3%
Total	84.04	277.39	2,213,626	44,350	37.74	177.91	1,423,839	46,674	44.9%	64.3%	105.2%

For the majority of the projects reviewed, the level of documentation supplied was lacking in detail. For many of the projects, the descriptions were very brief and did not fully explain the scope of the project.

8.3.1 Significant Contributions to Variance

In order to understand the implications of the sample Ex-Post to Ex-Ante Gross Savings Ratio, specific projects that had significant changes in the Ex-Post to Ex-Ante Gross Savings Ratio are described below.

a. RCO-10

For this project, ECO #2 looks at savings concerning the scheduling of kitchen exhaust fans. Currently they run 24/7 with makeup air being provided. The space is only occupied from 5 AM to 2 PM. Reducing these hours saves fan energy. The DAT was also reset; however, that only saves gas which is not provided by Xcel Energy. It is noted that the CFM (6,000) did not match the report (4,680). This did not change fan savings; however, the HP of the fans in the report is 3 not the 5 in the calculation which does reduce the savings from 21,543 kWh to 12,926 kWh. The fan is assumed to be 90% loaded. This is high for typical fan applications but no justification can be made to change the load factor.

ECO #3 looks at the savings for reducing condensing water return temp to improve chiller efficiency. The measure assumes a 1% efficiency increase for each 1F temp reduction in condenser return water which is a reasonable assumption. The analysis did not calculate the increased energy the cooling tower fans will use to provide the colder condensing return water. This has been added into the analysis to add a penalty. The savings changed from 15,948 kWh to 14,001 kWh.

It should also be noted that the calculations for ECO #6 and the description of ECO #6 in the report are inconsistent. No changes were made at this time.

b. RCO-12

The savings in this project are due to multiple measures that total 178.73 peak kW and 533,056 kWh. Only ECO-3, Correct Hybrid Heating Function, was revised in the ex post analysis. Due to a cell reference error, the demand was correctly calculated for all temperature bins. However, the demand was then incorrectly multiplied by the bin hours between 50°F-55°F. The ex post analysis multiplied the demand savings in each bin by the hours per year of operation in that bin. This significantly reduced the savings for this measure. The final savings are 178.73 peak kW and 485,213 kWh.



c. RCO-13

Several changes were made to the analysis for this project. First, for the optimal start measure, the original calculations assumed that 45 minutes of run time would be reduced on average each morning. Per discussions with the site engineer as well as inspection of the EMS system, this value was reduced to 20 minutes per day. In addition, for the optimized free cooling project, the project included increasing the free cooling savings by increasing the wet bulb setpoint for the economizer from 44°F to 48°F. At the time of the site visit, the economizer was set to 45°F. Both of these changes reduced the savings.

d. RCO-14

The savings for this measure are for optimal stop, strainer cycle optimization, and static pressure reset.

The calculations for ECO 1 and 2 were based on profiling the HVAC energy compared to building kW load. The savings were altered somewhat due to the reduction of the overnight building kW based on data supplied from the customer, and supported by interval data supplied by Xcel Energy. However, the majority of the savings reduction was due to the claiming of reduced chiller operation throughout the year due to the optimal start/stop. The cooling system at this facility includes a water-side economizer, and per discussions with the customer, the chillers do not operate below around 50°F. Therefore, although there will be reduced cooling loads for portions of the facility below these temperatures, no chiller savings can be claimed.

e. RCO-18

The ECO #1 savings were reduced due to use of collected data regarding the load factor of the supply fans, which was found to be much lower than assumed in the ex ante calculations. Optimal start measures ECO 2 and ECO 3 savings were reduced because the actual start time was 5:20 AM instead of the assumed 6:45 AM. Savings for measure ECO 4, fixing relief dampers, was reduced because the operating kW of the relief fans. The ex ante condition assumed that the fans would operate in a 'deadhead' condition, resulting in higher kW, but it appeared that the configuration and shrouding of the relief fans made this very unlikely so the kW was adjusted to normal operating power.

f. RCO-19

The most significant change to the savings calculations based on the onsite inspection and ex post analysis was the reduction in savings due to the optimal start. The reduction in hours of operation due to optimal start was expected to be approximately 45 min per day; however, based on discussions with the customer engineer, as well as by verifying the setpoints and operation from the customer EMS system, the reduction in hours of operation from the original operation is only approximately 20 min per day.

In addition, the original analysis assumed that the ventilation CFM for the AHUs would be reduced by half, from 15% OA to 7.5% OA. However, at the time of the site visit, the unit was set to provide 10% OA.



9. EVALUATION RESULTS—NET TO GROSS

This section presents program net-to-gross recommendations and details the methodology.

9.1 INTRODUCTION

The recommended net-to-gross ratio (NTGR) for the program was based on a review of program files and interviews with 1) 2009-2010 participating customers and influential vendors, 2) in-depth interviews with trade allies, 3) a literature review and benchmarking interviews with program managers of similar programs in the US, and 4) results from surveys with eligible nonparticipants. Planned future program changes were also used as inputs into the final NTGR recommendation.

The NTGR is the ratio of net program-attributable savings over program gross savings before any adjustment. This ratio includes **program free-riders** (i.e., participants that would have implemented at least some, if not all, of the actions incentivized by the program in absence of that program) and **program-induced spillover** (i.e., additional energy-efficiency projects implemented by a customer due to program influences but without any financial or technical assistance from the program).

When interpreting NTGR as one indicator of program performance, it is important to keep the following in mind:

1. The NTGR is a conservative estimate of Xcel Energy's program attribution. Program attribution refers to energy impacts that can be confidently attributed to program efforts. While the NTGR does take into account participant and nonparticipant spillover, this is a conservative approach and limited to 'like' spillover as discussed below. In addition, the NTGR does not take into account all market effects resulting from the programs (e.g., increased inventory, vendor changes in sales practices, etc.).
2. The NTGR should continue to be revisited and revised as program modifications are made that would have an upward or downward effect on the NTGR. The NTGR analysis presented here is based on program participation in 2009 and the first half of 2010. These should be taken into account in deciding what NTGR to apply for a program. Recent program changes are discussed in each program section in this memorandum as well as recommended adjustments to the NTGR based on these planned program changes.

Key findings from the net-to-gross research are highlighted below, followed by a detailed methodology overview and results.

9.2 KEY FINDINGS

Table 9-1 below summarizes the estimated NTGR for the Recommissioning program evaluated in 2010. This table presents the current deemed NTGR used for the program, the NTGR calculated as a result of using the California self report approach (SRA), and our recommended NTGR based on triangulation of multiple sources of information from customers, vendors, spillover, and planned program changes.

Table 9-1. Program NTGR

Program	Current Deemed NTGR	California SRA NTGR	Recommended NTGR
Colorado Recommissioning	1.0	0.69	.90

Our estimations of NTGR are based on several sources including participant and nonparticipant interviews, vendor interviews, and benchmarking data. Table 9-2 shows the number of participating



customer decision makers interviewed by measure type for each of the programs. We also conducted in-depth qualitative interviews with both participating and nonparticipating vendors for all programs. Quantitative surveys were conducted with those vendors identified by program participants as influential in their decision making process. In addition, utility benchmarking data on NTGR was collected for each program to the extent it was available for benchmarked programs. A detailed cooperation rate for the participant survey effort is attached in the Appendix.

Table 9-2. Breakdown of Respondents Used to Calculate the Net-to-Gross Ratio

Program		Participants Surveyed with Electric Savings	Participants Surveyed with Natural Gas Savings
Recommissioning ⁹	Colorado	4	1
	Minnesota	12	8

Next we provide an overview of the approach used to calculate a NTGR for Xcel Energy's business DSM programs, followed by a detailed discussion of the NTGR results for the program.

9.3 METHODOLOGY

9.3.1 Estimating the net-to-gross ratio using self-report methods

We computed the NTGR following the California self-report framework for standard net-to-gross projects¹⁰. The standard net-to-gross analysis specified in the California framework uses three primary sources of information to estimate net-to-gross: program files and information, participant (decision-maker) survey, and vendor (participating trade ally) surveys. Our approach to using each of these information sources for estimating free-ridership and spillover is described in more detail below.

Program information was used to provide key data needed for the decision-maker survey. This data included contact information, services/equipment received through the program, participation date, and estimated energy savings.

The decision-maker survey, targeted at participating customers, asked highly structured questions about actions that would have been taken in the absence of the program. The survey was informed through the information in program files. Respondents were first asked a series of questions to establish project context. They were then asked to rate the importance of program influences vs. non-program influences. Third, they were asked to rate the significance of different factors and events that may have led to their decision to install the efficient equipment at the time they did, including questions on the age or condition of the equipment, type of project, recommendations received, and their business policies related to equipment purchases.

⁹ The number for Recommissioning is small because it only includes those who implemented measures, not those who only completed a Recommissioning study. Program attribution results for those who only completed a study are included in the program-specific write-up as an additional data point for the triangulation of the NTG factor.

¹⁰ Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers, Prepared for the Energy Division, California Public Utilities Commission by the Nonresidential Net-To-Gross Ratio Working Group, Revised May 8, 2009. This method estimates net-to-gross directly rather than estimating 1 minus free-ridership.



The decision-maker survey also collected information about what participants would have done in the absence of the program. Specifically, respondents were asked a number of questions to assess the impact the program had on the timing, quantity, and efficiency level of the measure installed. Answers to these questions formed an initial picture of the program's influence—i.e., did the program impact the timing of the decision to replace equipment, and if so, by how many months/years? Did the program impact the quantity of equipment installed, and if so, by how much (partial free-ridership)? Did the program impact the efficiency of equipment installed, and if so, by how much (partial free-ridership)? As discussed above, in cases where the decision maker states that the vendor was highly influential in their decision to participate in the program, we attempted to interview the vendor to get their perspective on program influence (these are referred to as “influential vendors”).

A net-to-gross ratio was calculated for each participant. The calculation of the self-report-approach net-to-gross ratio based only on free-ridership is summarized below in text and in Figure 1. The calculation is also described in more detail in the Appendix. In summary, the net-to-gross ratio based on free-ridership is calculated as an average of three scores representing responses to one or more questions about the decision to install a program measure:

A **Timing and Selection** score that captures the influence of the most important of various program and program-related elements in influencing the customer to select the specific program measure at this time. Program influence through vendor recommendations is also captured in this score when the customer says the vendor was influential in their decision. In these cases, the influential vendor was also interviewed and their responses were incorporated into the timing and selection score.

An overall **Program Influence** score that captures the perceived importance of the program (whether rebate, recommendation, or other information) in the decision to implement the specific measure that was eventually adopted or installed. The overall program influence score is reduced by half if the respondent says they learned about the program only after they decided to install the program qualifying measure.

A **No-Program** score that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score accounts for deferred free-ridership by capturing the likelihood that the customer would have installed program qualifying measures at a later date if the program had not been available.

The core net-to-gross ratio is the average of these three scores divided by 10, as shown in Figure 9-1 below.

Figure 9-1. Net-to-Gross Ratio Flowchart Based on Self-report Free-ridership

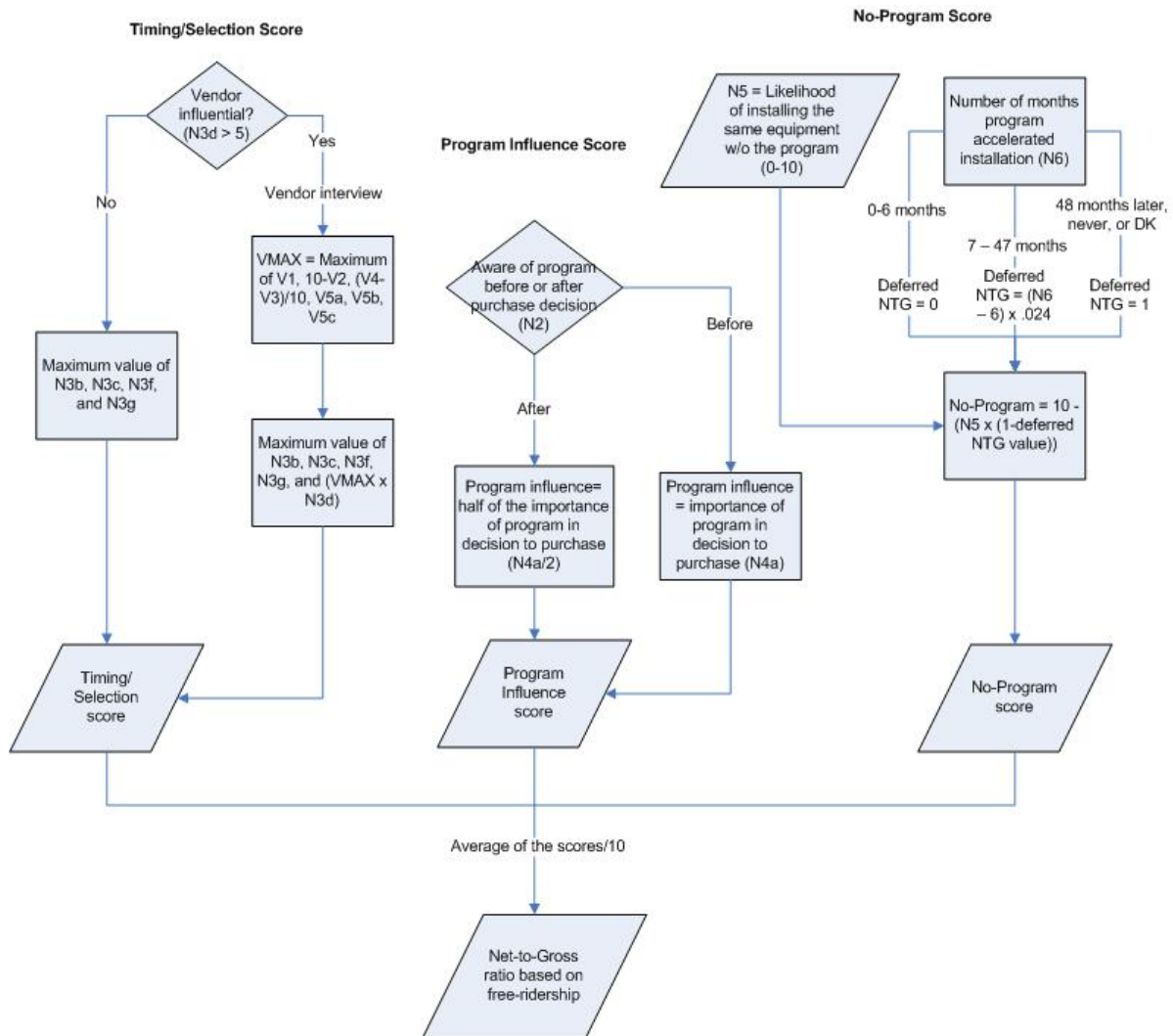




Table 9-3 presents the Timing and Selection, Program Influence, and No-Program Scores, as well as the final average NTGR based on free-ridership self reports.

Table 9-3. Independent Scores and Final NTGR Score by Program Based on Self Reports¹¹

Program	Number of respondents	Timing & Selection Score	Program Influence Score	No Program Score	Final Score (no spillover)
Colorado Recommissioning	4	7.75	5.00	8.06	0.69
Minnesota Recommissioning	12	8.58	5.36	7.18	0.70

The California framework defines partial free-ridership as when, in the absence of the program, the participant would have installed something more efficient than the program-assumed baseline efficiency but not as efficient as the item actually installed as a result of the program. Partial free-ridership results for each program are discussed in the program-specific sections.

9.3.2 Measuring Spillover

In addition to the California framework, we also examined spillover and free drivers to calculate the net-to-gross ratio. **Spillover** refers to additional energy-efficient equipment installed by a customer due to program influences but without any financial or technical assistance from the program. **Participant “like” spillover** occurs when a customer installed equipment or conducted services through the program in the past year and then installed additional equipment or conducted additional services of the same type due to program influences.

California’s self-report protocol includes a battery of questions to quantify spillover for use in estimating spillover. The spillover methodology uses a series of questions designed to measure “like” spillover. These questions ask about recent purchases (since program participation) of any additional energy-efficient equipment of the same type as installed through the program that were made *without* any technical or financial assistance from the utility, but were influenced by the program. Since California does not allow for spillover to be included in net savings estimates, we followed the Massachusetts analysis methodology¹² for estimating spillover. A “like” spillover estimate is computed based on how much more of the same energy-efficient equipment the participant installed outside the program and did so because of their positive experience with the program.

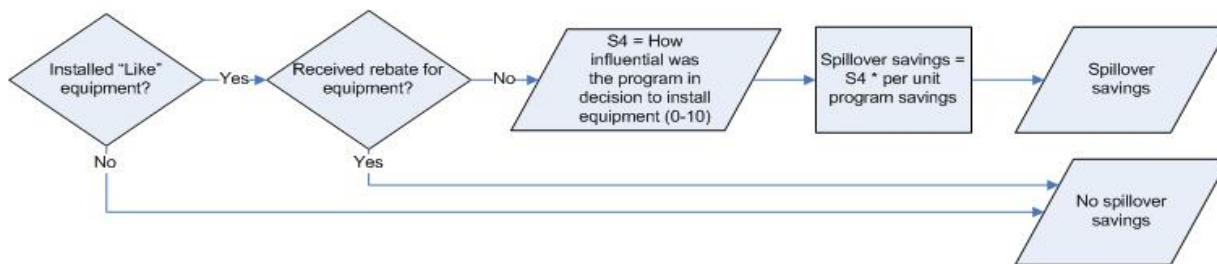
One of the issues with attempting to quantify spillover savings is how to value the savings of measures installed outside the program since we are relying on customer self-reports of the quantity and efficiency of any measures installed. We used a conservative approach and reported only those measures installed outside the program that were of exactly the same type and efficiency as the ones installed through the program. Our conservative approach allowed customers to be more certain about whether the equipment they installed outside the program was the same type as the program equipment. This, in turn, made it possible for us to use the estimated program savings for that measure to calculate the customer’s “like” spillover savings. Figure 9-2 details the process for quantifying spillover savings.

¹¹ Weighted by BTUs.

¹² “Standardized Methods for Free-Ridership and Spillover Evaluation—Task 5 Final Report (Revised)”, prepared for the Massachusetts Utilities, June 13, 2003.



Figure 9-2. Customer “Like” Spillover Savings



9.3.3 Measuring Nonparticipant Spillover

Free drivers, or nonparticipant spillover, refer to energy efficient measures installed or services conducted by program nonparticipants due to the program's influence. The program can have an influence on design professionals and vendors as well as an influence on product availability, product acceptance, customer expectations, and other market effects, all of which may induce nonparticipants to buy more high efficiency products than they would have in the absence of the program.

We attempted to measure qualitatively the extent of nonparticipant spillover. The data for this type of analysis could be collected from nonparticipants directly or from the design professionals and vendors who recommended, sold, and/or installed qualifying high efficiency equipment. We prefer to survey the design professionals and/or vendors primarily because they typically provide much more accurate information about the efficiency level of installed equipment than nonparticipants do. Our experience has shown that customers cannot provide enough data about the new equipment they have installed to allow for accurate estimates of the energy savings achieved from the equipment. While they usually can report what type of equipment was installed, they typically cannot provide sufficient information about the quantity, size, efficiency, and/or operation of that equipment to allow us to determine whether the equipment is "program-eligible." On the other hand, design professionals and equipment vendors who have worked with the program are typically more knowledgeable about equipment and are familiar with what is and is not "program-eligible."

For this effort, we asked participating vendors and providers about any changes attributed to the program in their recommendations of program-eligible equipment or services, how frequent they recommend program-eligible equipment or services, and the amount of program-eligible equipment or services they sell that receive program incentives. These results were weighted by the number of full time employees to account for larger firms having a greater effect on the market. We examined these responses to determine what, if any, nonparticipant spillover might exist because of program activity. Specific results are discussed in each program section.

9.3.4 Peer utility benchmarking

As part of our benchmarking review of similar programs offered in the U.S. and Canada, we examined the NTGR, and whether the NTGR for each program was a deemed value or whether it was based on an evaluation of that program. In cases where the programs were comparable in design and scope to Xcel Energy's program, and the NTGR reflected that specific program's performance (e.g., not deemed, evaluated at the program and not the sector level), we considered the NTGR for that program when determining whether the Xcel Energy's NTGR should be adjusted.

9.3.5 Measuring influence of previous experience

Finally, we also examined participants' reports of the importance past participation in the program had on their decision to install the efficient equipment or implement the recommendations. In the current California NTGR battery, this factor is not included in the calculated NTGR, although a question is asked about the importance of previous program participation. The Massachusetts standardized



methodology for estimating free-ridership recognizes the importance that past participation may have had on the current project.

The Massachusetts methodology asks respondents to simply agree or disagree with three statements about the influence of past program participation on their decision to participate in the current program. If they agree to all three statements, the free-ridership rate is reduced by 75 percent. If they agree to two of the statements, the free-ridership rate is reduced by 37.5 percent. The California battery of questions asked participants to rate the importance of their previous experience with the program on their decision to implement the energy efficient measure/action at that time. Consistent with the Massachusetts methodology to recognize the importance of previous participation, if participants rated their past experience with the program as high (a 9 or a 10 on a scale of 0-10 with 10 being “very important”), we reduced their free-ridership rate by 75 percent. If they rated the importance of their past experience with the program a 7 or an 8, we reduced their free-ridership rate by 37.5 percent. Lower ratings of the importance of previous program experience did not receive any adjustment. Specific findings are discussed in each program section.

9.3.6 Future program considerations

Based on interviews with Product Managers, we also considered planned program changes in our final recommended NTGR for each program. This is discussed in more detail under each program section.

9.4 DETAILED RESULTS

The Recommissioning program claims savings for participants that conducted a utility-sponsored study and implemented low or no-cost opportunities identified in that study (defined as a payback less than one year). This could include participants that did not receive any financial assistance to implement those opportunities. We sampled customers that were involved in the Recommissioning between July 1, 2009 and July 1, 2010. If a participant had only conducted a study prior to July 1, 2009 but implemented sometime afterwards, our sampling included both phases in our analysis.

9.4.1 Self-report net-to-gross ratio and like spillover

Free-riders in the Colorado Recommissioning program would include customers that would have conducted a recommissioning study without any assistance or education from the program. NTGR were initially calculated using the California and Massachusetts methodologies, one for each state, weighted by BTUs to take into account projects with kWh and therms savings. The NTGR is calculated following the California methodology, and shows an initial NTGR that is .69 in Colorado. Combined with spillover results, the resulting combined NTGR is .89 in Colorado. As indicated in Table 9-4 below, the number of respondents who implemented a recommended measure is very low.

**Table 9-4. Recommissioning Preliminary Colorado NTGR Calculation
Using Customer Self-reports¹³**

Program	Number of respondents	Calculated NTGR	Calculated ‘like’ spillover	Combined NTGR (Calculated NTGR + spillover)
Colorado Recommissioning	4	.69	.20	.89

9.4.2 Partial free-ridership

Since recommissioning is a process that either a participant does or does not implement, partial free-ridership is not applicable.

¹³ Weighted by BTUs.



9.4.3 Spillover from trade ally in-depth interviews

Using the preponderance of evidence approach, we compared the customer results with information collected from vendors to determine whether there was consistent evidence that the customer self-reports should be adjusted.

In total, we interviewed 11 recommissioning providers regarding their experiences with the program. We interviewed one vendor in Colorado that was identified by the participant as influential at one project. This interview with the influential vendor discussed the decision-making process at specific projects. In addition, we conducted qualitative in-depth interviews with 10 vendors in Colorado to explore pre- and post-participation recommendations and collect their feedback on the expected implementation of recommissioning in the absence of the program.

Based on interviews with the influential vendor, the program had a slight influence on their recommendation practices. In Colorado, the influential vendor reported a 15 percent increase in their recommendation of recommissioning since program participation. However, vendors report that all recommissioning projects go through the Xcel Energy program. This would suggest that no adjustments be made to the combined NTGR.

In-depth interviews with vendors in both states suggest the program has encouraged customers to move forward with projects, as discussed in more detail below.

In Colorado, a majority of the providers (8 of the 9) believed that the program was effective in encouraging customers to conduct recommissioning studies when they otherwise would not (i.e., there is a low incidence of free-ridership). The program allows them to “dig deeper” and identify additional opportunities as the rebate allowed “more breathing room” in the project budgets. Providers also frequently mentioned that the program greatly assists their ability to sell recommissioning projects to customers as they can market the many benefits participation offers them. The program has also “opened up” the market for some providers and they now target customers that previously were not served.

Using these findings separate from the participant data as a point of triangulation, we estimate that the Colorado Recommissioning net-to-gross ratio could be as high as .85.

9.4.4 Peer utility benchmarking

Results from the benchmarking review of recommissioning programs that reported a NTGR (Wisconsin Focus on Energy business programs, PG&E and SCE) indicate that they apply a portfolio NTGR to recommissioning. In other words, a NTGR is not estimated only for recommissioning. However, a report submitted to the CPUC by SBW Consulting¹⁴ evaluates a program-level NTGR between .80 and .91 for PG&E and SCE. The PG&E and SCE programs include a broader range of measures than Xcel Energy’s program includes. Therefore, this NTGR is not representative of the Colorado program and is only included as a reference and not a point of triangulation. The primary benefit of the benchmarking is it does support a higher NTGR for recommissioning programs than other types of energy efficiency programs traditionally see.

9.4.5 Influence of previous program experience

In addition, we examined participants’ reports of the importance of past participation on their decision to move forward with the project. To examine this for recommissioning, we asked participants to rate

¹⁴ SBW Consulting, Inc. 2006–08 Retro-Commissioning Impact Evaluation. February 8, 2010. Study ID: CPU0020.01



the influence that past participation had on their decision to participate in the program (0–10 scale with 0 being not at important and 10 being very important).

In Colorado, if participants rated their past experience with the program as a 9 or a 10 (0 percent of participants), we reduced their free-ridership rate by 75 percent. If they rated the importance of their past experience with the program a 7 or an 8 (50 percent of participants), we reduced their free-ridership rate by 37.5 percent. Lower ratings did not receive any adjustment. Using this approach, the calculated NTGR for kWh savings increases by less than .01. For therms, the only person who had therm savings said previous experience with the program was not important.

9.4.6 Influence of the study rebate

Finally, we examined the importance of the study rebate (up to 75% of the study cost, with a \$25,000 limit) on participants' decision to conduct a recommissioning study. Program theory suggests that without this study, participants would not be aware of the energy-saving opportunities available to them. In Colorado, when asked to rate the importance of the study rebate, the mean rating given from 23 participants was 8.6 (on a 0 to 10 score with 10 being very important).

9.4.7 Other program considerations

As mentioned previously, our net-to-gross analysis is based on surveys with participants from 2009 and the first half of 2010. Therefore, the NTGR does not reflect recent and planned program changes that are likely to affect the NTGR. Program staff indicate that the program will be implementing additional study requirements for participating providers in Colorado before the end of 2010. While these changes will not affect the funding levels, they will require that program recommissioning providers conduct comprehensive study investigations that will identify "deep" opportunities. Prior to the having the recommissioning study, building staff are unlikely to be aware of these "deep" opportunities. Therefore, the savings gained from implementing any of these opportunities are more likely to be directly attributable to program activity (namely, the rebated study).

In addition, program staff have recently introduced an Excel spreadsheet that can be used as a savings calculator. This spreadsheet reduces the amount of effort required by providers to document energy savings for many energy conservation opportunities. This assistance, provided by the program, will mitigate one of the main barriers that providers stated when asked about the difficulties in conducting comprehensive studies. As mentioned above, this assistance should encourage providers to identify "deep" opportunities. Therefore, the savings gained from implementing any of these opportunities are more likely to be directly attributable to program activity (namely, the rebated study).

9.4.8 Recommended net-to-gross ratio

To account for the program changes that will affect the NTGR in 2011, we adjusted the reported influence of the study in our triangulation as shown in Table 9-5. We believe the NTGR should be adjusted upward to account for these changes. As spillover savings are based on a small number of respondents in both Colorado and Minnesota, we apply the average rate of both Colorado and Minnesota (.11) to both programs. Additionally, findings from the nonparticipant surveys, indicating that some customers are willing to conduct recommissioning without outside assistance, further support these findings.



**Table 9-5. Adjustment of Colorado Recommissioning NTG
Based on Changes in Study Requirements**

Measure of NTG ¹⁵	Colorado Recommissioning
Unweighted Count	4
Calculated score (with study influence hard-coded as '10')	0.77
A - Calculated score + spillover	0.88
Point adjustment for previous experience with program	0.00
B - Score adjusted for previous program experience	0.88
C - Trade ally score	0.85
D - Study Score (hard-coded)	1.00
Mean of A-D	.90

We recommend applying a NTGR of .90 in Colorado.

¹⁵ Weighted by BTUs.



10. EVALUATION RESULTS—TECHNICAL AND BASELINE ASSUMPTIONS

This section presents the results of the verification of the baseline and technical assumptions conducted as a part of the Xcel Energy Business Demand-Side Management program evaluation.

10.1 INTRODUCTION

To determine the validity of the default assumptions for the Xcel Energy recommissioning program, a literature review was completed to verify that the savings estimates and methodology, expected useful life, and baseline assumptions were reasonable and consistent with other programs. A partial list of reviewed sources is given below.

- Final Report. 2006-08 Retro-Commissioning Impact Evaluation. SBW Consulting, Inc.
 - This report describes the results of an evaluation completed by SBW on the 2006-2008 Retro-Commissioning High Impact Measure Program for the California Public Utilities Commission.
- Work Paper WPSCNRM10007, Revision 1. Southern California Edison Company.
 - This report describes the approach, market potential, and past EM&V results, energy savings calculation methodology, and expected useful life information for recommissioning projects for the Southern California Edison Company.
- Technical Reference Manual for Pennsylvania Act 129, Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards. Southern Pennsylvania Public Utility Commission, June, 2010.
 - This report describes the standard approaches and savings associated with a variety of energy savings measures for the state of Pennsylvania. The report includes a description of savings methodology, recommended baselines, typical input values, as well as acceptable expected useful life values.
- RCx Project Submittal Guidelines. Pacific Gas and Electric Company. Version 1.1: December 18, 2009.
 - This report provides guidelines for quantifying the energy and demand reduction as well as the associated documentation requirements so program implementers can provide accurate, transparent, and repeatable calculations and savings estimates.
- How Much Does Retrocommissioning Really Save? Results from Three Commissioning Program Evaluations in California. Bing Tso (SBW Consulting, Inc.), et al.
 - This report provides a summary of the results for the evaluation of three commissioning programs in California. It shows that many of the measures completed under commissioning programs are programming changes or tune-up type measures, and therefore, the expected useful life of these measures is short.

In addition to the literature review, a review of the recommissioning calculator was completed. The calculations were reviewed for both technical accuracy as well as inputs descriptions that could be easily misinterpreted.

Finally, a desk review was conducted that included reviews of individual project documentation, including bill histories, invoices, application data, etc. An onsite inspection was completed for a subset of the desk reviewed projects. The onsite inspection included a customer interview on the pre- and post-recommissioning building operation as well as an inspection of the equipment controlled, reviewing equipment setpoints, and collecting trended data from building energy management systems



(EMS), when possible. The results of the individual project desk and onsite reviews are presented in the Recommissioning Gross Impact Results (Task 5A) memo.

10.2 KEY FINDINGS

10.2.1 Recommissioning Calculator

- None of the projects evaluated under the current program year utilized the recommissioning calculator. The reviewed calculations vary significantly in quality and scope. It is expected that the use of the recommissioning calculator will increase and this should result in greater consistency in savings estimates as well as ease the review process.
- Many of the ECO calculations reviewed in the recommissioning calculator currently include potential minor calculation errors or unclear input criteria. It is recommended that these calculations be updated with the errors corrected and inputs clarified to increase the accuracy of the resulting savings. At the end of the 2010 evaluation, program staff were working on an updated version of the calculator to correct these errors.
- The expected useful life of 7 years is reasonable when compared to other programs. However, it is suggested to investigate the possible defining of measure life according to individual measures. Measures, such as control setting changes have a lower expected useful life than other measures, such as new hardware installations or hardware repairs.

10.3 DETAILED FINDINGS

10.3.1 Recommissioning—Default Assumptions

a. Baseline conditions

The baseline condition that is used to determine the savings for the Xcel Energy recommissioning program is the existing building condition. To determine that condition, an engineering study is completed to determine the operation of the existing equipment. This approach is consistent and reasonable when compared to other similar programs. No changes are recommended to the baseline condition or determination.

b. Expected useful life values

The savings for recommissioning projects are claimed based on an expected useful life of 7 years. Based on the results of the literature review, the claimed expected useful life of 7 years is not unreasonable and no changes are recommended. However, some programs choose to assign an expected useful life on a measure level. This would likely provide a more accurate estimation of the persistence of savings. Additional research would need to be performed to define the expected useful life for the various measures expected to be completed through the Xcel Energy recommissioning program. A partial description of the sources reviewed, as well as the expected useful life determined from each source is given below.



Study	Measure	EUL
Final Report. 2006-08 Retro-Commissioning Impact Evaluation. SBW Consulting, Inc.	Retrocommissioning	8 Years
Work Paper WPCSNRMI0007, Revision 1. Southern California Edison Company.	Retrocommissioning	10 Years
Technical Reference Manual for Pennsylvania Act 129, Energy Efficiency and Conservation Program and Act 213 Alternative Energy Portfolio Standards. Southern Pennsylvania Public Utility Commission, June, 2010.	Building O&M (Many similar measures to RCx)	3 Years
RCx Project Submittal Guidelines. Pacific Gas and Electric Company. Version 1.1: December 18, 2009.	Control Setting Change	3 Years
	Hardware Repair	8 Years
	New Hardware Installation	12 Years
	Control Change with Monitoring	5 Years
DEER (Similar Measures for Office Buildings)	Add Daylighting Controls	16 Years
	Restore degraded economizer performance	3 Years
	Install programmable thermostats in older Buildings	11 Years
	Large area lighting sensor control	8 Years
	Suite of EMS measures	14 Years
	Packaged system Economizer retrofit	15 Years
	time clocks control packaged system operation	10 Years
	EMS system reduced unoccupied lighting levels	8 Years
	Boiler Tune-Up	1 Year
OEP, BTU Evaluations (Based on evaluator, implementer consensus, DEER)	Program Schedule Changes to EMCS (setpoint, start/stop schedules)	3 Years
	Recalibrate terminal Boxes	3 Years
	Program logic changes to EMCS (add reset control, optimum start/stop, control sequences)	5 Years
	Repair and recalibrate damper controls	5 Years
	Inspect and repair steam traps	8 Years
	Lighting Occupancy Sensors	8 Years
	Recharge Refrigerant in AC Units	8 Years
	Replace smooth belts with cogged belts	8 Years
	Add or replace control components	10 Years
	Add VFDs to Supply Fans	15 Years
	Duct Heater	15 Years
	Eliminate Air Compressor	15 Years
	Replace Cooling Tower	15 Years
	Reduce Lighting Levels	16 Years
	Premium Efficiency Motor	18 Years
	Duct Insulation Material	20 Years
	High-Efficiency Chiller Replacement	20 Years
	Repair Pipe and Equipment Insulation	20 Years
	Overall	5.5 Years



10.3.2 Recommissioning Calculator

Although none of the projects evaluated for this program year utilized the recommissioning calculator, a review of the calculator was completed, per the scope of the evaluation. The review included a review of the calculations for technical accuracy as well as noting any inputs that may lead to confusion on the part of the user. As with any calculation template, it should be noted that the accuracy of the savings predicted by the recommissioning calculator will be directly correlated to the accuracy and appropriateness of the inputs used to calculate the savings.

We conclude that the recommissioning calculator is a well-thought out and appropriate tool that will increase the uniformity of the savings estimates for the recommissioning program. This will ease the review process for Xcel Energy staff and has the potential to increase the accuracy of the savings estimates on the whole for the program. For the measures included, the calculations appear to be reasonable and appropriate. However, several small errors or identified changes are given below. They are listed according to the ECO tab that they were found on. It should be noted changes recommended for multiple tabs are given in the “Multiple ECOs” category.

a. Savings summary

Column F is labeled as MMBTU savings per year, however, the values that are given in that column are the therm savings calculated in the ECO tabs. Therefore, the savings are inappropriately given as 10 times the actual savings. The therm savings summed from the individual ECO tabs should be divided by 10 to correct this error.

b. Multiple ECOs

A curve fit for the demand of a fan motor control of a VFD is taken from the ASHRAE 90.1 1989 Users guide. The use of this curve is appropriate and no changes are recommended. However, it should be noted that the minimum flow percent that is used in the calculation is 20%. The fan demand curve produces reasonable values from 100% to 26%, however, below 26% flow, the demand of the fan starts to increase as the flow rate decreases. It is recommended that the minimum flow rate be increased to 26%.

It should be noted that many of the ECO calculation sheets only allow the user to input one space temperature setpoint. Space temperature setpoints are commonly set at different levels for heating and cooling. The calculations should be modified to allow the user to input both the heating and the cooling setpoints.

For cases where CFM stays constant, but a static pressure is reduced (such as cleaning a coil on a VAV system), currently both the supply and return fan speed are modified. It is likely only supply fan speed would change for this ECO. The return fan would still be moving the same airflow with the same pressure differential.

For many of the ECO calculations, the return fan speed is assumed to be equal to the supply fan speed less 6 Hz. No justification for this assumption is included in the calculation. In some cases, this fixed speed reduction can cause errors in the calculation when the expected speed for the return fan becomes negative, which would appear to indicate that the fan would run backwards. It is recommended that the return fan speed be assumed to modulate in a manner proportional to the supply fan speed.



The balance point and space temperature appear to be used somewhat interchangeably. For example, load often load that must be met by the heating unit is often related to the difference in the outdoor air temperature and the space temperature. Although it is correct that the heat transfer through the shell of the building is proportional to the difference in the outdoor air temperature and the space temperature, due to internal gains a portion of the heat loss is satisfied and does not need to be met by the heating equipment. This error is found on the simultaneous heating and cooling ECO tab as well as others.

c. ECO-AHU runtime reduction

There is an error in cells DU199-DU266. The “total kW” formula is given as the sum of the fan kW, the cooling kW and the tons of cooling. The tons of cooling is incorrectly included and should be removed.

It should be noted that care needs to be taken when entering the load profile (balance point and supply air temperature and maximum flow percent). This ECO applies most typically to unoccupied periods. Therefore, the load profile would need to be input for the unoccupied period, which typically has much lower internal gains and associated cooling loads. In addition, the outdoor air supply may differ between occupied and unoccupied periods.

d. ECO-equipment runtime reduction

For reduced hours of operation for lighting, it is recommend that it be clarified in the calculation that only affected lighting is input, not total numbers of lighting fixtures.

Also, it should be noted that the relationship between percent speed and fan demand is non-linear. Calculating a demand based on an average flow will not result in an accurate average demand or total energy use. If the flow does not vary significantly this will not cause significant error, but a more accurate method would be to input percent time at percent speed profile.

e. ECO-optimize economizer

No suggested changes specific to this sheet.

f. ECO-coil cleaning

No suggested changes specific to this sheet.

g. ECO-air leak reduction

No suggested changes specific to this sheet. It should be noted that in cases where the mixed air temperature is below the return air temperature, a reduction in leakage can lead to a therm penalty. Care needs to be taken when inputting the mixed air temperature setpoint value.

h. ECO-outside air reduction

This ECO can be used to estimate the savings for demand controlled ventilation (DCV). Therefore, If DCV is selected, the calculation template should automatically default to airflow monitoring for the proposed case. If airflow monitoring is set to no with DCV set to yes, the OA is reduced both due to the DCV and proportionally to flow, resulting in required airflows not being met and savings being overestimated.

i. ECO-supply air temperature reset



Currently no cooling savings are calculated unless the system is constant volume (CV). Adding supply air reset to a variable-air-volume (VAV) system can reduce reheat and the associated energy. Anytime that a VAV system is reheating in any zone, and the zone of greatest cooling load is not at 100% flow, a potential to reduce reheat and save energy exists. Additional calculations should be added to account for savings for supply air temperature reset for VAV systems.

j. ECO-AHU supply air static pressure reset

For many of the ECO calculations, the return fan speed is assumed to be equal to the supply fan speed less 10%. If cases where the minimum fan speed in the base case is low and the pressure reset is large, the return air fan speed can actually be projected to be negative.

The return air speed is assumed to be a fixed percent less than the supply fan speed. Therefore, when the supply fan speed is reduced to the reduction in static pressure, the return air fan speed is also predicted to decrease. This does not appear to be appropriate. For the static pressure reset ECO, the CFM supplied to the space does not change, nor does the pressure across the return fan. Therefore, no changes would be expected to the return fan speed.

k. ECO-unoccupied setback

If heating and cooling space temperature setpoints are set at the same temperature, due to the “if” statements in the calculations, the calculated fan speed is negative in the cooling region.

For the region between the space temperature and the balance point, no fan operation is calculated. This does not appear to be appropriate. At a minimum the zero operation range should not be the same for the case with and without setback.

The zone load for this calculation is determined based on the difference between the outdoor air temperature and the space temperature. This does accurately account for the heat transfer through the shell, however, due to internal gains, a portion of that load does not need to be met by the heating equipment. It is more appropriate to base the zone load (that must be met by the heating equipment) on the difference between the outdoor air temperature and the balance point. Also, it needs to be made clearer that the balance point that is referred to in this calculation is the balance point *during the unoccupied period*. If the daytime heating balance point is 55°F, the nighttime heating balance point could be 65°.

Finally, the balance point is assumed to be the same for the baseline and proposed condition. By changing the space temperature, the balance point will change as well. It is recommended that the proposed balance point be recalculated based on the heat load from the baseline condition and the change in the space temperature setpoint.

l. ECO-eliminate simultaneous heating and cooling

For cases where a zone electric coil is operating incorrectly, savings are claimed for all temperature bins where the OAT is greater than the zone temperature. It would likely be more appropriate to claim savings for all temperature bins where the OAT is greater than the zone balance point. Below this point, heating is required, and above this point, cooling is required (mechanical or free). If the unit has an economizer, in the economizer band, only heating savings would be claimed. Above the economizer band, both heating and cooling savings would be claimed.



m. ECO-VAV minimum flow reduction

For this calculation, it does not appear that the load supplied to the space is kept constant in the baseline and proposed conditions. For example, the user can set the temperature setpoint to the same temperature in both the existing and proposed cases and reduce the minimum flow from 50% to 25%. By doing so, only 50% of the heating or cooling load to the space is delivered to the space in the proposed condition as was delivered to the space in the baseline condition. Unless the supply temperature setpoints are modified, reducing VAV minimum flow will have no effect on the heating or cooling energy until zones hit their minimum box position. Once that point is reached savings could potentially be reached by cooling and then reheating less airflow.

n. ECO-heating water supply temperature adjustment/reset

There is a cell reference error in cell Y157. It refers to Cell Y154 instead of Cell Y155 for the maximum boiler load percent. This should be corrected.

The sheet does not allow the user to calculate the savings for the case of an uninsulated pipe. If a user were to attempt to bypass this by inputting a very small insulation thickness, the calculated piping heat loss becomes extremely large. A maximum value of the heat loss should be added based on natural convection. This would allow the calculation of savings for cases with uninsulated pipes.

The calculation does not allow the user to accurately model a boiler serving both fixed loads (such as water heating) and temperature dependant loads. A calculation that the user could input the load at design conditions and the load for temperatures above the balance point would allow savings to be calculated for the higher temperature bins as well.

The condensing boiler heating source efficiency is based around a return water temperature of 130°. If the user inputs a boiler efficiency at another operating point is put input, the adjustment curves will not be accurate. A comment should be added to notify the user that the boiler efficiency to input is the boiler efficiency at a 130° return water temperature.

The calculation appears to assume that the boiler will operate at the minimum firing rate as a minimum operating point. Below the minimum firing rate, the boiler will cycle to maintain temperature and meet load. The label for the input should be reworded to ensure that the user inputs the minimum heating load and not the minimum firing rate of the boiler.

o. ECO-chilled water supply temperature setpoint adjust/reset

There is a cell reference error in cell Y157. It refers to Cell Y154 instead of Cell Y155 for the maximum boiler load percent.

The “power correction delta T” formulae in cells AO174:AO237 and BI174:BI237 refer to the outside air temperature. However, the outdoor air temperature is incorrectly fixed at the -24°bin instead of the actual outdoor air temperature of the bin. The formula should be correct to refer to the appropriate temperature bins (the bin that the calculation is calculating).

The chiller kW formulae in columns AT, AY, BN, and BR appear to be incorrect. When compared to the DOE 2.2 curves (as referenced) the chiller kW formula needs to be multiplied by the Chiller Capacity Correction Factor –Temp, given in column AN and BH. (page 195, Building Energy Use and Cost Analysis Program, Volume 2: Dictionary.)

p. ECO-condenser water supply temp. setpoint adjust/reset



The chiller kW formulae in columns AT, AY, BN, and BR appear to be incorrect. When compared to the DOE 2.2 curves (as referenced) the chiller kW formula needs to be multiplied by the Chiller Capacity Correction Factor –Temp, given in column AN and BH. (page 195, Building Energy Use and Cost Analysis Program, Volume 2: Dictionary.)

The cooling tower methodology in this sheet is questionable. If the cooling tower is VFD controlled, the VFD speed is set equal to the percent chiller load. For two speed fans, the percent time at each speed is set the maximum of what appears to be an arbitrary curve or percent chiller load. This does not account for any oversizing of the cooling tower or weather conditions. The VFD speed or percent of time a two speed fan will operate at high or low speed will be a function of the water temperature, water flow, temperature setpoints, and the wetbulb temperature. For example, the fan of a cooling tower will operate at a higher flow rate at a 75° wetbulb than at a 55° wetbulb, even if the load and the water flow and temperatures are the same. A more appropriate method would be to use the DOE 2.2 curves, in a similar manner to the chiller curves currently used.

q. ECO-pump total dynamic head reduction

Cell W139 is labeled incorrectly. This does not affect the savings calculation, but it is listed as a proposed pressure drop, but actually refers to the reduction in pressure drop.

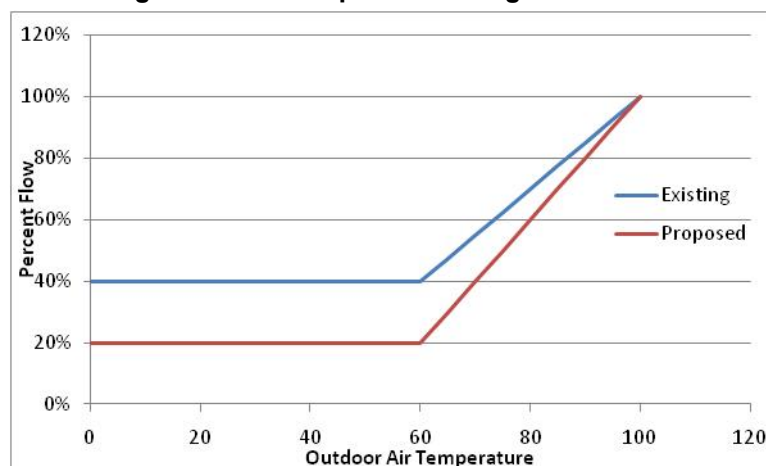
r. ECO-pump differential pressure setpoint adjust/reset

There is a cell reference error in cells P158:159 and V158:159. The referenced values in columns AC are already converted to feet, therefore the 2.31 conversion factor is redundant.

s. ECO-pump minimum flow reduction

The savings for this measure are determined based on a reduction in the minimum flow setpoint for a pump. To determine the percent flow for a given bin temperature, a linear profile is developed with the pump operating at the maximum flow rate at the heating or cooling design point, depending on if it is a heating or cooling water pump. The minimum flow rate is expected to occur at the average zone balance point. The figure below shows an example of the flow profiles calculated using the current methodology.

Figure 10-1. Example of Existing Flow Profile



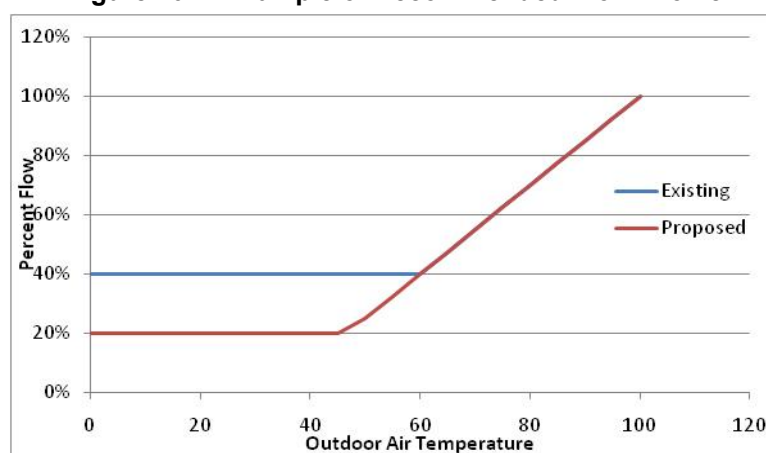


As shown above, the current calculation methodology predicts that the pump speed will be reduced in all temperature bins. This is not appropriate. Unless the water temperature setpoints are changed, the percent flow of the pump will not change for any temperature bins that the baseline flow was not at the minimum condition. By reducing the minimum flow setpoint, you do not reduce the flow required at any point, you only allow the flow to be reduced in temperature bins that the minimum flow allowed in the baseline condition was excessive.

It is recommended that the flow not be changed for any bin that the baseline flow is above the minimum flow condition. Instead the linear profile developed be extended to the lower flow conditions allowed in the proposed case.

The figure below shows an example of the flow profiles calculated using the recommended methodology.

Figure 10-2. Example of Recommended Flow Profile





11. CONCLUSION AND RECOMMENDATIONS

The evaluation of Xcel Energy's Colorado Recommissioning program indicates that the program is running well, resulting in both electric and natural gas savings for Colorado customers. With few exceptions, both participants and the providers that operate within the program are satisfied with the way in which the program is currently implemented and are happy with the results they see from participation. In addition, program staff have foreseen some of the issues identified in this evaluation and have already taken steps to improve program performance. For example, the savings calculator recently implemented addresses some of the complaints of both customers and providers about the difficulty in predicting and documenting savings. This type of proactive action is indicative of the program staff's commitment to evolving the Recommissioning program to meet changing market demands.

Within that context, we offer the following recommendations to improve the program and/or maintain the high quality at which it operates for Xcel Energy's consideration:

Recommendation #1: Educate providers about the recent program changes such as the study checklist.

By the end of 2010, program staff are planning on requiring providers to review a 38 point checklist when submitting any recommissioning project for approval. The intent of this checklist to clearly communicate what opportunities Xcel Energy expects to be investigated during the study phase and, therefore, encourage studies that identify "deep" savings. Previously, providers may have focused on opportunities that are readily apparent during a cursory review, that are limited to that provider's area of focus (e.g. HVAC contractors only identifying improvements with HVAC systems), or that do not require complex savings calculations.

We believe this addition to the program will positively affect program performance by increasing the total savings per project and limiting the amount of unqualified participating providers through self-selection (i.e., providers that are not qualified to address the checklist will choose not to participate). In order to maximize its effectiveness, program staff should plan to conduct some level of outreach to providers so that the intent of the checklist is understood. In addition, any educational materials regarding the opportunities listed will ease the adoption of and compliance with the new checklist. Possible educational materials include example situations where opportunities could be implemented or reports from facilities where "deeper" savings were found. Providers reported positive experience with program trainings in the past and the new checklist may warrant an additional training in 2011 that focuses on the checklist and other recent program changes.

Recommendation #2: Continue to support and provide training on the savings calculator tool.

Recently implemented, the savings calculator tool supports the goal of the provider study checklist mentioned above. By reducing the savings calculation burden on providers, this calculator mitigates one of the barriers providers mentioned about conducting comprehensive studies, namely the amount of effort required to calculate savings for relatively minor opportunities. By maintaining support for this tool and working to increase its scope over time, program staff can work to mitigate lost opportunities in recommissioning studies. A 2011 provider training, suggested above, could cover the savings calculator tool as well as the study checklist.

Recommendation #3: Maintain internal staffing levels to ensure timely study review and application approval.

Both participants and providers mentioned lengthy approval times as a source of frustration within the program. This is not an issue only mentioned for the Recommissioning program. Xcel Energy is fully



aware of this issue and has been working to improve turn-around times. Providers did report that this problem has largely been addressed in recent years. Program staff should continue to monitor approval and review turn-around times to ensure that program operations remain timely. In addition, any staffing changes that will affect turn-around times should be carefully considered. Finally, we recommend customers are kept informed of expected approval times as we have found this to increase customer satisfaction in other similar situations.

Recommendation #4: Consider developing an attenuated study checklist for facilities under 50,000 square feet.

Interviews with providers suggested that recommissioning could be conducted with smaller facilities if the scope of the study is reduced and the amount of documentation required is minimized. While program staff reported that the 50,000 square footage requirement is waived when smaller facilities can demonstrate potential energy savings, a formalized recommissioning “light” offering could open additional opportunities. This program could be modeled after the Refrigeration Recommissioning program. It was reported the refrigeration program has successfully engaged smaller business as it concentrates on one high saving opportunity: the optimization of refrigeration. A recommissioning “light” offering could mimic this approach by focusing on a limited number of other high saving opportunities.

Recommendation #5: Create sector-specific direct mailing marketing materials for any future marketing that also include education about what is meant by recommissioning.

Many of the providers requested that Xcel Energy conduct additional marketing targeted at non-managed accounts and specific customer segments. They perceived the lack of awareness regarding recommissioning among these customers as a major barrier to increasing program participation. Indeed, the nonparticipant survey showed that while almost half of nonparticipating customers report they know what recommissioning is, a review of their open-ended comments show a large amount of misunderstanding about what recommissioning entails. Therefore we recommend not only continued marketing pieces, but marketing pieces that provide customer education on what is meant by recommissioning. While the providers stated that face-to-face meetings at trade shows are very effective in reaching customers, these opportunities typically do not reach as wide an audience as targeted marketing.

We recommend that, if Xcel Energy does conduct additional targeted marketing to non-managed accounts and specific segments, marketing staff craft tailored messages for specific sectors (e.g. health, education, office) with case studies on the possible energy and cost savings and types of recommissioning opportunities identified. In addition, both the participant and nonparticipant survey showed a strong customer preference for receiving information via email, therefore case studies could be distributed via a cost-effective email format.

Recommendation #6: Continue to leverage the provider infrastructure to provide program marketing.

The nonparticipant survey showed customers' receptivity to receiving program information from contractors and vendors. Colorado participant results show that program providers are not a major source for customers learning of the program. This is most likely a result of the Colorado program being less mature and providers having less experience with the program. In Colorado, program staff should continue to work with providers to educate them about the program and also to provide the necessary information to help them effectively market the program to their customers.



Recommendation #7: We recommend no changes in the technical or baseline assumptions used in savings calculations or in the savings calculator.

Using the existing condition of the building as the baseline (as identified by an engineering study) is a reasonable and appropriate methodology for calculating savings realized through a recommissioning program. In addition, the assumptions within the calculator are reasonable and accurate. Finally, many of the minor errors identified by the team's review of the calculator have already been addressed by Xcel Energy (or are addressed in the next version).

Recommendation #8: Net-to-Gross Ratio is 0.90.

The program's recommended net-to-gross ratio is .90. The evaluation research found high program attribution, or the percentage of the energy impacts that can be confidently attributed to program efforts. The program currently uses a deemed estimate of zero free-ridership, implying that none of the participants would conduct recommissioning studies in the absence of the program. Based on surveys with participants, recommissioning providers, and nonparticipants, the evaluation research found low levels of free-ridership. This finding is corroborated by benchmarking results from similar programs across the country. The recommended net-to-gross ratio based on a triangulation approach is .90.



APPENDIX A: PROGRAM STAFF INTERVIEW GUIDE

Internal Staff interview guide

Interview Objectives:

- Identify program activities, inputs (resources), outputs, short to medium term outcomes and long term outcomes to develop the program logic model
 - Identify important influences on program operation and achievements
 - Identify issues that should be incorporated into evaluation activities
 - Characterize program operations including staffing, outreach activities and marketing, types of customers participating and not participating and role of the trade allies
 - Identify areas that are working well and opportunities for improvement
-

A. Describe your role within Xcel Energy and with the program(s)

- 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, trade allies, customers
 - Roles and responsibilities of these other persons
 - success of interactions; suggestions for improvements

B. 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?
- 2) 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?
- 3) Are there similarities between the projects that participate in the program, or is each project unique?
- 4) What are the target markets within the commercial sector for the program?
- 5) What marketing activities are being used to reach the different target markets? How effective have each of these methods been in identifying and enrolling potential participants? Why?
- 6) What are major barriers to participation?
 - why do you think customers choose to participate or not participate?
 - what are the comparative strengths of these reasons?
 - are the marketing efforts designed to build on customers' reasons for participation and minimize reasons for nonparticipation?



- 7) Are there sufficient program resources to meet the programs goals? (Probe: Examples of resources are staff resources, incentives, program partners support (co-op ads, spiffs), and marketing materials.)

C. Program Operations

- 1) What are the participation steps from the customer's perspective? Have these changed over time?
- 2) Describe your communications and working relationship with trade allies. What support is provided through the program to trade allies? In what areas could this be improved?
- 3) What is the level of customer satisfaction with the various aspects of the program (participation process, program application, measure performance, rebate processing, etc.)? How can satisfaction be improved?
- 4) What aspects of the program implementation are working well? Which are not working well?
- 5) How does the type of equipment or services being purchased and installed through the program vary? Why do you think there is this variation?
- 6) Do the incentive levels seem appropriate? If not, why not? What, if any, changes in the incentive levels do you think may be needed?
- 7) What do you see as future challenges for the program?
- 8) How are participants and non participants 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?
- 9) How do you identify prospective customers for the program?

D. Program impacts

- 1) (If relevant), Next I'd like to ask you about various technical inputs into your current tracking system estimates for gross energy and demand impacts. Could you please briefly summarize your approach for these inputs and any concerns/issues you may have with the input. Capture across the specific pieces of program equipment or service (RCx).

Inputs	Summary of Approach	Concerns/issues (if any)
Baseline equipment		
Replacement equipment specifications (e.g., capacity, nominal rating of equipment capacity, energy efficiency ratio)		
Operating hours		
System coincidence factors		
Load factors		



O&M savings and/or costs		
Equipment/measure life		
Persistence, snapback, and degradation		
Incremental costs		
Free-ridership and spillover rate		

2) Have these inputs change over the course of the program? If so, how?

3) Are there any plans to make changes to these inputs moving forward? If so, how?

E. Evaluation

- 1) What are your needs from this evaluation?
- 2) What do you hope to learn from the evaluation?
- 3) (Probe if not mentioned in 1 or 2) Do you have any specific questions that you want to make sure are included in primary data collection activities with market actors. Probe about trade ally interviews, participant and non-participant surveys, the benchmarking study and the engineering review.

F. Inputs for Logic Model. This next series of questions will be used in conjunction with a review of 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? (Interviewer note: Probe about activities with trade allies, other stakeholders and customers as applicable. If needed give examples such as recruitment and training of contractors, recruiting customers and installing high efficiency equipment or performing audit.)
- 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.
- 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? (probe to 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. (Interviewer



note: Walk them 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.

G. Other Suggestions for Improvement

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



APPENDIX B: TRADE ALLY INTERVIEW GUIDE

XCEL ENERGY DSM PROGRAMS BUSINESS EVALUATION TRADE ALLY INTERVIEW PROTOCOL

A.1 INTERVIEW GUIDE FORMAT

This interview guide is for trade allies that have participated in the last two years in Xcel Energy's DSM business programs being evaluated in 2010. This includes both trade allies that have been fairly active in the program as well as 'informed' non-participants. Informed non-participants are trade allies that have completed a project through the program, but have had very limited involvement. An example would be a trade ally who has done one or two projects through the program or who completed projects in 2009, but not 2010 to-date.

First the guide summarizes the key researchable issues that the interviews will explore across all the programs and at the program-specific level. Next, the interview guide presents the specific questions to be asked. Trade allies will only be asked about the relevant program, indicated by [program] when name of the program is to be stated or referred to as the program in the below guide. Specific questions and probes only relevant for one program are noted at the beginning of the question with the program indicated in []. There are also program specific modules, which will only be asked for that program.

Because senior staff will be conducting interviews, trade ally interviews will be semi-structured. Therefore the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance.

A.2 OVERARCHING KEY RESEARCHABLE ISSUES

- How are the programs leveraging the trade ally infrastructure and are there areas for improvement?
- What impact have the programs had on the relevant commercial market in terms of greater availability of efficient products or program services?
- What are the opportunities to streamline the application and rebate process?
- Are trade allies effectively conveying program information and encouraging customer participation? What additional training or support from Xcel Energy do trade allies need to more effectively support the programs?
- How effective is the marketing of the programs? Are there customer segments that marketing efforts should specifically target? What are strategies for effectively marketing the program to identified customer segments such as small/medium business? Is more program-specific marketing needed?
- Are rebate levels and program equipment/services optimally set to encourage participation while maximizing the cost-effectiveness of the program?
- What is the customer decision-making processes regarding participation in Xcel Energy's Business DSM Programs? What are customer barriers to participation?
- How receptive are customers towards energy efficiency measures given the current economic conditions?

A.3 MOTORS/VSDS KEY RESEARCHABLE ISSUES

- How satisfied are vendors with communications about the program? Are any changes needed?



- How informed are customers about program equipment and rebates?
- What barriers prevent customers from purchasing program equipment?
- What is the impact of the general economy, versus other factors?
- Is it difficult to obtain motors specification information?
- Are pre-approvals for custom equipment a significant barrier?
- What would cause vendors to specify program equipment more often?
- Are sales of VSDs projected to increase, decrease or remain level?
- Will vendor sales practices change when premium motors become the new federal standard?

A.4 EFFICIENCY CONTROLS RESEARCHABLE ISSUES

- Are providers aware of what information they need to provide in their proposals for their customers to gain pre-approval? What barriers do they face in gathering this information?
- Has the number of lighting control projects been limited? What can Xcel Energy do to encourage participation from more lighting contractors and promote lighting projects?
- What benefits do controls providers receive from participating in the program? How influential is the contractor rebate in motivating providers to participate in the program?
- Are providers aware of the recent rebate level change? Has this change affected their communications with customers and/or the level of customer interest in the program?
- How aware are customers of the (existence and benefits of technologies for implementing energy efficient building control systems?
- Are there any barriers specific to small business customers that may be preventing them from installing EMS or other building controls systems?

A.5 RECOMMISSIONING RESEARCHABLE ISSUES

- How are the current tools (e.g., sample report, calculator tools) offered by the program to the providers beneficial? Are there opportunities for improvements in the offered tools? What other tools do they need to be successful?
- What level of influence do the providers have on the customers' decision to participate in the program or implement the recommendations?
- Do providers expect the volume of recommissioning work to increase, stay the same, or decrease?
- Why are some studies more exhaustive than others? What are the barriers that discourage providers from covering all opportunities within a facility?
- Are some easily remedied recommissioning opportunities being corrected and not being identified to the customer?
- Are some recommissioning opportunities being identified to the customers but not included in the report?
- Who makes the decision to implement study recommendations?
- What improvements do you see as necessary for the pre-approval and rebate stages of the Recommissioning program?
- Other utilities require customers to implement opportunities from their studies. Would this be a beneficial to Xcel Energy's recommissioning program?

A.6 INTRODUCTION

My name is _____, with [company]. Xcel Energy has hired us to evaluate its [relevant program]. The study will provide recommendations on how they can improve the program for you and your customers. I would like to ask you some questions about your experience with the [program]. Your feedback on the program is extremely valuable as Xcel Energy wants to improve your experience and satisfaction with



the program as well as your customers. As part of this study we are talking to approximately ten businesses such as yourself that work with the [program] as well as customers who have and have not participated in the program. This interview should take approximately [30 minutes of your time for Motors and Drives, Efficiency Controls, 45 minutes for Recommissioning] . May we take some time now to do the interview? (If no, when would be a convenient time?)

NAME: _____

COMPANY: _____

TITLE: _____

PHONE: _____

INTERVIEWER: _____

DATE COMPLETED: _____ **LENGTH:** _____

A.7 FIRMOGRAPHICS

Research company website before interview to learn about company.

F1. What is your primary role(s) in the supply and delivery of [relevant program equipment or service] to the commercial customer market? (Examples include manufacturer, manufacturer representative, wholesale distributor, engineering firm, contractor, energy services firm, etc.)

F2. Could you please tell me specifically the types of [program] equipment or services you sell/specify for commercial customers? Probe for the specific types, sizes and efficiency levels as applicable. Note: Commercial refers to all businesses in Xcel Energy's territory that qualify for the program.

F3. What percentage of your commercial business is:

Planned Equipment Replacement? _____%

New Equipment Purchases (for new buildings) _____%

Failed/Emergency Equipment Replacement _____%

Other (specify) _____%

F4. What percent of the projects that you completed in the last 12 months were for small or medium businesses in terms of energy usage versus large businesses? We are defining small businesses as those with 100 or less employees. Medium businesses have over 100 employees. Large businesses are those that have an Xcel Energy account manager.

A.8 PROGRAM AWARENESS AND INVOLVEMENT

P1. Could you describe for me your participation in [Program]? Probe for reasons ally participates at the reported level of activity.

P2. When did you first get involved with [Program]?

P3. How did you first hear about [Program]? (Do not prompt. Circle all that apply)



Through Xcel Energy staff (probe if account manager, channel manager, product manager, etc.)
 Attended workshop or training seminar and learned about the program
 Through a manufacturer/supply house
 Learned about the program at trade show
 Saw/heard ads for the program (Where? _____)
 Attended a program-sponsored information session
 Magazine, newspaper, TV, radio (morning, eveninging, weekend,)..etc
 Xcel Energy Website
 Business Colleague
 Business Customer
 Other _____
 Don't know/unsure

P4. Why did you decide to participate/get involved in the program? *(Do not prompt)*

P4a. When was the last time you completed a project through/sold equipment through the program?

P4b. (IF HAVEN'T COMPLETED A PROJECT/SOLD EQUIPMENT IN LAST YEAR) Why have you not completed a project through the program recently?

P5. Do you expect your participation/involvement in the program to increase, decrease or stay the same in the next 12 months? Why? If not mentioned, probe specifically what the slower economy has on their current and expected involvement in the program.

P6. What could the program do to help you provide more services/promote program equipment more? [Motors and Drives] Probe to see if batch applications processing is desired.

P7. Do you feel there are adequate program communications? Are any changes needed? How do you like to receive communications about the program?

P8. Who do you typically interact with from the program? For what purposes? How would you describe your interactions with program staff? (minimal, helpful, very involved, probe to characterize)?

P9. What is the primary benefit(s) you receive from [Program]?

P9a. [CONTROLS] Are you aware that the Efficiency Controls Program offers rebates to installation contractors? Have you received any of these rebates? What impact, if any, did the contractor rebate have on your participation in the program?

[RCx – MN only (not CO)] Are you aware that the Recommissioning Program offers trade incentives for identifying a certain level of savings within a study? (They can earn \$2/1,000 kWh identified in a study).

P10. [RCX] How satisfied are you with the current tools and support offered by the program such as the savings calculator and sample recommissioning reports? Would you say you are very satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, or very dissatisfied?

P10a. [RCX and CONTROLS] What additional support could the program offer that you would find beneficial? Are there any additional tools that the program should offer?

P11. Are there other types of energy efficiency programs that you participate in /are aware of? If yes, do you think there are lessons learned for Xcel Energy from these other programs?



A.9 CUSTOMER INTERACTIONS

C1. Do you actively promote [Program]? What percent of your customers already know about [Program] before you tell them about it? How do they find out about the program? Who (title/position) do you need to work with in order to get interest and close the sale. What info do they seek from you? Why do customers call you – equipment failure, maintenance/service call, warranty work, primary interest in energy efficiency, other?

C1a [CONTROLS] How aware are your customers of technologies for controlling their lighting, heating, cooling, or ventilation systems (through a centralized system vs. stand-alone controls)?

C2. What are the primary reasons why customers typically want to participate in the program? 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 and differences for new construction and retrofits.

If needed, examples of factors include the following:

- Fits standard design
- Overall cost of the project
- Availability of a rebate through utility program
- Information and education provided by utility on the benefits of energy-efficient technologies or services
- Saves electric costs
- Helps the environment
- Shows good corporate citizenship
- Meets payback criteria
- Impact on company financials
- Recommendation of manufacturer, supplier, contractor, etc.

C3. What are the primary reasons why customers typically do not want to participate in the program? Do these reasons vary across different customer segments? (PROBE: small vs large customers) [MOTORS and DRIVES] Are pre-approvals for large/custom program equipment a barrier? If YES: Is this because of the application paperwork, approval time or other factors?

C4. 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 [high efficiency program equipment or service] to your customers?

C4a. Probe to understand why the program equipment or service is easy or difficult to sell for respondent and why there are "lost opportunities" for Xcel Energy (e.g., projects that are not high efficiency that could have been or recommissioning studies that do not result in projects). Characterize customer participation barriers (e.g., incremental cost of efficient high efficiency equipment, too long of a payback period, etc.) to the extent possible. If not mentioned, probe specifically about the effect of the slower economy on customers' decision to participate in program.

C4b. Probe if they have any specific recommendations to make it less difficult.

C5. What do you think are the main benefits your customers receive by participating in [Program]?

C6. What additional services would you like to see the program provide customers?

C7. What can be done to increase the number of participating customers in the program? Probe about managed accounts (large customers) versus small and medium size customers.



C8. Are there other opportunities to promote energy-efficient products and services to business customers that the program is not currently addressing?

C9. Would you like to see the program do more direct or specific marketing to customers for the program? If yes, what kind of marketing would you like to see added? [For Motors and Drives, probe specifically about magazines Xcel Energy should use/subscribe to for placing program-specific advertising].

A.10 MOTORS AND DRIVES SPECIFIC QUESTIONS

M1. Are there components of the program that are confusing to you? What do you find that is unclear or confusing about our program?

M2. What do you need from the program to be more effective in promoting the motors and drive components? Are there marketing components (analytical tools, feature sheets, technical sheets) missing that you need to sell higher efficiency?

M3. What is the biggest challenge that you face with the motors/drive program?

M4. What do you think needs to change with the program to get customers more interested in making the purchase of the higher efficiency equipment?

M5. What are the top three reasons/explanations given to you by customers for not purchasing a higher efficiency option?

M6. What tools/resources do you use to make sell the higher efficient equipment? Do you use any of the tools/resources that Xcel Energy makes available to you? Why or why not?

M7. How often do you do a motor inventory /assessment planning for your customers? An example of this is how many motors a customer has and what of their stock they should replace/repair or rewind.

A.11 RECOMMISSIONING SPECIFIC QUESTIONS

R1. Do you typically only conduct recommissioning studies, only implement building recommissioning procedures, or do you both conduct the study and implement the recommissioning procedures?

R2. (IF CONDUCTS STUDY) What opportunities do you typically identify during a recommissioning study?

R3. (IF CONDUCTS STUDY) Do you feel studies are typically exhaustive in identifying opportunities at customer facilities? How could studies identify more opportunities at customer facilities? What are the challenges in identifying additional opportunities? (PROMPT WITH EXAMPLES OF OPPORTUNITES NOT MENTIONED ABOVE)

R4. (IF CONDUCTS STUDY) Are there any opportunities that you identify that are communicated to the customer but aren't recorded in the study? If so, what are they?

R5. In your experience, who typically makes the decision to implement the opportunities identified in the recommissioning study? Is there anything the program should do to encourage implementation?

R6. Do you actively seek new customers to perform studies on or do you just focus on existing customers. If you don't seek new customers, why?



R7. Do you understand Xcel Energy's study documentation requirements, specifically what you need to provide to document energy savings?

R8. Are there specific technical training needs you have? If so, what training sessions would you like to see Xcel Energy offer?

R9. What percent of your business focuses on RCx?

R10. Do you feel you are conservative with your savings estimates? (Interviewer note: Xcel Energy's last research found providers are conservative, which leads to the question if the program is missing out on capturing realistic energy savings.)

R11. Do you have any suggestions on how to structure the program's study rebate so that the customer can get an idea of what amount they may be eligible for before they apply for preapproval?

R12. What other support do you need from Xcel Energy (i.e. hands on training to help identify measures)?

A.12 CONTROLS SPECIFIC QUESTIONS

EC1. What types of equipment is controlled by the automated control systems you typically implement? (PROBE: lighting, heating, cooling, ventilation)

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. Do you help your customers fill out the pre-approval rebate application and/or project worksheet (if yes, proactively offer, or wait for customer to ask for help)? What obstacles do customers typically face in providing information needed for pre-approval? What obstacles do you face in providing information needed for preapproval?

EC4. (IF INSTALLS LIGHTING CONTROL SYSTEMS) The program has historically seen low 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?

A.13 PROGRAM PROCEDURES

E1. On a scale of 1 to 5 where 1 is 'very difficult' and 5 is 'not at all difficult', how would you rate the program's administrative burden in terms of application requirements and processing? Why do you give this ranking?

E2. What is your involvement with the application portion of the program? What is working well about the application process from the customer's point of view? Your point of view? How would you like to see the application process improved? Probe specifically about the pre-approval process for custom measures if not mentioned.

E3. Are the customer rebates offered through the program adequate? How would you like to see the rebate structure revised?



E3a. [CONTROLS] Are you aware that the program changed its rebate levels in the fall of 2009? Has this change affected your communications with customers? Has it affected customer interest in the program?

E4. What changes would you make to the equipment and/or services rebated through the program?

A.14 COMMERCIAL MARKET

M1. One of the purposes of the program is to encourage customers to purchase more efficient equipment or services than they would otherwise purchase. Do you feel the program is accomplishing this? Why or why not?

M2. What direction do you see the commercial market taking in [state] in the next 2 years? Do you see specific challenges for Xcel Energy or opportunities to promote efficient equipment or services?

M3. [MOTORS, if they sell VFDs] Do you think your sales of VFDs will increase, decrease or remain the same? Why?

M4. [MOTORS] Will you change your equipment stocking or sales practices in any way when premium motors become the new federal standard?

A.15 CONCLUSION

C1. What do you think is working best in Xcel Energy's [program]?

C2. What do you think is most in need of improvement?

C3. 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? How could your satisfaction be increased?

C4. Would you recommend the program to others in your field, i.e. other trade allies you know?

Is there anything else that you would like to share concerning the [Program]?

Thank you for your time. This completes our interview.



APPENDIX C: PARTICIPANT SURVEY INSTRUMENT AND COOPERATION RATE

XCEL ENERGY BUSINESS DSM PARTICIPANT SURVEY

One participant survey will be used for the following programs: Motors and Drives Program, Recommissioning Program, and the Efficiency Controls Program. Program specific questions are noted where applicable.

The complete list of survey modules follows:

- Introduction
- Identification of Decision-Maker
- Installation Verification
- Source of Program Information
- Net-to Gross
- Spillover
- Program Satisfaction
- Operating Hours
- Customer Characteristics

Sample variables

The following fills will be used throughout the survey. These fills are program and measure specific. Some of these may need to be revised once we have had a chance to examine the participant database.

[Program] Program name

- 1 Motors and Drives Program
- 2 Recommissioning Program
- 3 Efficiency Controls Program

[Date] Date of participation

[Rebate] Rebate amount

[Quantity] Quantity of measure installed (If greater than one, fill with quantity installed).

[All Assistance] Assistance received through program

- 1 Rebate of [rebate] for **[EEMeasure]**
- 2 (RCx) Rebate of [rebate] for a study to identify recommissioning opportunities within your facility
- 3 (RCx) Rebate of [rebate] for implementing opportunities

[Action] Action program encouraged

- 1 Purchased a **[EEMeasure]** (Motors/Controls)
- 2 (RCx) Implement opportunities identified through the recommissioning study
- 3 (RCx) Have a recommissioning study done
- 4 (RCx) Implement energy-saving opportunities



[Measure type] generic product description

- 1 Motor
- 2 Control system
- 3 Building study

[EEMeasure] Specific high efficiency equipment implemented or service performed

- 1 Energy efficient motor
- 2 Variable speed drive (adjustable frequency drive)
- 3 Efficiency control systems
- 4 Opportunities identified through the recommissioning study (RCx)
- 5 Energy efficient motors and variable speed drives

[Stage] RCx program stage

- 1 Received study
- 2 Received study and implemented recommended measures
- 3 Implemented energy-saving measures

[ECO] Specific energy conservation opportunity measures implemented through RCx program

[Custom] Flagged if no prescriptive motors were installed

[Address] address where measure implemented

[Contact name] contact listed in participant files

[Program contact and phone number] name and phone number of Xcel Energy Market Research staff responsible for program evaluation:

Mandy McLean – Controls

Mike Morris - Motors

Bruce Nielsen - Recommissioning)

Introduction

Hello, my name is **[interviewer name]**, and I'm calling on behalf of Xcel Energy regarding your firm's participation in their **[program]**. May I speak with **[contact name]**?

- 1 Yes
- 2 No [attempt to convert]

(RCx) I'm with Tetra Tech, an independent research firm. I am calling to learn about your experiences with your recent recommissioning project and the rebates you received through Xcel Energy's **[program]**.



(MOTORS/CONTROLS) I'm with Tetra Tech, an independent research firm. I am calling to learn about your experiences with the **[EEMeasure]** that you received a rebate for through Xcel Energy's **[program]**.

I'm not selling anything; I'd just like to ask your opinion about this program. You should have received an email or letter from Xcel Energy explaining the purpose of this study. Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone unless you grant permission.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored and that this call will take between 15 and 20 minutes of your time.

(Who is doing this study: Xcel Energy has hired our firm to evaluate the program. As part of the evaluation, we're talking with customers that participated in the program to understand their experiences and satisfaction with the program.)

(Why are you conducting this study: Studies like this help Xcel Energy better understand customers' need for and interest in energy efficiency programs and services.)

(Timing: This survey should take between 15 and 20 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.)

(Sales concern: I am not selling anything; we would simply like to learn about your experience with the program. Your responses will be kept confidential. If you would like to talk with someone from Xcel Energy about this study, feel free to call **[program contact and phone number]**.)

(NOTE: For all questions, "DON'T KNOW" and "REFUSED" will be coded if offered as a response.)

Identification of Decision-Maker

C1 (MOTORS/CONTROLS) Program records indicate that you received a rebate for a **[EEMeasure]** through the **[program]** around **[date]**. Is this correct? (ASK FOR EACH MEASURE REBATED)

(RCx) Program records indicate that you received a rebate (IF STAGE = 1) for conducting a recommissioning study (IF STAGE = 2: and a rebate for **[ECO]**) (IF STAGE = 3) for **[ECO]** through the Recommissioning program around **[date]**. Is this correct?

- 1 Yes (*SKIP TO C5*)
- 2 No (*SPECIFY WHAT IS INCORRECT ABOUT THIS STATEMENT. IF DOESN'T RECALL MEASURE, ASK C2*)

C2 (ASK IF DOESN'T RECALL THE MEASURE) Is there someone else at your firm that would be more knowledgeable about your organizations' participation in Xcel Energy's **[program]**?

- 1 Yes (*SKIP TO C4*)
 - 2 No
- D DON'T KNOW
R REFUSED (*TERMINATE*)



C3 Through Xcel Energy's **[program]**, your organization received **[all assistance]**. Are you sure you don't recall this? (RECORD ONE NUMBER)

- 1 Don't remember (*TERMINATE, RECORD ANY COMMENTS*)
- 2 Remember (*READ, "GREAT, THEN LET'S CONTINUE", SKIP TO C5*)
- R REFUSED (*TERMINATE*)

C4 May I please speak with that person? (RECORD ONE NUMBER)

- 1 Yes (*BEGIN THE SURVEY AGAIN WITH THIS NEW RESPONDENT*)
- 2 No (*TERMINATE*)
- D DON'T KNOW (*TERMINATE*)
- R REFUSED (*TERMINATE*)

C5 (RCx) Thank you. [IF STAGE = 2 OR STAGE = 3: For the rest of the survey, I'll be referring to those measures as "the implemented measures".] Are you the person most knowledgeable about your organization's decision to have a recommissioning study done (IF STAGE = 2: and implement the recommended measures) through Xcel Energy's **[program]**?

(MOTORS/CONTROLS) Are you the person most knowledgeable about your organization's decision to install **[EEMeasure]** through Xcel Energy's **[program]**?

- 1 Yes
- 2 No
- D DON'T KNOW (*TERMINATE*)
- R REFUSED (*TERMINATE*)

C6 (RCx) Who else at your company was involved in the decision of whether or not to (IF STAGE = 1 OR STAGE = 2) have a recommissioning study done (IF STAGE = 2: and implement the recommended measures)(IF STAGE = 3: implement the recommended measures) through the **[program]**?

(MOTORS/CONTROLS) Who else at your company was involved in the decision of whether or not to install **[EEMeasure]** through the **[program]**?

(PROBE: IF MORE THAN ONE DECISION MAKER, ASK R WHO WAS RESPONSIBLE FOR MAKING THE ULTIMATE DECISION)

- 1 No one else
- 2 (SPECIFY):

Name	Title	Phone number	Probe for role:

(IF RESPONDENT WAS INVOLVED IN THE DECISION, CONTINUE; ELSE TERMINATE AND DIAL ONE OF DECISION MAKERS IN C6)



Installation Verification

IO1a (RCx AND STAGE <> 3) How did you select the recommissioning study provider? (INDICATE ALL THAT APPLY)

- 1 List of providers
- 2 Obtain competitive bids from providers
- 3 Used previous provider
- 4 Recommendation from friend/colleague
- 5 White pages/Internet search
- 6 Internal staff conducted study
- 7 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

IO1b (RCx and STAGE = 2 OR STAGE = 3) Who implemented the [EEMeasure]? Someone within your organization or an outside contractor or vendor?

- 1 Internal staff
- 2 External contractor or vendor
- D DON'T KNOW
- R REFUSED

IO1c (IF IO1b=2) How did you select the contractor who implemented the recommendations from the study?

- 1 Recommendation of study provider
- 2 Used same provider that completed the study
- 3 Obtain competitive bids from providers
- 4 Used previous provider
- 5 Recommendation from friend/colleague
- 6 White pages/Internet search
- D DON'T KNOW
- R REFUSED

IO1d (RCx) Would you have preferred that Xcel Energy provide a preapproved list that you could choose from or did you like the flexibility of being able to select the study provider (STAGE=2: and the contractor who implemented the study recommendations?

- 1 Prefer to have a preapproved list
- 2 Prefer the flexibility to choose own contractor
- 3 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED



(REPEAT **I1a – I4 SERIES** FOR EACH **EEMeasure**)

(IF **RCX** AND **STAGE** = 1, **SKIP TO PA1**)

I1a (MOTORS/VSDS) Is/are the **[Quantity]** **[EEMeasure]** still installed and operating at your business?

(EFFICIENCY CONTROLS) Is/are the **[EEMeasure]** still installed and operating according to the recommended control strategy?

(**RCx** AND **STAGE** = 2 OR **STAGE** = 3) Is/are the **[EEMeasure]** still operating according to the study's recommended specifications?

- 1 Yes
- 2 No (**SKIP TO I2**)
- D DON'T KNOW (**IF NO OTHER KNOWLEDGEABLE R, TERMINATE**)
- R REFUSED (**IF NO OTHER KNOWLEDGEABLE R, TERMINATE**)

I1b (MOTORS) On what type of equipment was the **[EEMeasure]** installed?

- 1 Fan
- 2 Pump
- 3 Something else (**SPECIFY**)

(**ONLY ASK IF I1a** = NO. **ELSE SKIP TO PA1**)

I2 (MOTORS) Was it/Were they ever installed?
(**RCX**/EFFICIENCY CONTROLS) Was/were the **[EEMeasure]** ever in operation?

- 1 Yes (**SKIP TO I4**)
- 2 No
- D DON'T KNOW
- R REFUSED

I3 Do you plan on implementing **[EEMeasure]** at **[address]**?

- 1 Yes → When do you plan to install it? _____ (month) ____ (year)
- 2 No
- D DON'T KNOW
- R REFUSED



I4 (MOTORS) Why isn't it currently operating at [address]?

(EFFICIENCY CONTROLS/RCx) Why isn't it currently operating according to the recommended control/ recommissioning strategy at [address]? (SELECT ALL THAT APPLY)

- 1 Equipment didn't work properly
- 2 Equipment failed/broke
- 3 Unhappy with performance [SPECIFY]
- 4 Installed at other location [SPECIFY ADDRESS]
- 5 Lack of order to product
- 6 Change in production schedule
- 7 Eliminated production line permanently
- 8 Eliminated production line temporarily
- 9 Other [SPECIFY]
- D DON'T KNOW
- R REFUSED

Source of Program Awareness/Social Media

PA1 How did you learn about the [all assistance] available through Xcel Energy's [program]?
PROBE: Did you hear about the program from any other sources? (DO NOT READ LIST, RECORD ALL THAT APPLY)

- 1 Information in your mailbox (SKIP TO PA1a)
- 2 A phone call (SKIP TO PA1b)
- 3 By making a phone call (SKIP TO PA1c)
- 4 An online resource (SKIP TO PA1d)
- 5 A mass advertising campaign (SKIP TO PA1e)
- 6 Other (SPECIFY) (SKIP TO PA2)
- *7 Previous experience
- *8 Vendor
- *9 Xcel Energy event
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

(IF PA1 = 1)

PA1a Where did you receive the information in your mailbox from?

- 1 A flyer in your Xcel Energy bill (bill insert) (SKIP TO PA2)
- 2 Stand-alone direct mail piece from Xcel Energy (SKIP TO PA2)
- 3 Information from a vendor that sells the equipment or service related to the program (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

(IF PA1 = 2)



PA1b Who did you receive a phone call from?

- 1 From an Xcel Energy Account Manager (*SKIP TO PA2*)
- 2 From Xcel Energy's Business Solution Center (BSC) (*SKIP TO PA2*)
- 3 From a vendor that sells the equipment or service related to the program (*SKIP TO PA2*)
- D DON'T KNOW (*SKIP TO PA2*)
- R REFUSED (*SKIP TO PA2*)

(*IF PA1 = 3*)

PA1c Who did you call?

- 1 Xcel Energy about your bill or your service (*SKIP TO PA2*)
- 2 Xcel Energy specifically about the program(s) (*SKIP TO PA2*)
- 3 A vendor that sells the equipment or service related to the program (*SKIP TO PA2*)
- D DON'T KNOW (*SKIP TO PA2*)
- R REFUSED (*SKIP TO PA2*)

(*IF PA1 = 4*)

PA1d Which online resource?

- 1 Email from Xcel Energy (*SKIP TO PA2*)
- 2 Xcel Energy's website (*SKIP TO PA2*)
- 3 A vendor's website (*SKIP TO PA2*)
- 4 An online ad (*SKIP TO PA2*)
- 5 An Xcel Energy blog (*SKIP TO PA2*)
- 6 A blog other than Xcel Energy's (*SKIP TO PA2*)
- 7 Xcel Energy's Facebook fan page (*SKIP TO PA2*)
- 8 Xcel Energy's Twitter page (*SKIP TO PA2*)
- D DON'T KNOW (*SKIP TO PA2*)
- R REFUSED (*SKIP TO PA2*)

(*IF PA1 = 5*)

PA1e What type of advertising campaign?

- 1 A radio ad (*SKIP TO PA2*)
- 2 A television ad (*SKIP TO PA2*)
- 3 A newspaper ad (*SKIP TO PA2*)
- 4 Billboards (*SKIP TO PA2*)
- D DON'T KNOW (*SKIP TO PA2*)
- R REFUSED (*SKIP TO PA2*)



PA2 How would you prefer to learn more about the **[program]** or other energy efficiency programs offered by Xcel Energy in the future? By... (READ LIST)

- 1 Receiving information in your mailbox (SKIP TO PA2a)
- 2 Receiving a phone call (SKIP TO PA2b)
- 3 You making a phone call (SKIP TO PA2c)
- 4 You using an online resource or e-mail (SKIP TO PA2d)
- 5 A mass advertising campaign (SKIP TO PA2e)
- 6 Other (SPECIFY)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA2a Where would you prefer to receive it from?

- 1 A flyer in your Xcel Energy bill (bill insert) (SKIP TO PA3)
- 2 Stand-alone direct mail piece from Xcel Energy (SKIP TO PA3)
- 3 Information from a vendor that sells the equipment or service related to the program (SKIP TO PA3)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA2b Who would you prefer to receive a phone call from?

- 1 From an Xcel Energy account manager (SKIP TO PA3)
- 2 From Xcel Energy's Business Solution Center (BSC) (SKIP TO PA3)
- 3 From a vendor that sells the equipment or service related to the program (SKIP TO PA3)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA2c Who would you prefer to call?

- 1 Xcel Energy about your bill or your service (SKIP TO PA3)
- 2 Xcel Energy specifically about the program(s) (SKIP TO PA3)
- 3 A vendor that sells the equipment or service related to the program (SKIP TO PA3)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA2d Which online resource?

- 1 Email from Xcel Energy (SKIP TO PA3)
- 2 Xcel Energy's website (SKIP TO PA3)
- 3 A vendor's website (SKIP TO PA3)
- 4 An Online ad (SKIP TO PA3)
- 5 An Xcel Energy blog (SKIP TO PA3)
- 6 An blog other than Xcel Energy's (SKIP TO PA3)
- 7 Xcel Energy's Facebook fan page (SKIP TO PA3)
- 8 Xcel Energy's Twitter page (SKIP TO PA3)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA2e From what type of advertising campaign?

- 1 A radio ad (SKIP TO PA3)



- 2 A television ad (SKIP TO PA3)
- 3 A newspaper ad (SKIP TO PA3)
- 4 Billboards (SKIP TO PA3)
- D DON'T KNOW (SKIP TO PA3)
- R REFUSED (SKIP TO PA3)

PA3 (RCx) Where does your organization typically go to get information on recommissioning?

(RECORD VERBATIM)

99 Have not looked into recommissioning before participation

Net-to-Gross Questions¹⁶

(IF RCX & STAGE = 1, SKIP)

N1 Why did you decide to purchase/implement **[EEMeasure]**? (CHECK ALL THAT APPLY. DO NOT READ LIST. PROBE WITH "Were there any other reasons?")

- 1 (The program incentive)
- 2 (The program-provided technical assistance)
- 3 (RCX only: The program-subsidized study)
- 4 (Recommendation of third party contractor/engineer)
- 5 (Recommendation of Xcel Energy staff)
- 6 (Recommendation of internal staff)
- 7 (Wanted to save energy)
- 8 (Wanted to reduce costs)
- 9 (Past experience with the program)
- 10 (Funding from an outside source – SPECIFY SOURCE & AMOUNT)
- 11 (Something else – SPECIFY)
- D DON'T KNOW
- R REFUSED

N2 (ASK IF PRESCRIPTIVE MOTORS) Did you hear about Xcel Energy's **[program]** BEFORE or AFTER you decided to purchase/implement the exact same **[EEMeasure]** that was eventually purchased/implemented? (PROGRAM INFLUENCE SCORE)

- 1 Before
- 2 After
- D DON'T KNOW
- R REFUSED

¹⁶ The question numbers in this section match the numbering in the CA PDF file describing the NTGR approach and analysis document revised May 8, 2009.



N2a (MOTORS/CONTROLS) Did you receive a feasibility study or custom analysis through the [program]?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

N2b (RCx AND STAGE = 1 OR STAGE = 2) The Recommissioning program paid a portion of the cost for a study of your facility that identified energy conservation opportunities. Using a 0 to 10 scale, where 0 means not at all important and 10 means very important, please rate the importance of that financial assistance in your decision to conduct the recommissioning study at that time?

- ___ 0-10 rating
- D DON'T KNOW
- R REFUSED

N3 (MOTORS) The program offers rebates to cover a portion of the cost of purchasing and implementing energy efficient motors and drives on fans and pumps.

(CONTROLS): The program offers custom engineering analysis of proposed projects to determine a pre-approved rebate amount based on potential energy savings for implementing energy efficient building control systems

(RCx IF STAGE=2): In addition to paying a portion of the cost for a recommissioning study, the program provides rebates for implementing energy efficient recommissioning opportunities identified in the study

(RCx IF STAGE = 3) The program provides rebates for implementing energy efficient recommissioning opportunities at your facility.

With that in mind, I'm going to ask you to rate the importance of factors that might have influenced your decision to purchase/implement [EEMeasure]. Using a 0 to 10 scale, where 0 means not at all important and 10 means very important, please rate the importance of each of the following in your decision to purchase/implement this [EEmeasure] at this time. (ROTATE LIST; AT END OF LIST ASK: Is there anything else that I may have missed? RECORD RESPONSE AS OTHER)

- a. The age or condition of the old equipment
- b. Availability of the program rebate (TIMING AND SELECTION SCORE¹⁷)
- c. (IF MOTORS & CONTROLS & N2a=YES) Information provided through an Xcel Energy feasibility study or audit or custom analysis (TIMING AND SELECTION SCORE)
- d. Recommendation from a vendor/supplier (IF > 5, COLLECT NAME AND CONTACT INFORMATION OF VENDOR AND INTERVIEW VENDOR) (TIMING AND SELECTION SCORE)

¹⁷ For items that are used in the NTGR algorithm, we have indicated the score where the response is used. Appendix A at the end of this document explains how the questions are used in the algorithm.



- e. Previous experience with the **[program]**
- f. Information from the program training course or seminar (TIMING AND SELECTION SCORE)
- g. Information from the program or utility marketing materials (TIMING AND SELECTION SCORE)
- h. Standard practice or corporate policy in our business
- i. Payback on investment
- j. General concerns about the environment/global warming/energy independence
- k. (IF Q1=YES) Financial assistance or rebate from [INSERT Q2 SOURCE]
- l. Other (SPECIFY)

N4 Now I'd like to ask you about the importance of the program (IF RCX AND STAGE = 1 OR STAGE = 2: including the program-subsidized study) to your decision. Again using the 0 to 10 rating scale, where 0 means "Not at all important" and 10 means "Very important", please rate the overall importance of program versus [IF N3A > N3J: the age or condition of the old equipment] [IF N3J > N3A: your general concerns about the environment] [IF N3A = N3J: factors outside of the program such as the age or condition of the old equipment and your general concerns about the environment] in your decision to implement the specific **[EEMeasure]**.

I'd like you to give me a 0 to 10 score for the program's influence and a 0 to 10 score for the influence of the most important other factor so that the two scores total 10. (PROGRAM INFLUENCE SCORE)

a. ____ rating of the importance of the **[program]**

b. ____ rating of the importance of most important other factor

N5 Now I would like you to think about the action you would have taken if the **[program]** had not been available.

N5a (RCx, STAGE = 1) 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 had a recommissioning study done if the **[program]** had not been available? (NO-PROGRAM SCORE)

____ (0-10)
 D DON'T KNOW
 R REFUSED

N5b (MOTORS/CONTROLS) 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 installed exactly the same equipment if the **[program]** had not been available? (NO-PROGRAM SCORE)

(RCx, STAGE=2 OR STAGE = 3) 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 [EEMeasure] if the **[program]** had not been available? (NO-PROGRAM SCORE)

____ (0-10)
 D DON'T KNOW
 R REFUSED



(ASK IF N5>0)

N6 (MOTORS/CONTROLS) You said that there was a **[N5 response]** in 10 likelihood that you would have installed exactly the same equipment if the **[program]** had not been available. When do you think you would have installed this equipment?

(RCx if STAGE=1) You said that there was a **[N5 response]** in 10 likelihood that you would have had a recommissioning study done if the **[program]** had not been available. When do you think you would have had a recommissioning study done?

(RCx if STAGE=2) You said that there was a **[N5 response]** in 10 likelihood that you would have had a recommissioning study done and implemented **[EEMeasure]** if the **[program]** had not been available. When do you think you would have had a recommissioning study done and implemented **[EEMeasure]**?

(NO-PROGRAM SCORE)

(RCx if STAGE=3) You said that there was a **[N5 response]** in 10 likelihood that you would have implemented **[EEMeasure]** if the **[program]** had not been available. When do you think you would have mplemented **[EEMeasure]**?

(NO-PROGRAM SCORE)

(INTERVIEWER: PLEASE ANSWER IN MONTHS)

- ☐ Within 6 months? [NTG = 0]
- ☐ 6 – 47 months later [NTG=(months-6)*.024]
- ☐ 4 or more years later [NTG=1]
- ☐ Never [NTG=1]
- ☐ D DON'T KNOW [NTG=1]

R REFUSED



PARTIAL FREE-RIDERSHIP BATTERY¹⁸
--

P1a (MOTORS/CONTROLS) Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not participated in the program, which of the following alternatives would you have been MOST likely to do? (READ LIST, RANDOMIZE OPTIONS 1-6, INDICATE ONLY ONE)

- 1 Install or implement fewer high efficiency units
- 2 Install standard efficiency equipment or whatever required by code
- 3 Install equipment more efficient than code, but less efficient than we installed through the program
- 4 Repair/refurbish the existing equipment
- 5 Done nothing (keep the existing equipment as is)
- 6 Install the exact same equipment
- 7 Something else (specify)
- D DON'T KNOW
- R REFUSED

P1b (RCx AND STAGE <> 1) Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not participated in the program, which of the following alternatives would you have been MOST likely to do? (READ LIST, INDICATE ONLY ONE)

- 1 Implement fewer recommendations
- 2 Done nothing (keep the existing equipment as is)
- 3 Implement the exact same recommendations
- 4 Something else (specify)
- D DON'T KNOW
- R REFUSED

(IF P1a=1 or P1b = 1)

P4 How many measures would you have installed or implemented? (RECORD NUMBER OF UNITS OR PERCENTAGE OF UNITS ACTUALLY INSTALLED)

- ___ Number of units OR ___ Percentage of units
- D DON'T KNOW
 - R REFUSED

P6 (IF P1a=3 and MOTORS) Can you tell me what model or efficiency level you were considering as an alternative? (INTERVIEWER: IT IS OK TO TAKE AN ANSWER SUCH AS "10% more efficient than code", "10% less efficient than the program equipment", "standard efficiency motor", or "premium efficiency motor".)

(RECORD VERBATIM)

¹⁸ This battery is used to adjust gross savings prior to applying the NTGR



P7a (IF MOTORS OR CONTROLS) Did this equipment replace existing equipment?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

P7B (IF MOTORS OR CONTROLS AND P7A = YES) How long do you think the existing equipment/control system would have lasted before requiring replacement?

- ____ Years
- D DON'T KNOW
- R REFUSED

Like Spillover

S1 Since you participated in the **[program]**, have you purchased/implemented the same **[EEMeasure]** without the assistance of an Xcel Energy program at this facility or at other locations served by Xcel Energy?

- 1 Yes, only at this facility
- 2 Yes, only at another facility
- 3 Yes, at both this and another facility
- 4 No (*SKIP TO S6*)
- D DON'T KNOW (*SKIP TO S6*)
- R REFUSED (*SKIP TO S6*)

S2 What specific energy efficiency measure did you purchase/implement without the assistance of an Xcel Energy program? (DO NOT READ; INDICATE ALL THAT APPLY)

- 1 Energy efficient motor (SPECIFY QUANTITY AND HP CLASS BY 1-40 HP, 41-100 HP, 101-500 HP, or 501+ HP)
- 2 Variable speed drive (SPECIFY QUANTITY)
- 3 Efficiency control system (SPECIFY TYPE AND NUMBER OF ADDITIONAL LOCATIONS/SYSTEMS)
- 4 Recommissioning study → How many?
- 5 An opportunity identified in recommissioning study (SPECIFY)
- 7 Other (specify) → How many?
- D DON'T KNOW
- R REFUSED

(ASK IF S2=1 AND MOTORS)

S3 How do you know that this equipment is high efficiency or otherwise saves energy? (PROBE: IS IT LABELED AS "NEMA PREMIUM"? IS IT ENERGY STAR® RATED; DID THE VENDOR TELL YOU?)

(RECORD VERBATIM)



- S4** I'm going to read a statement about the energy efficiency measure that you purchased/implemented on your own. On a scale from 0-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

My past experience with the **[program]** influenced my decision to install or implement this **[S2 response]** on my own.

____ (0-10)
 D DON'T KNOW
 R REFUSED

- S5** Why did you purchase/implement this energy efficiency measure without going through an Xcel Energy program? (DO NOT READ; INDICATE ALL THAT APPLY)

- a. Application process too burdensome/Too much paperwork
- b. Takes too long to get pre-approval
- c. Takes too long to approve the rebate
- d. No time to participate, needed equipment immediately
- e. The program had ended
- f. The equipment would not qualify (PROBE: WHY NOT?)
- g. The amount of the rebate wasn't important enough
- h. Did not know program was available for this equipment
- i. There was no program available
- j. Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

- S6** (MOTORS) Do you plan to install any new drives or motors in the next year?

- 1 Yes (Specify: Motor, Drive, or Both)
- 2 No (*SKIP TO SA1*)
- D DON'T KNOW (*SKIP TO SA1*)
- R REFUSED (*SKIP TO SA1*)

- S7** (MOTORS) Which equipment types and sizes are you likely to install, regardless if you use Xcel Energy's program or not?

- 1 1 to 40 horsepower (HP) motor (SPECIFY: Is this an upgrade or replacement?)
- 2 41 to 100 horsepower motor (SPECIFY: Is this an upgrade or replacement?)
- 3 101 to 500 horsepower motor (SPECIFY: Is this an upgrade or replacement?)
- 4 500 or greater horsepower motor (SPECIFY: Is this an upgrade or replacement?)
- 5 1 to 50 horsepower VFD
- 6 51 to 200 horsepower VFD
- 7 200 or greater horsepower VFD
- D DON'T KNOW
- R REFUSED

Program Satisfaction



Next I'd like to ask you some questions about your experiences when participating in the **[program]**.

SA1a (CONTROLS) Who completed the pre-approval application, including the project worksheet, for you? (INDICATE ALL THAT APPLY)

(RCx) Who completed the pre-approval application for you? (INDICATE ALL THAT APPLY)

- 1 The Xcel Energy account representative
- 2 The equipment or study vendor
- 3 Respondent
- 4 Someone else at your company
- 5 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

SA1b (RCx AND STAGE <> 3) Who completed the study rebate application for you? (INDICATE ALL THAT APPLY)

- 1 An Xcel Energy account representative
- 2 The study vendor
- 3 Respondent
- 4 Someone else at your company
- 5 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

SA1c (RCx/MOTORS) And who completed the implementation rebate application form for you? (INDICATE ALL THAT APPLY)

- 1 An Xcel Energy account representative
- 2 The equipment vendor
- 3 Respondent
- 4 Someone else at your company
- 5 Other (SPECIFY)
- N Not yet complete
- D DON'T KNOW
- R REFUSED



SA1d (IF SA1c = 3) Did you require any assistance from Xcel staff or an equipment vendor?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

SA1e (IF SA1d = 1) With what did you require assistance? (DO NOT READ)

- 1 Motor type
- 2 Model number
- 3 Drive HP
- 4 Motor HP
- 5 Efficiency
- 6 General specifications
- 7 Custom process info/operations worksheet
- 8 Other, SPECIFY

SA2a (RCx AND STAGE <> 3) Who told you how much rebate you would receive for conducting a recommissioning study? (INDICATE ALL THAT APPLY)

- 1 Xcel Energy representative
- 2 Study vendor
- 3 No one – I figured it out myself
- 4 Other (specify)
- D DON'T KNOW
- R REFUSED

SA2b (CONTROLS/MOTORS/RCx IF STAGE=2 OR 3) Who told you how much rebate you would receive for installing **[EEMeasure]** through the program? (INDICATE ALL THAT APPLY)

- 1 Xcel Energy representative
- 2 Contractor or vendor
- 3 Pre-approval letter
- 4 No one – I figured it out myself
- 5 Other (specify)
- D DON'T KNOW
- R REFUSED

SA3a (RCx AND STAGE <> 3) Was the rebate amount you received for the recommissioning study less, more, or the same as was initially determined/estimated?

- 1 Less → Why was it less? (RECORD VERBATIM)
- 2 More
- 3 The Same
- D DON'T KNOW
- R REFUSED



SA3b (CONTROLS/MOTORS/RCx IF STAGE=2 OR 3) Was the rebate amount you received less, more, or the same as was initially determined/estimated for project implementation? ?

- 1 Less → Why was it less? (RECORD VERBATIM)
- 2 More
- 3 The Same
- D DON'T KNOW
- R REFUSED

SA4 Using a 0 to 10 scale, with 0 being very dissatisfied and 10 being very satisfied, how satisfied are you overall with the Xcel Energy **[program]**?

- ___ (0-10)
- D DON'T KNOW
- R REFUSED

SA5 Why do you say that?

(RECORD VERBATIM)

SA6 Next, I'd like you to tell me how satisfied you are with specific aspects of the **[program]** on that same 0-10 scale with 0 being very dissatisfied and 10 being very satisfied. (ROTATE LIST)

- a. ___ (0-10) The type of equipment eligible for the program (If <7, probe: Why is that?)
- b. ___ (0-10) Requirements for equipment eligibility (If <7, probe: Why is that?)
- c. ___ (0-10) (CUSTOM MOTORS/CONTROL) The length of time it took from project start to end (If <7, probe: Why is that?)
- d. ___ (0-10) (RCx AND STAGE <> 3) The length of time it took from study start to study end (If <7, probe: Why is that?)
- e. ___ (0-10) (RCx) The length of time it took from implementation start to implementation end (If <7, probe: Why is that?)
- f. ___ (0-10) (MOTORS/CONTROL) The amount of the rebate (If <7, probe: Why is that?)
- g. ___ (0-10) (RCx AND STAGE <> 3) The amount of the study rebate (If <7, probe: Why is that?)
- h. ___ (0-10) (RCx) The amount of the implementation rebate (If <7, probe: Why is that?)
- i. ___ (0-10) The rebate application process in general
- j. ___ (0-10) (RCx/CUSTOM MOTORS) The pre-approval process, including the required project documentation (If <7, probe: Why is that?)
- k. ___ (0-10) (CONTROL) The pre-approval process, including the project worksheet (If <7, probe: Why is that?)
- l. ___ (0-10) (RCX) The study done to identify potential energy saving measures (If <7, probe: Why is that?)
- m. ___ (0-10) The program's handling of your questions or complaints (If <7, probe: Why is that?)
- n. ___ (0-10) The amount of time it took to receive the rebate (If <7, probe: Why is that?)
- o. ___ (0-10) (RCx/CONTROLS) The contractor who installed the equipment or implement the measures (If <7, probe: Why is that?)
- p. ___ (0-10) The support you received from Xcel Energy (If <7, probe: Why is that?)
- q. ___ (0-10) (RCx) The amount of energy savings or measures identified in your study



SA6x (IF SA6i<7) You mentioned earlier that you weren't satisfied with the application process. What is the most difficult part of the application process? (DO NOT READ, RECORD ALL)

- 1 Understanding how to complete the application
- 2 Time required to fill out application
- 3 Amount of information required
- 4 Getting/providing the technical specifications
- 5 Determining the rebate
- 6 Determining if motor is enhanced efficiency/higher than premium
- 7 Time lapse between completing the application and getting approval from Xcel Energy
- 8 Other
- D DON'T KNOW
- R REFUSED

SA7a (RCx AND STAGE <> 3) What barriers did you face, either inside or outside of your company, when deciding whether or not to have a recommissioning study done?

(SAME RESPONSE CATEGORIES AS SA7b)

SA7b (MOTORS/CONTROLS/RCx IF STAGE=2 OR 3) What barriers did you face, either inside or outside of your company, when deciding whether or not to purchase or implement this [EEMeasure] through the program?

(DO NOT READ; INDICATE ALL THAT APPLY)

- 1 No barriers
- 2 Other priorities for capital spending
- 3 Lack of funds available for investment
- 4 Lack of financing
- 5 Economy
- 6 Amount of management time to oversee projects
- 7 Incremental cost for more efficient equipment higher than we expected
- 8 Rebate amount not high enough
- 9 Business hesitant to replace existing working equipment
- 10 Upper management doesn't see the benefit of energy efficient equipment
- 11 Unsure of energy savings potential
- 12 We lease the space
- 13 Contractors weren't familiar with program
- 14 Internal staff lacked expertise about measures
- 15 Rebate application process was demanding
- 16 Amount of information needed for pre-approval process
- 17 Other (SPECIFY)
- D DON'T KNOW

SA7c (CONTROLS) What types of equipment are controlled by the controls system implemented through Xcel Energy's program? (SELECT ALL THAT APPLY)

- 1 Lighting equipment
- 2 Heating equipment
- 3 Cooling equipment
- 4 Ventilation equipment
- 5 Other equipment
- D DON'T KNOW
- R REFUSED



SA7d (IF CONTROLS AND DID NOT INSTALL A LIGHTING CONTROLS SYSTEM IN SA7c) Are you aware that the Efficiency Controls program offers rebates for automated systems that centrally control lighting equipment, including a range of technologies such as occupancy sensors?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

SA7e (IF EFFICIENCY CONTROLS AND DID NOT INSTALL A LIGHTING CONTROLS SYSTEM) Has your company investigated or considered installing an efficient lighting controls system?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

(IF SA7D = 1)

SA7e Why haven't you pursued installing a lighting controls system through the program?

(RECORD VERBATIM)

SA8 Which aspects of the **[program]**, if any, would you change? (DO NOT READ LIST; INDICATE ALL THAT APPLY. PROBE: Anything else?)

- 1 No change
- 2 Include additional types of equipment (SPECIFY)
- 3 Increase the rebate level (SPECIFY)
- 4 Speed up the rebate processing
- 5 Speed up pre-approval process
- 6 Simplify the program application process or form (SPECIFY)
- 7 Require less information
- 8 (MOTORS) Do not require motors specifications
- 9 Have completely web-based/online process
- 10 (MOTORS) Eliminate pre-approvals for custom motors/VFDs
- 11 Give more detailed instructions or examples on application/form
- 12 Ensure that quoted rebate is the same as actual rebate
- 13 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

SA9 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? (IF NECESSARY, SAY:) You can use any number from 0 to 10. (REPEAT SCALE IF NECESSARY)

- ___ (0-10)
- D DON'T KNOW
- R REFUSED



Customer Characteristics

F1 Do you own or rent/lease the space you occupy at this location?

- 1 Own
- 2 Rent/lease
- 3 Own some and rent/lease some
- 4 Manage property
- 5 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F2 What actions other than the ones we have already discussed has your business taken at this location within the past few years in order to reduce your energy use. (DO NOT READ; INDICATE ALL THAT APPLY)

- 1 None
- 2 Installed high efficiency lighting equipment
- 3 Added lighting controls, occupancy sensors, and or time clocks
- 4 Installed high efficiency cooling equipment
- 5 Installed high efficiency heating equipment
- 6 Installed high efficiency ventilation equipment
- 7 Added controls to the heating, ventilation or air conditioning systems to reduce use
- 8 Made changes to the heating, ventilation or air conditioning system maintenance schedule
- 9 Made changes to the building envelope such as insulation, window film, etc.
- 10 Participated in other Xcel energy efficiency programs (SPECIFY)
- 11 Facility-wide energy awareness training
- 12 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F3 (IF HAVEN'T DONE ANYTHING) What are the reasons you haven't been able to make any additional energy saving improvements at this facility? (DO NOT READ; CIRCLE ALL THAT APPLY)

- 1 No need
- 2 Lack of available equipment
- 3 High initial cost
- 4 Don't know what to do
- 5 Don't have the staff to identify or make these improvements
- 6 Customer comfort
- 7 Need for certain look/feel (aesthetics)
- 8 Disruption to business operations
- 9 Lease the space
- 10 Poor economy
- 11 Budget constraints
- 12 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED



- F4** 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
D DON'T KNOW
- F5** 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
D DON'T KNOW
- F6** Those are all of the questions that we have. For confirmation, can you please tell me your title?
- (RECORD VERBATIM)
- COM** I'd like to thank you for your help with this survey! Do you have any comments you'd like to share?
- (RECORD VERBATIM)

Appendix A - NTGR Scoring Algorithm and Example

The calculation of the self-report-based core NTGR is described below. The NTGR is calculated as an average of three scores representing responses to one or more questions about the decision to install a program measure.

1. A **Timing and Selection** score that captures the influence of the most important of various program and program-related elements in influencing the customer to select the specific program measure at this time. Program influence through vendor recommendations is also captured in this score.
2. An overall **Program Influence** score that captures the perceived importance of the program (whether rebate, recommendation, or other information) in the decision to implement the specific measure that that was eventually adopted or installed. The overall program influence score is reduced by half if the respondent says they learned about the program only after they decided to install the program qualifying measure.
3. A **No-Program** score that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score accounts for deferred free-ridership by capturing the likelihood that the customer would have installed program qualifying measures at a later date if the program had not been available.



Calculation of each of the above scores is discussed below. For each score, the questions contributing to the calculation are presented (in parenthesis), the calculation is described, and an example is provided.

Timing and Selection Score

For the decision maker, the questions asked are:

Using a 0 to 10 rating scale, where 0 means not at all important and 10 means very important, please rate the importance of each of the following in your decision to implement this specific measure at this time:

- Availability of the PROGRAM rebate (N3b)
- Information provided through a recent feasibility study, energy audit or other types of technical assistance provided through the PROGRAM (N3c)
- Information from PROGRAM training course (N3f)
- Information from other PROGRAM marketing materials (N3g)
- Recommendation from a vendor/supplier (If >5, a vendor interview is triggered) (N3d)

For the vendor, the questions asked if the interview is triggered are:

- V1. I'm going to ask you to rate the importance of the **[program]** in influencing your decision to recommend [measure] to [Customer name] and other customers. Using a 0 to 10 scale where 0 is 'Not at all important' and 10 is 'Very Important', how important was the **[program]**, including incentives as well as program services and information, in influencing your decision to recommend that [Customer name] install the energy efficiency [measure] at this time?
- V2 And using a 0 to 10 likelihood scale, where 0 denotes "not at all likely" and 10 denotes "very likely," if the **[program]**, including incentives as well as program services and information, had not been available, what is the likelihood that you would have recommended this specific energy efficiency [measure] to [Customer name]?
- V3 Now, using a 0 to 100 percent scale, in what percent of total sales situations did you recommend [measure] before you learned about the **[program]**?
- V4 And using the same 0 to 100 percent scale, in what percent of total sales situations do you recommend [measure] now that you have worked with the **[program]**? (VMAX)
- V5 And, using the same 0 to 10 scale where 0 is "Not at all important" and 10 is "Very important", how important in your recommendation were . . . ?

____ Training seminars provided by Xcel Energy?

____ Information provided by the Xcel Energy website?

____ Your firm's past participation in a rebate or audit program sponsored by Xcel Energy?

If the vendor interview is triggered, a score is calculated that captures the highest degree of program influence on the vendor's recommendation. This score (VMAX) is calculated as the MAXIMUM value of the following:

1. The response to question V1
2. 10 minus the response to question V2
3. The response to question V4 minus the response to question V3, divided by 10
4. The response to question V5a.
5. The response to question V5b.
6. The response to question V5c.



The Timing and Selection Score is calculated as:

The highest of the responses to the first four decision maker questions and, if the vendor interview has been triggered, the VMAX score multiplied by the score the decision makers assigned to the vendor recommendation..

Example:

The decision maker provides responses of 5 for the importance of the rebate, 6 for an audit or feasibility study, 3 for training, 2 for other marketing materials, and 7 for the vendor recommendation, which means a vendor interview is triggered.

The vendor responses are 8 for the significance of the program, 5 for the likelihood of recommending the measure in the absence of the program, 40% for how often the measure was recommended before program awareness and 60% for how often it is recommended after program awareness, 3 for the importance of training, 2 for the importance of the website and 5 for the importance of previous participation. The VMAX score is the greatest of 8, $(10-5)$, $(60-40)/10$, 3, 2 and 5. So VMAX is 8. This score is multiplied by the importance of the vendor recommendation, to which the decision maker assigned a 7, so the vendor score is 5.6.

The timing and selection score is the maximum of the five decision maker responses (5, 6, 3, and 2) and the vendor score (5.6). Even though the vendor interview was triggered, the vendor score is not as high as the 6 assigned to the importance of the audit or feasibility study, so the timing and selection score is 6.

Program Influence Score

The questions asked are:

1. Did you hear about Xcel Energy's **[program]** BEFORE or AFTER you decided to purchase the exact same [measure] that was eventually purchased? (N2)
2. Now I'd like to ask you about the importance of the program (IF RCX: including the program-subsidized study) to your decision. Again using the 0 to 10 rating scale, where 0 means "Not at all important" and 10 means "Very important", please rate the overall importance of program versus *[IF N3A > N3J: the age or condition of the old equipment] [IF N3J > N3A: your general concerns about the environment] [IF N3A = N3J: factors outside of the program such as the age or condition of the old equipment and your general concerns about the environment]* in your decision to implement the specific **[EEMeasure]**.

I'd like you to give me a 0 to 10 score for the program's influence and a 0 to 10 score for the influence of the most important other factor so that the two scores total 10. (PROGRAM INFLUENCE SCORE)

a. ____ rating of the importance of the **[program]** (N4a)

b. ____ rating of the importance of most important other factor (N4b)

The program influence score is calculated as:

The program importance response, on the 0 to 10 scale, to question 2a reduced by half if the respondent became aware of the program only after having decided to adopt the program qualifying



measure per the response to question 1. As question 1 is only asked for projects without a pre-approval process, we assume that pre-approved projects (custom motors, controls, and recommissioning projects) were aware of the program before having decided to adopt the program qualifying measure.

Example:

The decision maker says they became aware of the program before deciding to implement the measure, and provides a response of 7 to question 2a. Therefore, the program influence score is 7.

No-Program Score

The questions asked are:

1. 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 installed exactly the same equipment if the **[program]** had not been available? (N5)
2. (IF 1>0). You said that there was a [N5 response] in 10 likelihood that you would have installed the same equipment if the **[program]** had not been available. When do you think you would have installed this equipment? (PLEASE ANSWER IN MONTHS) (N6)
 - a. _____ Within 6 months? (Deferred NTG Value=0)
 - b. _____ 7 to 47 months later (Deferred NTG Value=(months-6)*.024)
 - c. _____ 48 or more months later (Deferred NTG Value =1)
 - d. _____ Never (Deferred NTG Value=1)
 - d. _____ Don't know (Deferred NTG Value=1)

Note: The value 0.024 is 1 divided by 41 (41 is calculated as 47 – 6). This assumes that the deferred NTG value is a linear function beginning in month 7 through month 47, increasing 0.024 for each month of deferred installation.

The No-Program Score is calculated as:

10 minus (the likelihood of installing the same equipment multiplied by one minus the deferred net-to-gross value associated with the timing of that installation).

Example:

The respondent says there is a 4 in 10 likelihood that they would have installed the same equipment. In response to question 5, the decision maker says they would have installed the qualifying equipment 18 months later, which has a NTGR value of $(18-6)*.024$, or .29 associated with it.

The No-Program score is 10 minus $(4*(1-.29))$, which is 10 minus $4*.71$ or 7.16.

Core NTG Ratio



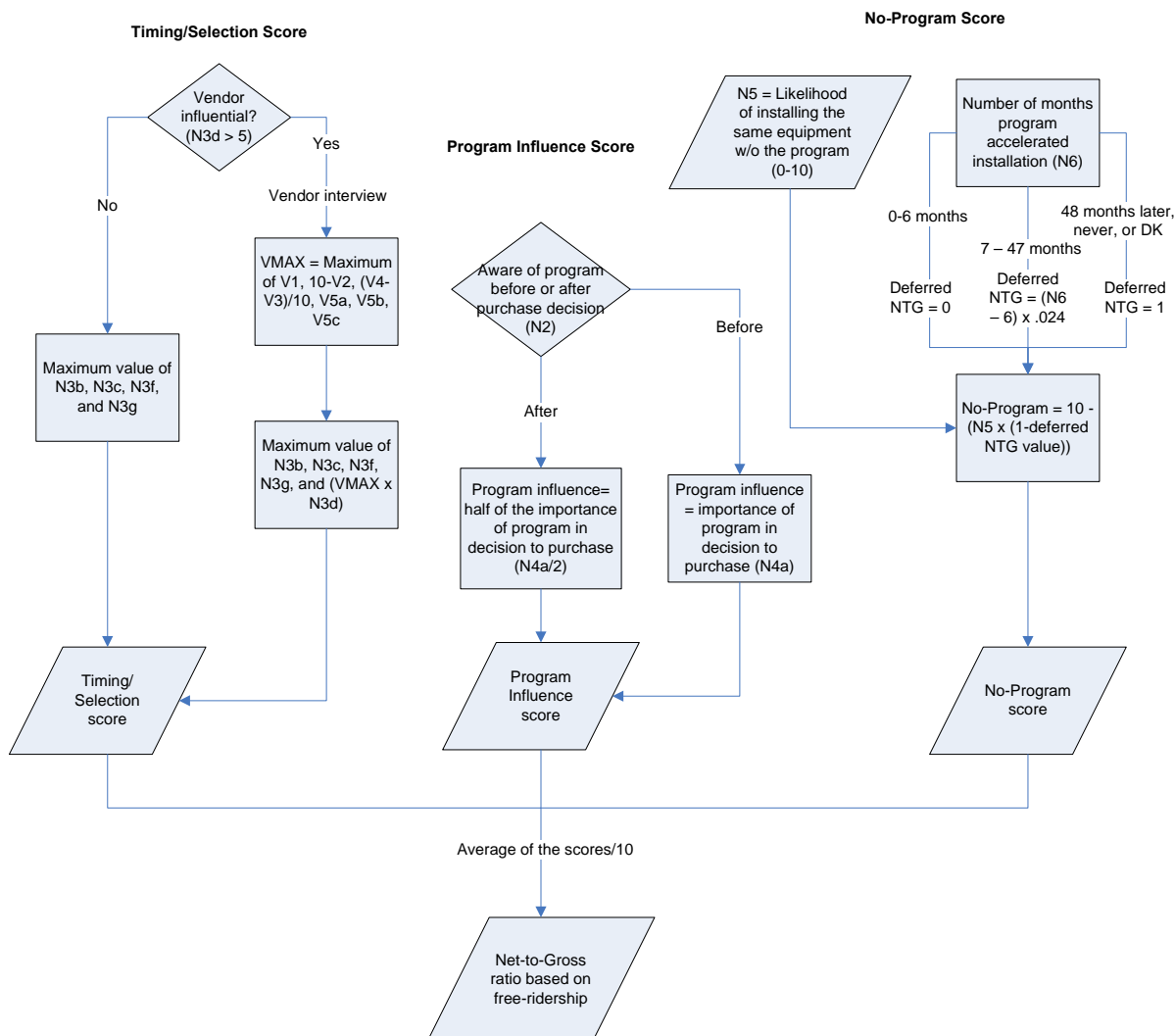
The self reported NTGR ratio is simply the average of the Program Influence, Timing and Selection, and No-Program Scores, divided by 10.

Example:

The NTGR is the average of 6, 8 and 7.2, or 7.1 divided by 10 = .71. This figure is then applied to adjusted gross savings to yield net savings.

The following flowchart documents the calculation of the self-report-based core NTG ratio.

Figure 11-1. Self-report NTGR flowchart



Accounting for Partial Free-ridership

What is referred to as partial free-ridership is accounted for in the gross impact analysis and not in the NTGR calculation. Information is gathered on partial free-ridership using the following questions asked as part of the decision maker NTGR survey.



P1a (MOTORS/CONTROLS) Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not participated in the program, which of the following alternatives would you have been MOST likely to do? (READ LIST, INDICATE ONLY ONE)

- 1 Install or implement fewer high efficiency units
- 2 Install standard efficiency equipment or whatever required by code
- 3 Install equipment more efficient than code, but less efficient than we installed through the program
- 4 Repair/refurbish the existing equipment
- 5 Done nothing (keep the existing equipment as is)
- 6 Install the exact same equipment
- 7 Something else (specify)
- D DON'T KNOW
- R REFUSED

P1b (RCx) Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not participated in the program, which of the following alternatives would you have been MOST likely to do? (READ LIST, INDICATE ONLY ONE)

- 1 Implement fewer recommendations
- 2 Done nothing (keep the existing equipment as is)
- 3 Implement the exact same recommendations
- 4 Something else (specify)
- D DON'T KNOW
- R REFUSED

P4 (IF P1a=1 or P1b = 1) How many measures would you have installed or implemented? (RECORD NUMBER OF UNITS OR PERCENTAGE OF UNITS ACTUALLY INSTALLED)

- ___ Number of units OR ___ Percentage of units
- D DON'T KNOW
- R REFUSED

P6 (IF P1a=3 and MOTORS) Can you tell me what model or efficiency level you were considering as an alternative? (INTERVIEWER: IT IS OK TO TAKE AN ANSWER SUCH AS "10 PERCENT MORE EFFICIENT THAN CODE" OR "10 PERCENT LESS EFFICIENT THAN THE PROGRAM EQUIPMENT")

(RECORD VERBATIM)

P7a (IF MOTORS OR CONTROLS) Did this equipment replace existing equipment?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED



P7b (IF P1a=4 AND MOTORS AND OR CONTROLS AND it is a 'Retrofit/Replacement' project AND P7A = YES) How long do you think the existing equipment/control system would have lasted before requiring replacement?

____ Years
 D DON'T KNOW
 R REFUSED

As noted above, it is most appropriate to address partial free-ridership by adjusting the gross savings, the partial free-ridership questions should be asked of the key project decision maker during the NTG interview as well as by the engineer(s) conducting the on-site for a given project at the time the on-site audit is taking place. This information should help the NTG analysis team gain a more complete understanding of the equipment selection decision. However, all partial free-ridership findings will be passed back to the engineer for consideration in any calculations they may make.

Since the partial free-ridership adjustment will be taking place in the gross savings calculation and since the current NTG scoring algorithm does not incorporate the partial free-ridership questions, there is no need to incorporate partial free-ridership into the NTG scoring algorithm. However, when weighing other information that might have been used to override the algorithm-derived NTG score, the NTG analysis team will need to ensure that we are not inadvertently adjusting the savings twice for the same partial free-ridership i.e., through adjustments both to the gross savings calculation and to the NTG ratio.

Appendix B – “Like” Spillover methodology

California's self-report protocol includes a battery of questions to quantify spillover for use in estimating spillover. The spillover methodology uses a series of questions designed to measure "like" spillover. These questions ask about recent purchases (since program participation) of any additional energy-efficient equipment of the same type as installed through the program that were made *without* any technical or financial assistance from the utility, but were influenced by the program. A "like" spillover estimate is computed based on how much more of the same energy-efficient equipment the participant installed outside the program and did so because of their positive experience with the program.

Survey free-ridership questions are followed by questions designed to measure "like" spillover. These questions ask about recent purchases (since program participation) of any additional energy-efficient equipment of the same type as installed through the program that were made *without* any technical or financial assistance from the utility. A "like" spillover estimate is computed based on how much more of the same energy-efficient equipment the participant installed outside the program and did so because of their positive experience with the program. This estimate is separate from the free-ridership estimate and does not factor into any free-ridership analysis.

One of the issues with attempting to quantify spillover savings is how to value the savings of measures installed outside the program since we are relying on customer self-reports of the quantity and efficiency of any measures installed. We use a conservative approach and report only those measures installed outside the program that were of exactly the same type and efficiency as the ones installed through the program. Our conservative approach allows customers to be more certain about whether the equipment they installed outside the program was the same type as the program equipment. This, in turn, makes it possible for us to use the estimated program savings for that measure to calculate the customer's "like" spillover savings.

The following flowchart documents the calculation of the self-report-based spillover savings.



Figure 11-2. Self-report Spillover flowchart

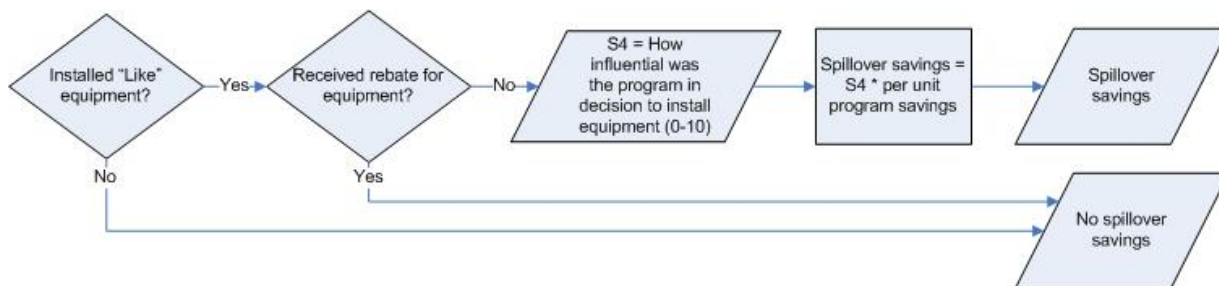


Table 11-1. Xcel Energy Participant Cooperation Rate

Sample Disposition	Colorado Motors & Drives	Colorado Recommissioning			Minnesota Recommissioning			Minnesota Efficiency Controls
		Study only	Implemented	Total	Study only	Implemented	Total	
Sample Size	255	40	22	62	38	40	78	74
Number not in service ⁴	10	0	0	0	2	2	4	0
Non-working number ⁴	9	3	1	4	0	0	0	2
Removed per Xcel Energy's request ¹	21	1	10	11	2	0	2	0
Ineligible - Does not recall participation, or incorrect contact	9	1	0	1	13	5	18	8
Disconnected number	2	4	0	4	0	0	0	0
Adjusted Sample Size	204	31	11	42	21	33	54	64
Hard Refusal	3	1	0	1	0	1	1	0
Soft Refusal	3	0	1	1	0	0	0	2
Incompletes (partial interviews)	5	1	0	1	0	1	1	0
Unavailable for duration	1	0	0	0	1	0	1	1
Language barrier/non-English	0	0	0	0	0	0	0	0
Active ²	94	9	6	15	9	19	28	28
Completed Surveys	98	20	4	24	11	12	23	33
Cooperation Rate ³	48.0%	64.5%	36.4%	57.1%	52.4%	36.4%	42.6%	51.6%

¹ Examples of these include: did not actually participate in program, account managers requesting their clients not be contacted further, etc.

² An average of 6 contacts per active case were made to reach these still active cases

³ Number of completed surveys divided by Adjusted Sample Size

⁴ All bad numbers were traced with a telephone append service or directory assistance service



APPENDIX D: NONPARTICIPANT SURVEY AND COOPERATION RATE

A.16 XCEL ENERGY BUSINESS DSM NONPARTICIPANT SURVEY

(Final)

One nonparticipant survey will be used for the following programs: Motors/VSD Program, Recommissioning Program, and the Efficiency Controls Program. Program specific questions are noted where applicable. Separate sample lists will be provided by Xcel Energy program staff.

The complete list of survey modules follows:

- Introduction
- Identification of Decision-Maker
- Source of Program Information/Social Media
- Important Factors in Decisions to Purchase New Equipment
- Satisfaction
- Operating Hours
- Customer Characteristics

Sample variables

The following fills will be used throughout the survey. These fills are program and measure specific. Some of these may need to be revised once we have had a chance to examine the participant database.

[Program] Program name

- 4 Motor & Drive Efficiency Program
- 5 Recommissioning Program
- 6 Efficiency Controls Program

[Program description] Program description

(MOTORS) provides rebates for the installation of energy efficient motors and variable speed drives (sometimes referred to as adjustable frequency drives) for controlling the motors that operate fans and pumps.

(CONTROLS): provides rebates for the installation of a system of controls that are centrally operated, typically via a computer software package. These systems have the potential to control facility functions in a way that saves energy, either through operator action or automatic programming. The most common energy-using applications controlled by a control system include heating, cooling, ventilation, and lighting.

(RCx) is designed to assist Xcel Energy's large commercial and industrial customers improve the efficiency of a building's existing operating systems. Recommissioning is intended to "tune-up" existing functional systems to run as efficiently as possible.



[Action] Action taken on own

(MOTORS) Installed energy efficient motors and/or variable speed drives on fans and pumps.

(CONTROLS): Installed a system of controls or sensors on your heating, cooling, ventilation, and/or lighting.

(RCx) Had recommissioning done to “tune-up” existing functional systems to run as efficiently as possible.

[Address] address where measure implemented

[Contact name] contact listed in participant files

[Program contact and phone number] name and phone number of Xcel Energy staff responsible for program evaluation

Introduction

Hello, my name is **[interviewer name]**, and I'm calling on behalf of Xcel Energy. May I speak with the person most familiar with purchasing and maintaining the energy-using equipment for [business name] at [address]?

- 1 Yes
- 2 No [attempt to convert]

I'm with Tetra Tech, an independent research firm. We have been hired by Xcel Energy to talk with some of their customers about the types of energy using equipment they have at their company and about the programs that Xcel Energy is offering to their business customers.

I'm not selling anything; I'd just like to ask your opinions. Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone unless you grant permission.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

(Who is doing this study: Xcel Energy has hired our firm to evaluate one of the energy efficiency business programs. As part of the evaluation, we're talking with customers that did and did not participate in the program to understand their awareness and experiences with the program.)

(Why are you conducting this study: Studies like this help Xcel Energy better understand customers' need for and interest in energy efficiency programs and services.)

(Timing: This survey should take about 10 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.)



(Sales concern: I am not selling anything; we would simply like to learn about your experience with high efficiency equipment and energy efficiency programs. Your responses will be kept confidential. If you would like to talk with someone from Xcel Energy about this study, feel free to call **[program contact and phone number]**.)

(NOTE: For all questions, "DON'T KNOW" and "REFUSED" will be coded if offered as a response.)

Identification of Decision-Maker

- C1** Are you the person who is most knowledgeable about the decision making process for maintaining or purchasing new energy-using equipment at this location?
- 1 Yes (SKIP TO C3)
 - 2 No (ASK C2)
- C2** Who else at your firm would be more knowledgeable about your organizations' decision making processes related to maintaining existing equipment or purchasing new energy using equipment at this location? May I please speak with that person? (RECORD ONE NUMBER)
- 1 Yes (SPECIFY NAME AND BEGIN THE SURVEY AGAIN WITH THIS NEW RESPONDENT)
 - 2 No (TERMINATE)
 - D DON'T KNOW (TERMINATE)
 - R REFUSED (TERMINATE)
- C3** Who else at your company is typically involved in the decision of whether or not to purchase new equipment at this location?
- 1 No one else
 - 2 (SPECIFY)

Screener

- SCR1** (MOTORS) Does your organization have any motors at this location/(IF MULTIPLE) any of your locations?
- 1 Yes
 - 2 No (THANK & TERMINATE)
 - D DON'T KNOW (THANK & TERMINATE)
 - R REFUSED (THANK & TERMINATE)
- SCR2** (IF SINGLE) What is the approximate square footage of the space your business occupies at this location?



___ Square feet (IF Colorado RCX & < 50,000 sq ft. THANK & TERMINATE)

D DON'T KNOW

R REFUSED

SCR2 (IF MULTIPLE) Are any of the buildings you oversee over 50,000 square feet?

1 Yes, all

2 Yes, some (SPECIFY)

3 No, none

D DON'T KNOW

R REFUSED

SCR3 (IF MOTORS) Do you have an Xcel Energy account representative assigned to your company?

1 Yes (ALSO ASK RCX BATTERY)

2 No

DDON'T KNOW

RREFUSED

SCR2_P Is your company currently participating in Xcel Energy's [PROGRAM], or have you participated in the past?

1 Yes (Thank and Terminate)

2 No

DDon't Know

RRefused

Source of Program Awareness/Social Media

PA0a Building recommissioning is a systematic process of ensuring that all of the building systems perform interactively and as efficiently as possible according to the building intent and the owner's operational needs. Before today, were you familiar with recommissioning, sometimes called "retrocomissioning"?

1 Yes

2 No

D DON'T KNOW

R REFUSED

PA0b Xcel Energy is offering an energy-saving program called the [program], which [program description]. Before today, had you heard of this program? (RECORD ONE NUMBER)

1 Yes

2 No (SKIP TO PA3)

D DON'T KNOW (SKIP TO PA3)

R REFUSED (SKIP TO PA3)



PA1 How did you learn about Xcel Energy's **[program]**? PROBE: Did you hear about the program from any other sources? (DO NOT READ LIST, RECORD ALL THAT APPLY)

- 1 Information in your mailbox (SKIP TO PA1a)
- 2 A phone call (SKIP TO PA1b)
- 3 By making a phone call (SKIP TO PA1c)
- 4 An online resource or e-mail (SKIP TO PA1d)
- 5 A mass advertising campaign (SKIP TO PA1e)
- 6 A workshop or Expo for customers (SKIP TO PA2)
- 7 Other (SPECIFY) (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

PA1a Where did you receive it from?

- 11 A flyer in your Xcel Energy bill (bill insert) (SKIP TO PA2)
- 12 Stand-alone direct mail piece from Xcel Energy (SKIP TO PA2)
- 13 Information from a vendor that sells the equipment or service related to the program (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

PA1b Who did you receive a phone call from?

- 21 From an Xcel Energy Account Manager (SKIP TO PA2)
- 22 From Xcel Energy's Business Solutions Center (BSC) (SKIP TO PA2)
- 23 From a vendor that sells the equipment or service related to the program (SPECIFY VENDOR TYPE) (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

PA1c Who did you call?

- 31 Xcel Energy about your bill or your service (SKIP TO PA2)
- 32 Xcel Energy specifically about the program(s) (SKIP TO PA2)
- 33 A vendor that sells the equipment or service related to the program (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)

PA1d Which online resource?

- 41 Email from Xcel Energy (SKIP TO PA2)
- 42 Xcel Energy's website (SKIP TO PA2)
- 43 A vendor's website (SKIP TO PA2)
- 44 An online ad (SKIP TO PA2)
- 45 An Xcel Energy blog (SKIP TO PA2)
- 46 A blog other than Xcel Energy's (SKIP TO PA2)
- 47 Xcel Energy's Facebook fan page (SKIP TO PA2)
- 48 Xcel Energy's Twitter page (SKIP TO PA2)
- D DON'T KNOW (SKIP TO PA2)
- R REFUSED (SKIP TO PA2)



PA1e What type of advertising campaign?

- 51 A radio ad (SPECIFY WHEN IF POSSIBLE) *(SKIP TO PA2)*
- 52 A television ad (SPECIFY WHEN IF POSSIBLE) *(SKIP TO PA2)*
- 53 A newspaper ad *(SKIP TO PA2)*
- 54 Billboards *(SKIP TO PA2)*
- D DON'T KNOW *(SKIP TO PA2)*
- R REFUSED *(SKIP TO PA2)*

PA2 You said that you received information from **[insert sources of information from PA1]**. Did this provide you with enough information to know how to participate in the program if you wanted to?

- 1 Yes
- 2 No→What additional information would you have liked to receive? (SPECIFY)
- D DON'T KNOW
- R REFUSED

PA3 How would you prefer to learn more about the **[program]** or other energy efficiency programs offered by Xcel Energy in the future? By... (READ LIST)

- 1 Receiving information in your mailbox *(SKIP TO PA3a)*
- 2 Receiving a phone call *(SKIP TO PA3b)*
- 3 You making a phone call *(SKIP TO PA3c)*
- 4 You using an online resource or e-mail *(SKIP TO PA3d)*
- 5 A mass advertising campaign *(SKIP TO PA3e)*
- 6 A workshop or Expo for customers *(SKIP TO PA2)*
- 7 Other (SPECIFY)
- D DON'T KNOW *(SKIP TO PA4)*
- R REFUSED *(SKIP TO PA4)*

PA3a Where would you prefer to receive it from?

- 1 A flyer in your Xcel Energy bill (bill insert) *(SKIP TO PA4)*
- 2 Stand-alone direct mail piece from Xcel Energy *(SKIP TO PA4)*
- 3 Information from a vendor that sells the equipment or service related to the program *(SKIP TO PA4)*
- D DON'T KNOW *(SKIP TO PA4)*
- R REFUSED *(SKIP TO PA4)*

PA3b Who would you prefer to receive a phone call from?

- 1 From an Xcel Energy account manager *(SKIP TO PA4)*
- 2 From Xcel Energy's Business Solutions Center (BSC) *(SKIP TO PA4)*
- 3 From a vendor that sells the equipment or service related to the program *(SKIP TO PA4)*
- D DON'T KNOW *(SKIP TO PA4)*
- R REFUSED *(SKIP TO PA4)*

PA3c Who would you prefer to call?

- 1 Xcel Energy about your bill or your service *(SKIP TO PA4)*
- 2 Xcel Energy specifically about the program(s) *(SKIP TO PA4)*
- 3 A vendor that sells the equipment or service related to the program *(SKIP TO PA4)*



- D DON'T KNOW (SKIP TO PA4)
- R REFUSED (SKIP TO PA4)

PA3d Which online resource?

- 1 Email from Xcel Energy (SKIP TO PA4)
- 2 Xcel Energy's website (SKIP TO PA4)
- 3 A vendor's website (SKIP TO PA4)
- 4 An Online ad (SKIP TO PA4)
- 5 An Xcel Energy blog (SKIP TO PA4)
- 6 An blog other than Xcel Energy's (SKIP TO PA4)
- 7 Xcel Energy's Facebook fan page (SKIP TO PA4)
- 8 Xcel Energy's Twitter page (SKIP TO PA4)
- D DON'T KNOW (SKIP TO PA4)
- R REFUSED (SKIP TO PA4)

PA3e From what type of advertising campaign?

- 1 A radio ad (SKIP TO PA4)
- 2 A television ad (SKIP TO PA4)
- 3 A newspaper ad (SKIP TO PA4)
- 4 Billboards (SKIP TO PA4)
- D DON'T KNOW (SKIP TO PA4)
- R REFUSED (SKIP TO PA4)

PA4 Have you **[Action]** or considered **[ACTION]** in the past two years?

- 1 Yes, implemented
- 2 Yes, considered
- 3 No (SKIP TO PA8)
- D DON'T KNOW (SKIP TO PA8)
- R REFUSED (SKIP TO PA8)

PA5 What did you [IF PA4 = 1: do, IF PA4 = 2, consider doing]? (INDICATE ALL THAT APPLY)

- 1 Energy efficient motor (SPECIFY QUANTITY AND HP CLASS BY 1 to 40 HP, 41 to 100 HP, 101 to 200, 201 to 300, 301 to 500 HP, or 501 plus HP)
- 2 Variable speed drive (SPECIFY QUANTITY)
- 3 Efficiency control system (SPECIFY TYPE: Heating, Cooling, Ventilation, Lighting, or specify others)
- 4 Recommissioning study
- 5 Implemented measures recommended in recommissioning study
- 6 Other (specify) → How many?
- D DON'T KNOW
- R REFUSED

PA6 (ASK IF PA0b = YES) Did you consider participating in the **[Program]** when you [IF PA4 = 1: did this?][IF PA4 = 2, considered doing this]?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

PA6a (ASK IF PA6=1) Did you apply to participate in the **[Program]**?



- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

PA7 (IF PA6a<>1) Why didn't you do this through this program? (IF PA6a=1) Why didn't you complete **[ACTION]** through the program? (DO NOT READ) (RECORD ALL THAT APPLY)

- a. Application process too burdensome/Too much paperwork
- b. Takes too long to get approval
- c. No time to participate, needed equipment immediately
- d. The program had ended
- e. The equipment would not qualify (PROBE: WHY NOT?)
- f. The amount of the rebate wasn't important enough
- g. Did not know program was available for this equipment
- h. There was no program available
- i. Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

PA7a (ASK IF PA6a=1) What additional support would you need to **[ACTION]** through the program?
(RECORD VERBATIM)

PA8 Using a scale of 0 to 10, with 0 being not at all interested and 10 being very interested, how interested will you be in participating in the **[Program]** in the future?

- ____ (0-10)
- D DON'T KNOW
 - R REFUSED

PA9 (ASK IF A8 <7) Why wouldn't you consider participating in this program in the future? (DO NOT READ) (RECORD ALL THAT APPLY)

- a. Application process seems too burdensome/Too much paperwork
- b. Would take too long to get internal approval
- c. Xcel Energy's program pre-approval process would take too long
- d. No time to participate, would need equipment immediately
- e. The amount of the rebate isn't important enough
- e.. Program is still unclear/difficult to understand
- f. Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

Important Factors in Decisions to Purchase New Equipment

Next I'd like to ask some questions about decision making at your business.

10a If you were considering installing processes to save energy or new energy efficient equipment at your company, where would you look for information regarding the new equipment or processes?



- 1 Internal staff (SPECIFY NAME and TITLE)
- 2 Xcel Energy website
- 3 Xcel Energy account manager
- 4 Xcel Energy Business Solution Center (BSC)
- 3 General Internet search (e.g., Google search)
- 4 Contractor/vendor
- 5 Engineer
- 7 Manufacturer
- 8 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

10b And who would you contact to implement the new equipment or process? (INDICATE ALL THAT APPLY)

- 1 Internal staff (SPECIFY NAME and TITLE)
- 2 Contractor/vendor
- 3 Engineer
- 4 Xcel Energy
- 5 Manufacturer
- 6 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

11 On a scale of 0-10, with 0 being not at all important and 10 being very important, how important would each of the following be to your business when considering new equipment or processes? (ROTATE LIST)

- ___ age or condition of existing equipment
- ___ availability of a program rebate
- ___ recommendation of utility
- ___ recommendation of contractor or supplier
- ___ compatibility with existing equipment
- ___ initial purchase cost
- ___ operating cost
- ___ length of payback period (IF GT 5, What payback period do you strive for?)
- ___ efficiency level of equipment
- ___ life of equipment
- ___ if equipment is readily available
- ___ environmental concerns
- ___ (ALWAYS READ LAST) some other consideration not already mentioned (SPECIFY)

12 Does your business have a policy that mandates the installation of energy efficient equipment when purchasing new equipment?

- 1 Yes
- 2 No (SKIP TO 14)
- D DON'T KNOW (SKIP TO 14)
- R REFUSED (SKIP TO 14)

13 What is the policy? (PROBE AND SPECIFY)
(RECORD VERBATIM)



- I4** What are some of the major obstacles or barriers that your business faces when considering purchasing new energy using equipment at your facility? (DO NOT READ; INDICATE ALL THAT APPLY)
- 1 Need to incorporate plans into longer term budget
 - 2 Lack of capital
 - 3 Time constraints
 - 4 Lack of resources to implement
 - 5 Approval by decision-makers
 - 6 Uncertainty regarding return on investment
 - 7 Contractors aren't familiar with measures
 - 8 Lack of awareness of or knowledge about energy savings opportunities
 - 9 Lack of knowledge about how to obtain assistance from Xcel Energy
 - 10 Low prioritization of energy conservation in firm
 - 11 Other (SPECIFY)
 - D DON'T KNOW
 - R REFUSED
- I6** (MOTORS) Regarding your drives for fans and pumps, are all, some, or none of your motors driven by variable speed drives?
- 1 All
 - 2 Some
 - 3 None
 - D DON'T KNOW
 - R REFUSED
- I7** How do you decide whether to rewind or repair a motor versus buying a new motor? (PROBE ON WHAT IS THE THRESHOLD)
- (RECORD VERBATIM)
- I8** Do you plan to install any new drives or motors in the next year?
- 1 Yes
 - 2 No (SKIP TO SA8)
 - D DON'T KNOW (SKIP TO SA8)
 - R REFUSED (SKIP TO SA8)
- I9** Which equipment types and sizes are you are likely to install, regardless if you use Xcel Energy's program or not?
- 1 1 to 40 horsepower motor (SPECIFY: Is this an upgrade or replacement?)
 - 2 41 to 100 horsepower motor (SPECIFY: Is this an upgrade or replacement?)
 - 3 101 to 500 horsepower motor (SPECIFY: Is this an upgrade or replacement?)
 - 4 500+ horsepower motor (SPECIFY: Is this an upgrade or replacement?)
 - 5 1 to 50 horsepower VFD



- 6 51 to 200 horsepower VFD
- 7 200+ horsepower VFD
- D DON'T KNOW
- R REFUSED

I10 (CONTROLS) Is your heating, cooling, ventilation, lighting or other systems at this location managed by a centrally controlled system? (INDICATE ALL THAT APPLY)

- 1 Yes, lighting
- 2 Yes, heating
- 3 Yes, cooling
- 4 Yes, ventilation
- 5 Yes, other (SPECIFY)
- 6 No
- D DON'T KNOW
- R REFUSED

Satisfaction

SA8 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? (IF NECESSARY, SAY:) You can use any number from 0 to 10. (REPEAT SCALE IF NECESSARY)

- _____ (0-10)
- D DON'T KNOW
 - R REFUSED

OPERATING HOURS

Next I'd like to talk about the hours that your business is open.

H1 During what days of the week and hours of the day is your business open for operations? (RECORD DAYS OPEN AND OPENING AND CLOSING TIME IN MILITARY TIME)

- 1 Monday OPEN TIME: _____ CLOSE TIME: _____
- 2 Tuesday OPEN TIME: _____ CLOSE TIME: _____
- 3 Wednesday OPEN TIME: _____ CLOSE TIME: _____
- 4 Thursday OPEN TIME: _____ CLOSE TIME: _____
- 5 Friday OPEN TIME: _____ CLOSE TIME: _____
- 6 Saturday OPEN TIME: _____ CLOSE TIME: _____
- 7 Sunday OPEN TIME: _____ CLOSE TIME: _____
- 8 Open 24 hours a day, 7 days a week

Customer Characteristics



F1 Last, I'd like to ask you a few more questions regarding your facility.

What business activity accounts for most of the floor space covered by your Xcel Energy bill at **[ADDRESS]**? (RECORD VERBATIM AND THEN CODE BELOW)

- 1 Office/professional
- 2 Data center/computer server farm
- 3 Warehouse or distribution center
- 4 Food sales or service→What is the total seating capacity of the food service areas in this building? _____
- 5 Retail
- 6 Education→How many students can be seated in all of the classrooms in this building at one time? _____
- 7 Religious worship→What is the total seating capacity of the religious worship areas in this building? _____
- 8 Public assembly→What is the fixed seating capacity of the public assembly areas in this building? _____
- 9 Health care→(IF APPLICABLE) What is the inpatient licensed bed capacity? _____
- 10 Service
- 11 Lodging→How many guest rooms or occupant rooms are there? _____
- 12 Public order and safety
- 13 Industrial/Manufacturing (SPECIFY)
- 14 Agricultural (SPECIFY)
- 15 Vacant (SPECIFY)
- 16 Leisure/Recreation (SPECIFY)
- 16 Other (SPECIFY IN DETAIL)
- D DON'T KNOW
- R REFUSED

F2 Which of the following best describes the space you occupy at **[ADDRESS]**? Is it . . . ? (READ LIST)

- 1 Located in an enclosed shopping mall
- 2 Located in an unenclosed shopping mall
- 3 Occupies part of a free-standing building
- 4 Occupies an entire free-standing building
- 5 Occupies part of a single building with apartments attached
- 6 Occupies an entire single building with apartments attached
- 7 Located in an apartment complex
- 8 Space at **[ADDRESS]** is the common area of an apartment/rental property
- 9 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F4 Do you own or rent/lease the space you occupy at this location?

- 1 Own
- 2 Rent/lease
- 3 Own some and rent/lease some
- 4 Manage property



- 5 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F6 What actions other than the ones we have already discussed has your business taken at this location within the past few years in order to reduce your energy use? (DO NOT READ; INDICATE ALL THAT APPLY)

- 1 None
- 2 Installed high efficiency lighting equipment
- 3 Added lighting controls, occupancy sensors, and or time clocks
- 4 Installed high efficiency cooling equipment
- 5 Installed high efficiency heating equipment
- 6 Installed high efficiency ventilation equipment
- 7 Added controls to the heating, ventilation or air conditioning systems to reduce use
- 8 Made changes to the heating, ventilation or air conditioning system maintenance schedule
- 9 Made changes to the building envelope such as insulation, window film, etc.
- 10 Participated in other Xcel Energy energy efficiency programs (SPECIFY)
- 11 Facility-wide energy awareness training
- 12 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F7 (IF HAVEN'T DONE ANYTHING) What are the reasons you haven't made any additional energy saving improvements at this facility? (DO NOT READ; CIRCLE ALL THAT APPLY)

- 1 No need
- 2 Lack of available equipment
- 3 High initial cost
- 4 Don't know what to do
- 5 Don't have the staff to identify or make these improvements
- 6 Customer comfort
- 7 Need for certain look/feel (aesthetics)
- 8 Disruption to business operations
- 9 Lease the space
- 10 Poor economy
- 11 Budget constraints
- 12 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

F8 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
- D DON'T KNOW

F9 Those are all of the questions that we have. For confirmation, can you please tell me your title?



(RECORD VERBATIM)

COM I'd like to thank you for your help with this survey! Do you have any comments you'd like to share?

(RECORD VERBATIM)

Table 11-2. Xcel Energy Nonparticipant Cooperation Rate

Sample Disposition	Colorado	Minnesota
Sample Size	599	684
Number not in service	44	58
Non-working number	1	0
Ineligible for program	24	57
Ineligible- other ³	33	40
Disconnected number	17	19
Non-business number	5	12
Adjusted Sample Size	475	498
Hard Refusal	19	27
Soft Refusal	33	23
Incompletes (partial interviews)	8	14
Unavailable for duration	14	12
Language barrier/non-English	0	0
Active ¹	307	301
Completed Surveys	94	121
Cooperation Rate²	19.8%	24.3%

¹ An average of 8 contacts per active case were made to reach these still active cases

² Number of completed surveys divided by Adjusted Sample Size

³ These include cases where the respondent indicated they had very recently complete



APPENDIX E: BENCHMARKING PROGRAM MANAGER INTERVIEW GUIDE

Xcel Energy DSM Evaluation Program Managers Interview Guide – Task 6 Peer Utility Benchmarking: Final 8/12/10

Introduction

Identify Xcel Energy as the company commissioning this study; provide a brief description of Xcel Energy's program, then a brief description of the program that we're interested in learning more about in an effort to improve Xcel Energy's program.

Explain purpose of study and which measures you want to discuss (e.g., motors and drives) if others may be included in program.

Offer to share results as motivation to participate – see needed information to share study results at the end of this interview guide.

Program scope and goals

- 1) What are your roles and responsibilities for the program? Is the program managed internally or by a 3rd party?
- 2) What are your program goals and/or objectives? (Probe for both written and informal) Who sets the goals? Are they annual goals or multi year goals?
- 3) Overall, how effective has the program been in achieving these goals and objectives? Are there ways you think the program could be more effective in achieving its goals?

Program Design, Measures and Incentives

- 4) What are the products/measures offered by your program?
 - a) (Motors) Do you have a custom measure component?
 - i) (If YES) What types of projects are typically covered?
 - b) (Motors) Do you have a motor inventory program?
 - i) (If YES) Is the program run in-house or outsourced?
 - (1) What aspects are outsourced?
 - c) (Motors, if Drives component) What types of end use equipment must the drives be used for?
 - d) (RCx) How does the program offer incentives for the recommissioning study and the implementation of recommended opportunities? Independently or are they linked?
 - e) (Efficiency Controls) Does the program offer incentives for whole-building HVAC or lighting controls systems?
- 5) Which measures comprise the bulk of the program?



- a) (Motors) Are there any particular measures that customers are not purchasing/installing? (If YES) Why do you think this is?
- b) (RCx) Are the recommissioning studies identifying all of the opportunities available at a facility? How do you encourage exhaustive recommissioning studies?
- 6) How do you determine your baseline and technical assumptions for energy impacts? What M&V do you conduct as part of project implementation? Probe about thresholds for conducting M&V, percentage of projects, etc.
- 7) What is the incentive structure (i.e. prescriptive, custom, both)? How are incentive levels calculated?
- 8) What are the current rebate/incentive levels as a proportion of typical project costs?
- 9) How have your rebate levels changed over time?
 - a) (If changes made) Why did you make these changes?
- 10) What documentation or approvals are required to receive a rebate?
 - a) (Motors) Does this vary by motor size?
 - b) Do you have any special arrangements for receiving applications from trade allies on behalf of customers?
 - c) Have you had any problems obtaining correctly completed documentation from customers or trade allies?
 - i) If YES, What problems do you have, and what steps have you taken to address this?
 - d) Do trade allies receive incentives from your program? (get description)
 - i) (if NO) Have you ever offered these incentives?
 - (1) If (YES) Why did you eliminate the incentives?
- 11) (RCx specific questions) What percentage of your customers implement the opportunities identified in the RCx study within one year? What have you found effective in decreasing that turnaround time? What is the typical timeframe for implementing measures?

How many studies do you review on an annual basis? Who and how many individuals review them? Are they internal engineers or is it done by a 3rd party?

How much calculation detail is required? What assumptions do you allow?

Do you allow study providers to include non-RCx items in the study?

How do you handle providers who find minimal savings per the study-portion of the RCx program?
- 12) What external influences are impacting your program? How are you addressing them?
 - a) (Motors) Probe on expected program changes when federal regulations for new motors efficiency change in 2011.



- 13) What has worked particularly well with the program? What has been a problem?
- 14) What do you see as future challenges for the program?
- 15) Have you performed any net-to-gross or spillover calculations for the program? (If YES) How were those derived, and what are the results? (If NO) Does your program incorporate net-to-gross, free-ridership or spillover, and if yes, what are those numbers?
- 16) How do you estimate and track penetration and standard practice in your market? Does this vary by customer segment?

Program recruitment and participation

- 17) How long has the program been offered?
- 18) What types of customers do you target for the program (business types, size, etc.)?
 - a) What is the mix of managed and non-managed accounts?
 - b) 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?
- 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?
 - b) Are there other marketing efforts? Any social media marketing?
- 20) (Motors, RCx) Do you do anything different to target small to mid-size businesses (Motors - less than 500 KW, RCx – less than 200 kW peak demand or unmanaged, Controls - unmanaged)? Probe about any effective strategies with this sector.
- 21) Do you segment customers for marketing your program? If yes, how? What key customer segments participate in the program? What customer segments do not participate?
- 22) Why do customers typically decide to participate in the program? Do reasons vary by customer types (or segments)?
- 23) What are the major barriers to participation?
- 24) How does the program leverage the trade ally market infrastructure?
 - a) (If allies utilized) How do you conduct outreach to trade allies? Has this been effective?
 - b) What do allies have to do to participate in the program (e.g. attend training, register, etc)
 - c) (RCx) How does the program communicate what is expected in the RCx study to the vendors?
 - d) (Motors, Efficiency Controls) What types of vendors typically participate in the program (e.g. lighting, HVAC, process)?
 - e) (Motors, Efficiency Controls, RCx) What tools or information do you provide to vendors to inform their customers about program offerings and requirements?



25) Do you offer trade ally incentives?

- a) If YES, what are the incentive levels, and what is required of the trade allies to get them?
- b) Are the incentives offered always or periodically? Why?

Conclusion

26) Are there any other topics that we have not covered in this interview that we should be aware of about this Program?

27) Do you have any program information (e.g., FAQ sheets, evaluation results) that you would be willing to share with us?

Thank you for your time. Verify their name, position and email address for receiving the summary of results (if a summary of the results is desired).