



Xcel Energy Colorado Insulation and Air Sealing Product 2017 Evaluation

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FINAL
REPORT



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Introduction

The Xcel Energy Insulation and Air Sealing product in Colorado offers residential customers rebates to upgrade insulation and improve air sealing in their homes to reduce their heating and cooling energy consumption. The product uses registered trade partners who must be BPI-certified and follow BPI practices for quality installation. Rebated projects must meet product requirements for installed insulation levels and air sealing improvements (or pre-existing home tightness).

Xcel Energy engaged a team of researchers led by EMI Consulting to conduct a process evaluation of the Insulation and Air Sealing product. The evaluation team assessed customer satisfaction with the product; Xcel Energy influence on customers' decisions to upgrade insulation and improve air sealing; the customer journey paths that lead to such upgrades; the roles, successes, and challenges faced by participating trade partners; and opportunities to increase product cost-effectiveness and influence on customer decisions. Based on the results of this research, the evaluation team developed key findings and recommendations for Xcel Energy.

Methods

Participant telephone survey (n=122)
 Non-participant telephone survey (n=120)
 Trade partner interviews (n=10)
 Peer program benchmarking interviews (n=6)
 Staff interviews (n=4)

Fielding:
 Mar 2017 – Oct 2017

Key Findings



Both participants and trade partners are **satisfied with the product**. 93% of participant respondents were somewhat or very satisfied with the product overall. Trade partners consider the product an important, positive, and fundamental part of their business.



The product influences home upgrades **through participating trade partner recommendations** to customers. Median product influence scores for contractor scope recommendations were 8 on a 0-10 scale, higher than the customer-reported influence of rebates or general outreach.



Customer selection of their potential contractor is a key determining factor in whether they will participate in the product or upgrade their home to recommended levels of insulation and air sealing. Shopping for contractors generally involves inquiries to 1, 2, or 3 contractors.



The product's structure is sound and in line with those of peer utilities. Adherence to BPI standards follows best practices in the industry.

Impact Results

0.85 Recommended NTGR for Insulation and Air Sealing Product



Drivers of product influence: Xcel Energy trade partner scope recommendations drive customers to more impactful home upgrades. Continuing best practice insulation and air sealing requirements and strong channel management is necessary to maintain and grow the product's strong network of trade partners.



Air sealing requirements and direct customer outreach: Expanded air sealing requirements as of 2017 likely increased the product's influence. Direct outreach to customers early in their consideration of shell upgrades could further enhance product influence on completed upgrades by causing upgrades that would not otherwise have happened and driving customers who are shopping for an insulator to participating trade partners.



Ways to optimize product influence:

- Reach customers early in their consideration of a home upgrade; direct them to participating trade partners.
- Encourage and facilitate greater outreach by participating trade partners.
- Direct product outreach at customers with the highest savings potential.

Executive Summary

2017 Colorado Insulation and Air Sealing Product

Process Results

Customers



Insulation and air sealing upgrades begin with the customer.

- Home comfort and reducing energy bills drives interest in insulation.
- 92% of participants reached out to their contractor.
- Participating customers shopped around among 1-3 contractors.
- Scope options presented to customer depend on whether they call a participating trade partner.



Participants rely on contractor scope recommendations.

- 61% of participants only knew they “needed some” insulation or air sealing.
- Trade partners are the most common information source about the Xcel Energy rebate.

Non-participants perceive savings opportunities, but may underestimate savings opportunities from insulation and air sealing.

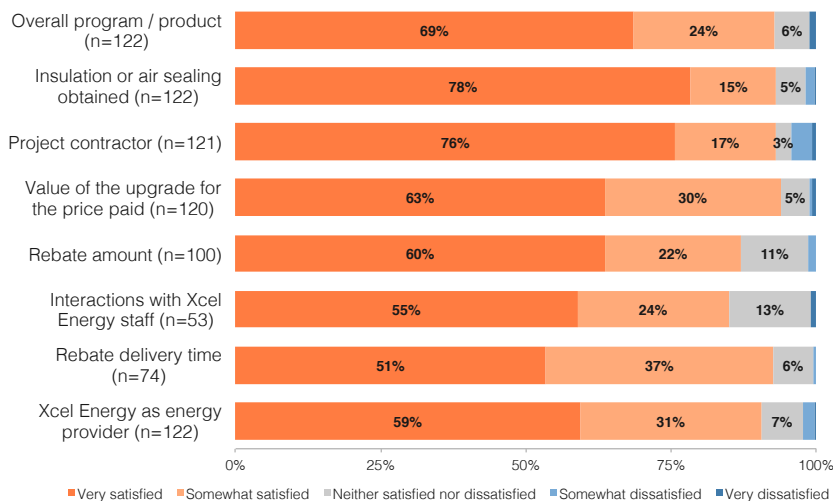
Trade Partners



Trade partners rely on the market differentiation that their affiliation with the Xcel Energy product provides.

- High product standards are well-received by trade partners.
- Rebates help make comprehensive upgrades possible.
- Trade partners would like to see more outreach and explanation of benefits of comprehensive upgrades to customers.

Product Satisfaction by Participants



The Net Promoter score—the proportion of participants who are very or extremely likely to recommend the Insulation and Air Sealing product (71%) minus the proportion who are not at all likely to (9%)—**is 63%, which suggests a high level of satisfaction with the Insulation and Air Sealing product.**

Key Conclusions and Recommendations

The product influences the scope of home upgrades through its registered trade partners, but the success of this strategy relies on customers to reach out to—and select—a registered trade partner.

The product is not quite cost effective.

- 1) Conduct more customer-facing outreach designed to steer customers considering an insulation upgrade to participating trade partners.
- 2) Explore ways to strengthen the market differentiation that participating trade partners receive and facilitate trade partner-based marketing.
- 3) Increase targeting of customers with the greatest and most cost-effective insulation and air sealing opportunities, such as those in older homes or with high usage.
- 4) Explore ways to increase flexibility in the measure structure without compromising on the product's use of BPI standards or its emphasis on comprehensive shell upgrades.

1. INTRODUCTION

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

1.1 Product Overview

The Insulation and Air Sealing product (the product) offers downstream rebates to residential customers that have air sealing, wall insulation, and/or attic insulation installed by an Xcel Energy-registered trade partner. To be registered, trade partners need to be BPI-certified and agree to the terms of the product, which includes following BPI practices for quality installation practices and blower door testing.

The product has been operating continuously since 2009. Changes from 2016 to 2017 included an increase in the air sealing requirement for homes that do not meet a minimum tightness standard. Whereas insulation upgrades were previously eligible with air sealing that reduced air infiltration 10%, air infiltration now needs to be improved by at least 20% while the minimum air tightness standards that trigger the need for air sealing loosened from 0.45 natural air changes per hour (NACH) to 0.5 NACH.²

Rebates are based on a percentage of project cost with caps that depend on the home's heating fuel and the presence of air conditioning. Rebates are 30% of project costs for insulation measures and 60% for air sealing. Table 1-1 presents the rebate structure of the product in 2017-2018.

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

² Product changes also included a shift from three tiers of air sealing to two tiers, while the minimum improvement increased from 10 to 20 percent.

Table 1-1. 2017-2018 Rebate Structure

		Heating and Cooling Mix Caps		
Improvement		Natural Gas Heat, no AC	Natural Gas Heat, with AC	Electric Resistance Heat
Attic Insulation (30% of cost up to cap)		\$350	\$500	\$600
Wall Insulation (30% of cost up to cap)		\$350	\$500	\$600
Air sealing, bypass sealing and weather-stripping (60% up to cap)	20% - 30% reduction	\$175	\$300	\$350
	30% and above reduction	\$250	\$400	\$450

In 2016, the product over-performed substantially on both its electric and gas goals, shown in Table 1-2 below. The product was not cost-effective in 2016 under the Modified Total Resource Cost Test (MTRC) for both fuel types, gas and electric. On the gas side, the product has struggled with cost-effectiveness over several program cycles, in part due to persistent low natural gas prices.

Table 1-2. 2016 Product Performance against Goals

	Participants	Natural Gas Savings (Dth)	Electric Savings (kWh)	MTRC – Gas	MTRC – Electric
Actuals	319	27,703	323,947	0.87	0.92
Goals	150	16,102	179,911	0.85	1.00

* Source: Xcel Energy. 2016 Demand Side Management Annual Status Report. Proceeding No. 14A-1057EG. March 31, 2017

The changes in air-sealing requirements in 2017 are likely to take away some participation; however, the product should achieve more savings per home with this methodology, making it more cost-effective.

1.2 Evaluation Overview

The evaluation team designed a comprehensive evaluation of the Insulation and Air Sealing product to provide information on the following:

- The role of trade partners, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them;
- Sources of participant awareness and levels of satisfaction;
- The customer journey path (e.g., what prompts customer projects and participation);
- How product changes have affected participation, customer satisfaction, and free-ridership;
- Potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness;
- Whether there are rebate process efficiencies to be achieved, and if so, what and how; and
- Customer engagement and satisfaction.

Table 1-3 presents an overview of the research topics and data sources used in this evaluation of the Insulation and Air Sealing product.

Table 1-3. Evaluation Components and Objectives Mapped to Report Layout

Evaluation Component	Report Section	Evaluation Objective
Impact Evaluation	2.3 Net-to-Gross Ratio	• Determine the product's influence on gross savings by estimating a NTGR
Process Evaluation	3.3 Market insights	• Role of trade partners • Understanding customer journey paths
	3.4 Participant experience and satisfaction	• Customer satisfaction • Trade partner experiences and satisfaction
	3.5 Customer outreach	• Customer awareness • Customer engagement
	3.6 Product structure and operations	• Understand effects of past product changes • Identify potential cost effectiveness enhancements • Assess opportunities for operational enhancements

1.3 Report Organization

The following chapters organize the evaluation findings into two components: impact and process evaluation results. As illustrated in Table 1-3, each data collection activity may have contributed to more than one evaluation objective. Further detail on the evaluation approach is presented in the following chapters.

- Chapter 2 reviews the approach and results of the impact evaluation and the attribution of product impacts using a customized net-to-gross ratio (NTGR) analysis.
- Chapter 3 discusses the process evaluation components, which address the manner in which the product interacts in the marketplace, selected product changes, program design and operational questions, and customer and trade partner experience and satisfaction.
- Conclusions and recommendations are presented in Chapter 4.
- Detailed, descriptive methodology information, evaluation plans, and survey instruments can be accessed in the appendices.

2. IMPACT FINDINGS

A central component of this evaluation was the estimation of the net-to-gross ratio (NTGR) for the Insulation and Air Sealing Product. For DSM programs, the NTGR is a metric that estimates the influence of the program on the target market. It is used to adjust reported gross energy savings to account for energy efficiency that would occur in absence of a program, and it is also used as a benchmarking indicator of program effectiveness. NTGR results can indicate opportunities for Xcel Energy to adjust the design and implementation of its products to increase the cost-effectiveness of individual products and the entire portfolio. The NTGR includes several factors that create differences between gross and net savings, such as free ridership and spillover. The evaluation team developed the NTGR based on data provided by customers and trade partners. To assess the plausibility of this NTGR, the evaluation team then compared it to the NTGRs of similar programs sponsored by other peer utilities. Note that, while a NTGR of 1.0 is often seen as desirable, it may not be appropriate for all program designs depending on a variety of factors (including the maturity of the program and the technologies it promotes, program intervention strategies, and cross-program coordination strategies). The evaluation team has taken care to present our NTGR results with this context in mind.

This chapter presents:

- **Key findings** – The key findings section presents the recommended NTGR based on the evaluation team’s synthesis of findings from market actors and peer utilities.
- **Approach** – The approach section presents an overview of the evaluation team’s methods to calculating the recommended NTGR.
- **Net-to-gross ratio inputs** – This section presents qualitative and quantitative data that support the NTGR calculations.

2.1 Key Findings: Net-to-Gross Ratio

The evaluation team estimated a 2016 NTGR of 0.72 based on free-ridership and spillover calculations derived from participant self-reported responses, weighted using insights from trade partner interviews and customer journey questions in the participant survey. The team recommends a prospective NTGR of 0.85 for the Insulation and Air Sealing product, an increase over the 2016 estimate, to account for the impact of actual and potential product changes since 2016 including a tightening of air sealing standards and the potential impact on customer participation of strategically-focused Xcel Energy outreach recommended in this evaluation. (The product currently uses a NTGR of 0.89.)

2.2 Approach

This section provides a summary of the evaluation team’s overall approach for estimating NTG ratios and presents key data inputs used. Additional background and conceptual detail on our approach is found in Appendix B.

The evaluation team developed the NTGR for the Insulation and Air Sealing product using a self-report approach (SRA) based on participating customer survey results in combination with

additional research data inputs. The methodology used in this evaluation was built from the 2016 *Illinois Stateline Technical Reference Manual for Energy Efficiency Version 6.0*. The evaluation team customized this methodology to the Insulation and Air Sealing product, and supplemented the methodology with additional qualitative and quantitative data characterizing the customer's decision process as well as trends in the market.

This process combines free-ridership and spillover to assess the share of gross energy savings associated with a product that is attributable back to the product. Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Spillover is a measure of the amount of energy savings that occur due to the product that are *not* captured in the product's (or other Xcel Energy products') claimed energy savings.

The evaluation team used self-reported data from participating customers to develop an initial NTGR for 2016. Data from the additional sources listed above were then used in constructing a logical narrative of product attribution, and in finalizing the NTGR for the product.

It is important to note that this estimate is subject to multiple sources of uncertainty, including sampling error and measurement error due to problems of respondent recall, the challenge of answering hypothetical questions about actions they might have taken in the absence of the product, and the assumption that a 0-10 influence score is linear and accurately reflects the impact of the product on the customer's decision. The evaluation team has taken multiple steps to mitigate this uncertainty by adhering to best practices in the design of representative samples, the use of the self-report approach in estimating NTGRs, the use of effective strategies to minimize non-response, and the testing of NTGR questions to ensure construct validity.

2.3 Net-to-Gross Ratio Inputs

Inputs to the NTGR calculation were based on the following questions included in the participating customer survey:

Free-ridership (quantitative questions)

- How influential was any encouragement you saw from Xcel Energy to consider an insulation or air sealing upgrade³ in your decision to do an upgrade?
- How influential was the availability of the rebate from Xcel Energy on your decision to install the amount of insulation or air sealing that you installed?
- How influential was the contractor recommendation on your decision to install the amount of insulation or air sealing that you installed?
- How influential was (the) package of customer support⁴ on your decision to conduct the comprehensive insulation or air sealing project that you did, as opposed to no upgrade at all or a less comprehensive upgrade?

³ Respondents were asked about either insulation, air sealing, or insulation and air sealing in accordance with the nature of their project. The survey did not attempt to distinguish between product influences on insulation and air sealing if they conducted both. Customers will have varying ability to parse their upgrades into individual scope components and what factors influenced the details of their project. Any future attempts to distinguish between different components may require interviews in addition to surveys, so the evaluator can assess the respondent's recall and probe accordingly. Insights from such investigations could be useful, but are likely to provide qualitative insights rather than numeric scores.

- If (the) package of customer support and rebate had not existed, do you think you would have done the same exact insulation or air sealing project, done something close but maybe not as extensive, done a substantially less involved upgrade, or not done any upgrade in insulation or air sealing yet?
- If this Xcel Energy customer support and rebate package did not exist, do you think you would have done the project at about the same time as the insulation or air sealing project you did, in a year or two, three or four years from now, or longer than four years from now?

Spillover (quantitative & logical questions)

- Since (the insulation or air sealing) work, have you made any other energy efficiency upgrades to your heating or cooling system, other home appliances, windows or doors, light bulbs or lighting fixtures, or any other aspect of your home's energy efficiency?
- What did you do?
- Did you receive a utility rebate?
- How influential was installing the (insulation or air sealing) in your consideration of a(n) (spillover measure)
- How do you know that the (spillover measure) you installed or acquired was energy efficient?
- How many (spillover measure) did you install?

Results and discussion of how free-ridership responses were combined into a single score are shown in Appendix B.

Estimated Net-to-Gross Ratio for the 2016 Program Year

Based on the estimates of free-ridership and spillover described above, the evaluation team computed the net-to-gross ratio for the 2016 program year as follows:

$$\text{NTGR} = 1 - \text{Free-Ridership} + \text{Spillover} = 1 - 0.60 + 0.12 = 0.72$$

Prospective Net-to-Gross Ratio

As the starting point for estimating the prospective NTGR, the evaluation team used the computed NTGR for 2016 and adjusted it based on:

- Tightening of air sealing standards since 2017; and
- Potential impacts of strategically-focused Xcel Energy outreach recommended in the process evaluation component of this study.

As noted in Section 1, the Insulation and Air Sealing product increased the minimum air sealing improvement from 10% to 20% beginning in 2017. This change is likely to weed out lighter, less

⁴ Defined in preamble to the survey question shown. The package of customer support consists of general encouragement from Xcel Energy, the Xcel Energy rebate, and the contractor's recommendation concerning scope of the project. The evaluation team introduced this concept for the insulation and air sealing product to recognize potential product influences, which are potentially more complex than products for efficiency upgrades that are more tangible and more narrowly tied to rebates.

impactful upgrades. While the higher energy savings resulting from these tighter standards are already included in the gross savings calculations, the evaluation team believes that the higher standard will also reduce the share of participants who would have conducted the work even without the product—particularly, the contractor’s recommended scope. While the actual effects on the product cannot be reliably quantified, the evaluation team believes that an increase in attribution of 10 percentage points from 60% (0.6) to 70% (0.7) seems justified until retrospective data can be reviewed in a subsequent evaluation.

As noted in Section 4, the evaluation team recommends more targeted outreach to direct customers who are considering an upgrade to their homes’ insulation or air sealing to participating trade partners. More outreach to influence customer decisions at this stage of their project consideration should increase the number of participants and, thus, total gross energy savings. Attribution for these added customers should be higher than calculated for the current cohort of participants because their participation will be driven by the Xcel Energy outreach. Again, the impacts of this outreach cannot be reliably quantified at this early stage, but the evaluation team believes that an increase in total attribution scores of three percentage points from 70% (0.70) to 73% (0.73) is justified and potentially conservative until retrospective data can be reviewed in a subsequent evaluation.

When these adjustments are incorporated into the NTGR, the prospective NTGR becomes 0.85 as shown in the formula below:

$$\text{Prospective NTG Ratio} = 1 - (1 - 2016 \text{ attribution})^5 + \text{incremental 2017 attribution} + \text{incremental attribution from targeted outreach} + 2016 \text{ spillover}$$

$$\text{Prospective NTGR} = 1 - (1 - 0.6) + 0.1 + 0.03 + 0.12 = 0.85$$

Additional Considerations for Interpreting Net-to-Gross Ratio

The evaluation team offers additional context for interpreting the NTGR from both the peer utility benchmarking task and a review of the baseline used for Xcel Energy’s gross energy savings calculations.

Peer Program Net-to-Gross Ratios

As a frame of reference, Table 2-1 presents the net-to-gross ratios used by the six peer utilities that the evaluation team interviewed.⁶ As noted, most of the peer utilities assume parity between free-ridership and spillover or simply report gross savings. Two utilities use billing analyses that include a comparison group for savings estimates, thereby obtaining a net savings estimate that would already include any free-ridership and spillover. Finally, one utility uses a deemed NTGR of 0.8.

⁵ Note: The term (1- attribution) is the same as free-ridership.

⁶ The peer utilities were nominated by Xcel Energy’s insulation product managers in Colorado and Minnesota. They comprised independently owned utilities (and one statewide program) in nearby states in the Rocky Mountain region and in the Midwest with similar climates.

While common in the energy efficiency field, the use of gross energy savings adjusted for free-ridership and spillover through an NTGR is the exception rather than the norm among the Xcel Energy peer programs.

Table 2-1. Peer Utility NTGRs

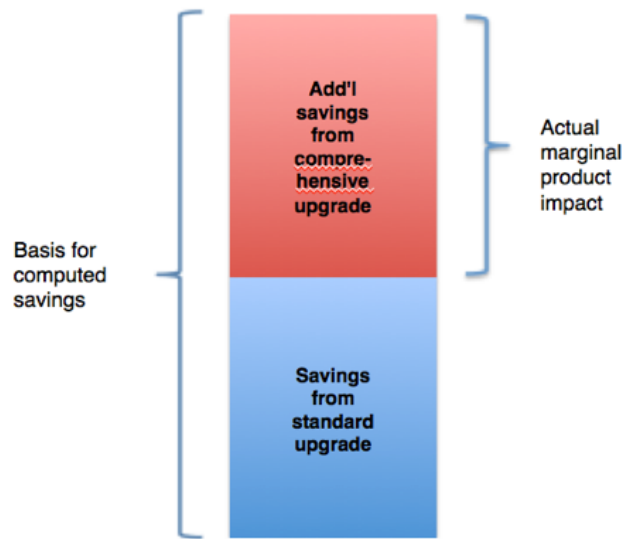
Utility / Program Administrator	NTGR	Method / Notes
A	0.6 / 1.0	Use billing analysis to obtain net (NTGR=1); equals 60% of modeled savings (effective NTGR = 0.6)
B	0.8	Deemed
C	1.0	Not computed; assumed to be 1
D	1.0	Not computed; assumed to be 1
E	1.0	Not computed; assumed to be 1
F	1.0	Use billing analysis to obtain net

Baseline Condition

Furthermore, the evaluation team notes that some free-ridership is inherent in the product's computation of energy savings. When Xcel Energy calculates gross energy savings for its Insulation and Air Sealing product, it estimates the savings of the entire rebated upgrade, effectively assuming that the participating customer would have taken no action at all. However, the product's operating theory and attempted market intervention focuses not on encouraging insulation and air sealing upgrades to occur, but on ensuring those upgrades are comprehensive. Hence, the product's most likely influence is in increasing the savings, not in causing them all to happen. Given this difference between the active baseline and the product's intervention, a given degree of free-ridership is built into the energy savings computations.

Figure 2-1 illustrates this dynamic visually. Nearly all participants indicate that they identify the need for more insulation on their own and select a contractor. Depending on whom they select, they may engage in a standard upgrade or a more comprehensive one promoted by Xcel Energy through its trade partner network. Hence, the product's impact in most projects is likely to be the added savings from conducting a comprehensive upgrade (shown in red), although savings claimed currently total the full savings from the entire upgrade (shown in blue and red) without any discounting of the upgrade that may have occurred anyway (shown in blue).

Figure 2-1. Energy Savings Components of Comprehensive Upgrades



3. PROCESS EVALUATION

In addition to calculating a recommended NTGR, the evaluation team conducted a process evaluation to determine whether Xcel can optimize the design and delivery of the Insulation and Air Sealing product to its customers. Our process evaluation addressed the evaluation objectives previously outlined and repeated in Table 3-1 below. To allow for easier presentation and more holistic discussion, we have grouped related objectives together.

Table 3-1. Process Evaluation Objectives Mapped to Report Layout

Report Section	Evaluation Objective
Market insights	• Role of trade partners • Understanding customer journey paths
Participant experience and satisfaction	• Customer satisfaction • Trade partner experiences and satisfaction
Product outreach	• Customer awareness • Customer engagement
Product measures and operations	• Understand effects of past product changes • Identify potential cost effectiveness enhancements • Assess opportunities for operational enhancements

This chapter presents key findings from the process evaluation, the evaluation team's approach to conducting the process evaluation, and specific findings relating to each group of evaluation objectives. These findings, along with findings from the impact evaluation, inform the conclusions and recommendations presented in the next chapter.

3.1 Key Findings

The evaluation team found that:

Xcel Energy's Insulation and Air Sealing product intervenes in the marketplace for residential building shell upgrades primarily through scope recommendations by its registered trade partners and its rebates. Scope recommendations by trade partners encourage customers to complete more comprehensive upgrades than they may have done otherwise through non-participating contractors, while the rebates help to facilitate the more comprehensive projects. The existence of a qualified, BPI-certified set of registered trade partners strengthens the market presence of insulation contractors who promote comprehensive upgrades to customers vaguely seeking more insulation. The impetus for an upgrade comes from the customer, however, with moderate influence by either Xcel Energy or its registered trade partners. Moving up the customer decision-chain would require exerting a greater influence on which contractors customers call or nudging customers to conduct the insulation or air sealing upgrade in the first place.

Participating customers and trade partners expressed high satisfaction with the Insulation and Air Sealing product. The product's net promoter score is 63%, but with numerous

respondents who count as detractors, providing low scores only because they would have no opportunity to promote the product. All other customer satisfaction metrics we tracked indicated high satisfaction. Individual critical comments or suggestions provide context for future product adjustments, but do not require intervention on their own account.

Product impact could be increased with enhanced product outreach that goes beyond bundled messaging in order to influence customer decisions earlier in their consideration of insulation and air sealing upgrades. Insights from customer surveys and trade partner interviews not only suggest the importance of steering residential customers considering shell upgrades toward registered trade partners, but also offer some suggestions on messaging and customer targeting.

The Insulation and Air Sealing product's structure is sound and in line with peer programs, but challenges with cost-effectiveness may be ameliorated with greater flexibility in measures and measure levels and through more emphasis on strategic customer acquisition. Optimization of the product's cost-effectiveness and impact needs to be balanced against clarity for participating customers and trade partners and ease of administration, however. Although rebate processing time is one of the primary customer and trade partner concerns, there are no obvious red flags in the process or clear operational improvements evident without a more detailed review.

3.2 Approach

To accomplish the evaluation objectives for the Insulation and Air Sealing product, the evaluation team completed a suite of intersecting and complementary research activities in 2017. Detailed information on the sampling approach used for the research can be accessed in Appendix C. The following discussion highlights the research topic coverage contributed by each research activity: the staff interviews, participant surveys, non-participant surveys, trade partner interviews, benchmarking interviews, and a measure analysis.

Staff Interviews

The evaluation team conducted in-depth interviews with Xcel Energy personnel involved with the Insulation and Air Sealing product early in the course of this evaluation. The staff interviews were intended to accomplish the following:

- Assess the extent to which the product design supports product objectives and customer service/satisfaction objectives.
- Assess the degree to which product resources are sufficient to conduct product activities with fidelity to the implementation plan.
- Gather information about trade partner outreach, marketing, and rebate structures.
- Understand the day-to-day operations of the product and the impact of 2017 changes.
- Collect staff feedback on implementation successes and challenges.

Appendix D presents the interview guide(s) used for these discussions.

Participant Surveys

The evaluation team conducted telephone surveys with both participants and non-participants using customer records from Xcel Energy for the sample frames. The evaluation plan used for this project can be found in Appendix A. Sample sizes for the participant and non-participant surveys were set at levels adequate to provide a 90% level of confidence with a minimum of +/- 10% relative precision.

The participant survey comprised 122 telephone interviews. For the purposes of this evaluation, a participating customer was defined as any customer for whom successful participation in the Insulation and Air Sealing product was completed and closed in the product's tracking system in 2016 or the first quarter of 2017. We stratified by CAMEO⁷ group to allow for some analysis by these groups among participating and non-participating customers. Respondents who had installed multiple measures were asked about the entire insulation, air sealing, or insulation and air sealing project. Unless otherwise noted, participant survey results presented in this report are based on the full set of completions and weighted by CAMEO group to reflect the full population of participants.

The participant survey was designed to:

- Characterize participants, including prior participation in company energy efficiency products;
- Understand the participation process including customer motivations and participation barriers;
- Assess customer product awareness and satisfaction, and influences on satisfaction with Xcel Energy;
- Understand the influence of product assistance on customer decisions; and
- Determine the level of free-ridership and product-induced spillover effects.

The participant survey is presented in Appendix E.

Non-participant Surveys

Telephone survey completions with 120 non-participating customers were also used to collect process evaluation data. In order to efficiently survey non-participants, the evaluation team conducted a single residential non-participant survey for Colorado to support the process evaluations of the Residential Heating product and the Insulation and Air Sealing product. Non-participating customers were defined as residential customers who fell into one of two groups:

1. **Audit Participants (in other words, near-participants)** - residential customers that received an energy audit, but did not participate in either the Residential Heating product or the Insulation and Air Sealing product.
2. **“General Non-participants”** - residential customers that did not receive an energy audit and did not participate in either the Residential Heating product or the Insulation and Air Sealing product.

⁷ CAMEO customer classification groups designate neighborhoods into 10 different (largely socio-economic) categories.

The evaluation team pulled a total of 2,500 customer records for this sample frame.

The non-participant survey addressed the following topics:

- Characteristics of eligible customers
- Customer awareness and best communication channels
- Proportion of customers who installed or considered installing qualifying measures but did not participate in the product
- Barriers, and actions Xcel Energy could take that might increase participation

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

Trade Partner Interviews

The evaluation team completed in-depth interviews with ten participating trade partners, i.e., contractors and vendors. Participating trade partners were defined as trade partners with high or recent participation in the product.

Data collected in the trade partner research included:

- Satisfaction and awareness; experience with the Insulation and Air Sealing product and with other utility energy efficiency programs.
- Decision factors for both trade partners and customers; factors that might increase likelihood of future participation; barriers.
- Successes and challenges that trade partners have faced in implementing projects.
- Perceived trends in the insulation market.
- Impacts of the Insulation and Air Sealing product on business and the approach to insulation projects in general.

The evaluation team selected and recruited interview subjects from a list of 31 participating trade partners with more than one submitted project.⁸ The in-depth interviews were conducted in September and October of 2017 and ranged from 45 to 50 minutes in length. Combined, the ten participating trade partners interviewed had a total of 578 submitted projects in 2016 and 2017, which represents 32% of all submitted projects. Appendix G presents the interview guides used for the trade partner research.

Benchmarking Interviews

The evaluation team contacted six peer utilities to benchmark the Xcel Energy product against others in the industry, assessing product design and delivery and key performance indicators (e.g., participation levels, free-ridership). The evaluation team conducted in-depth interviews with program managers to address the following topics:

- Savings impacts estimation methodologies, by measure type
- 2016 savings goals and results by product and for the product portfolio

⁸ Xcel Energy provided a complete list of 42 trade partners that included inactive trade partners.

- Net-to-gross methodology
- Net-to-gross ratios values
- Cost per Mcf saved and Total Resource Cost (TRC) values.

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

Appendix H contains the interview guide used for the benchmarking interviews.

Measure Analysis

The evaluation team reviewed a random sample of 35 applications and contractor invoices for insulation and air sealing projects completed in 2017. Based on documentation on the contractor invoices, the team analyzed which measures were installed, whether they were rebated, the quoted cost, the quoted rebate amount, and the actual rebate amount. We then reviewed the non-rebated measures installed at the same time as product-rebated insulation and air sealing to determine which, if any, additional measures may be beneficial to offer under the insulation product.

Data on all of the process evaluation topics are presented below. Because the sample frames for the customer surveys were stratified, those results are weighted back to the population of participants and Xcel Energy residential customers unless otherwise noted. The synthesis of findings places an emphasis on helping Xcel Energy interpret customer and trade partner perspectives and identifying actionable opportunities for improving product operations and marketing.

3.3 Market Insights

The Insulation and Air Sealing product intervenes in the marketplace for residential building shell upgrades primarily through scope recommendations by its registered trade partners and its rebates. Scope recommendations encourage customers to complete more comprehensive upgrades than they may have done otherwise, while the rebates help to facilitate these projects. The existence of a qualified, BPI-certified set of registered trade partners strengthens the market presence of insulation contractors who promote comprehensive upgrades to customers seeking more insulation, and a share of participants credit the product's list of registered trade partners as substantially influential. The initial consideration for an upgrade comes from the customer, however, with moderate influence by either Xcel Energy or its registered trade partners.

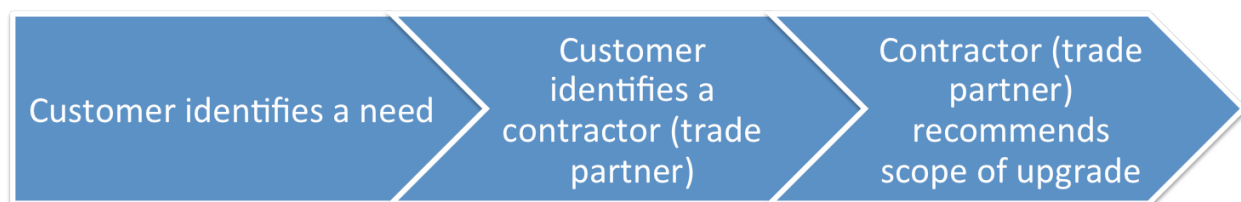
Table 3-2 lists the initial evaluation questions that led the evaluation team to explore the market insights presented in this section and the research methods employed to address these topics.

Table 3-2. Data Sources Used to Assess Market Insights

Research Questions	Data Source					
	Participant Survey	Non-participant Survey	Trade Partner Interviews	Peer Program Interviews	Product Staff Interviews	Other
What role do trade partners play in the product and customer upgrade decisions?	X		X	X	X	
What are the customer paths that lead to insulation and air sealing upgrades?	X	X	X	X	X	

Findings and insights concerning market insights are organized to follow an upgrade's life cycle, as shown in Figure 3-1.

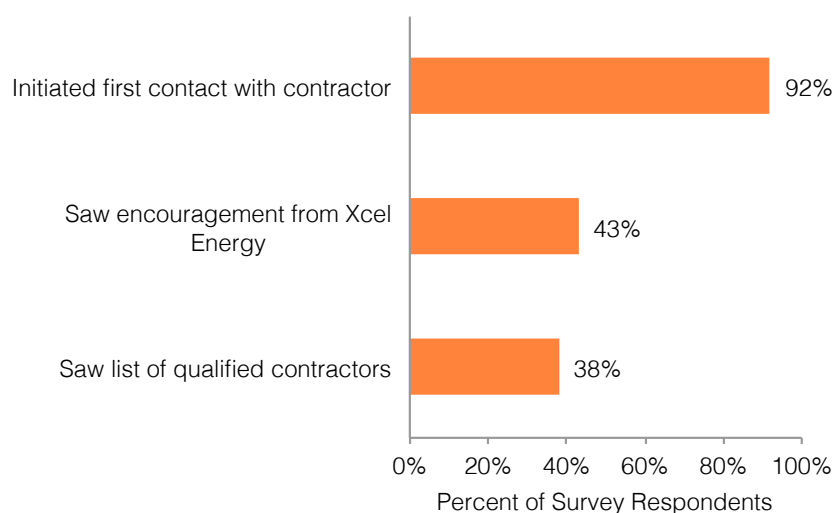
Figure 3-1. Typical Insulation / Air Sealing Project Flow



Customer Identifies a Need

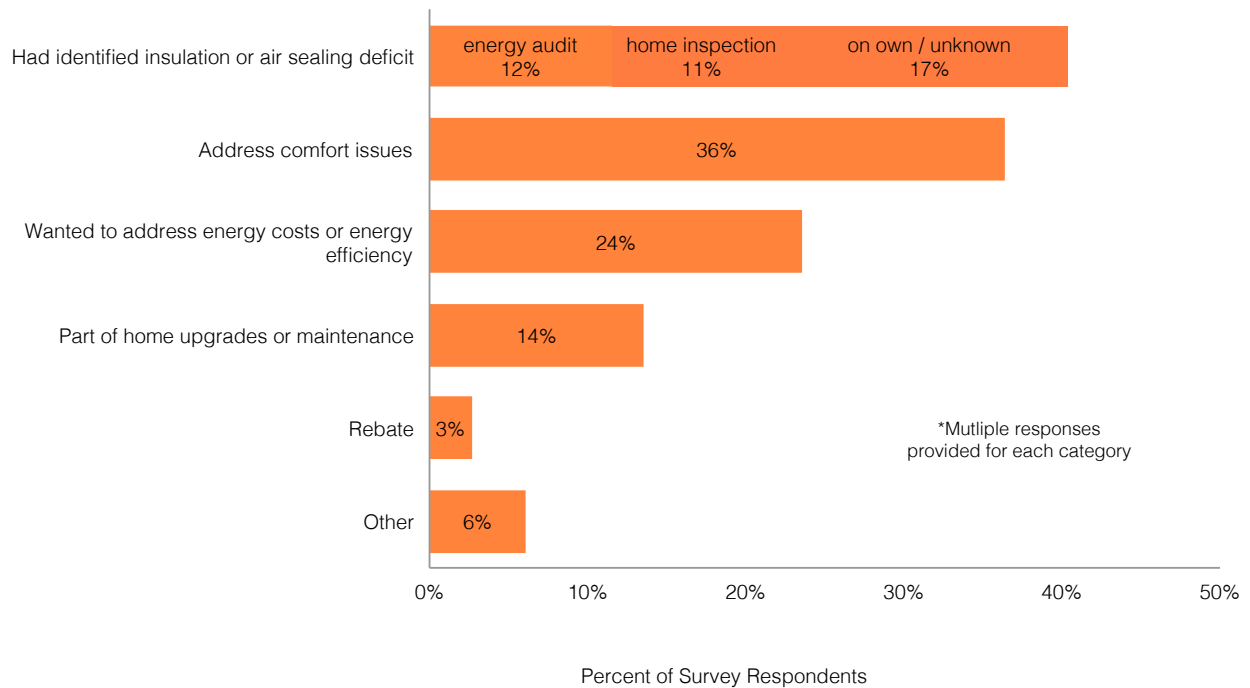
Participating projects begin with the customer. Nearly all participating customers said they identified a need for an insulation or air sealing upgrade and reached out to one or more contractors. As shown in Figure 3-2, 92% of customers initiated the contract with a contractor, suggesting that the impetus for upgrades do begin with the customer. Encouragement by Xcel Energy and exposure to lists of qualified contractors do play a role at this stage of a project's process, but are not primary.

Figure 3-2. Customer Selection of Contractor and Exposure to Xcel Energy Information



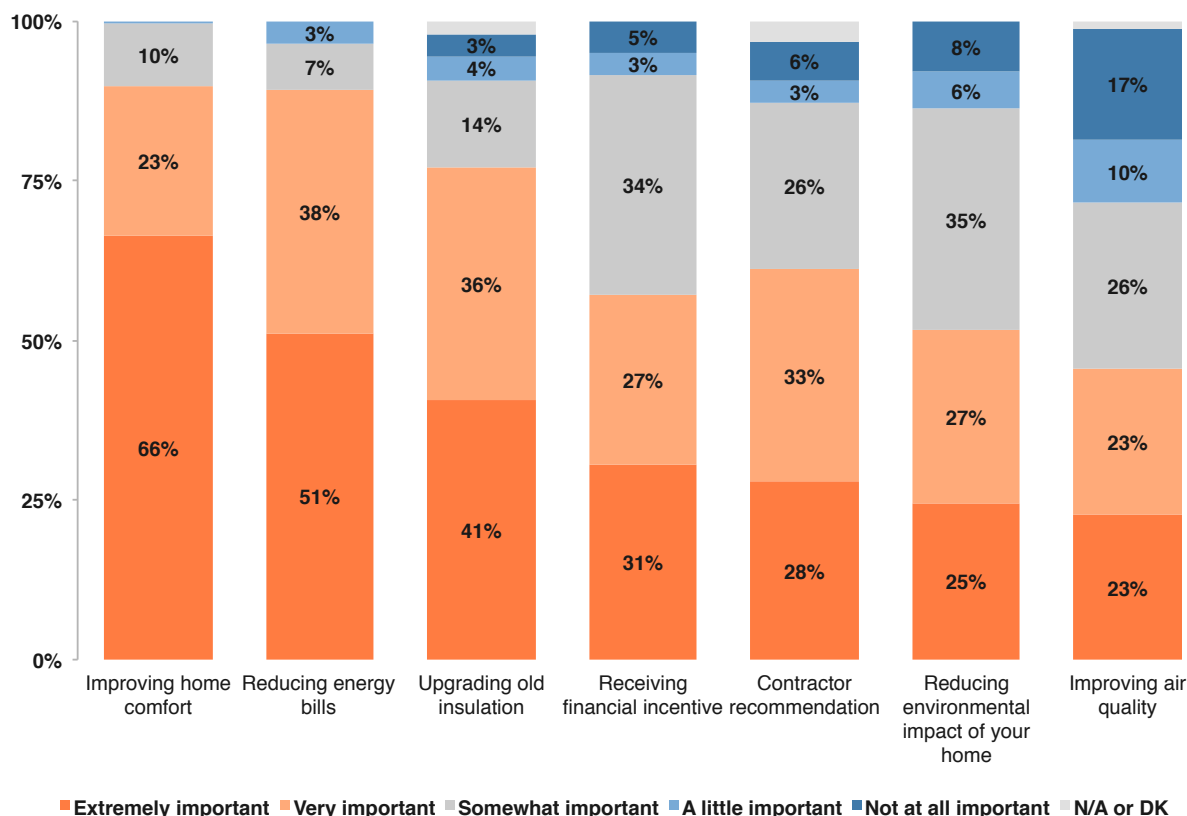
A wide range of factors influenced customer decisions to undertake an insulation and air sealing project (Figure 3-3). The most commonly cited reason in an open-ended question for undertaking the project was to address insulation (usually) or air sealing (uncommon) deficits from recommended levels (40%), followed by addressing home comfort issues (36%), wanting to reduce energy costs or increase energy efficiency (24%), and addressing home upgrades and maintenance issues (14%). Among those who focused on overcoming insulation or air sealing deficits (without mentioning specific symptoms), participants cited energy audits, home inspections, and their own awareness of the need for an upgrade.

Figure 3-3. Initial Impetus for Insulation or Air Sealing.



In response to an aided question with limited response options, participating customers cited home comfort, saving energy/money, and upgrading to current standards as the three most important drivers for their insulation or air sealing upgrade (Figure 3-4). Other factors such as protecting the environment were mentioned, but less frequently.

Figure 3-4. Drivers for Insulation or Air Sealing Upgrade.



Trade partners echoed most of the perceived needs and project instigators mentioned by contractors. Two primary drivers were mentioned across all interviewed trade partners to describe what customers are trying to accomplish:

- Increasing home comfort** – Customer homes are either too hot or too cold and often drafty, so customers are looking for insulation and air-sealing work to improve their general comfort. One trade partner explained that “*customers are comfort driven right now, gas prices are pretty low and have been for a while so costs are not as important*”.
- Decreasing energy bills** – Residential customers are often looking for ways to reduce their energy bills, and additional insulation and air sealing is commonly the first project type that individuals think of and home auditors suggest.

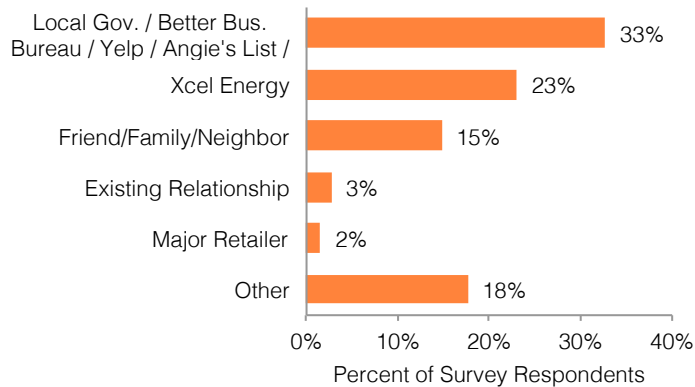
In addition to comfort and reduced energy bills, two trade partners mentioned environmental concerns and commitment to principles of energy efficiency as motivators for their customers. One trade partner mentioned that customers occasionally receive a home energy report that motivates them to save energy to match their neighborhood peers.

Customer Finds a Contractor

Once a household decides to pursue an insulation or air sealing upgrade, they reach out to a contractor. Most customers discuss their project with three or fewer contractors. Roughly equal numbers of participants said they spoke with one, two, or three contractors.

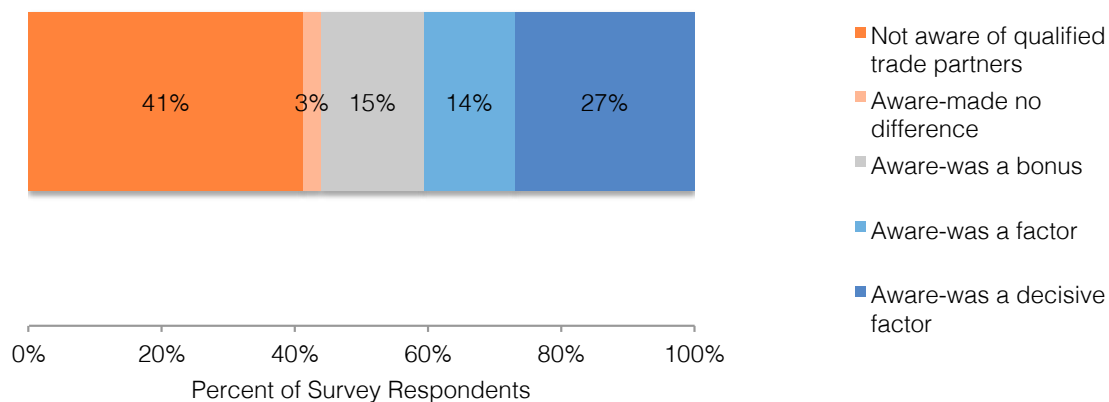
Common information sources for identifying contractors include various vendor lists, Xcel Energy, and word of mouth, as shown in Figure 3-5.

Figure 3-5. Customer Information Sources When Looking for a Contractor.



The existence of Xcel Energy-registered trade partners serves as an additional influencer in customers' selection of their insulation contractor. Roughly 60% of participants indicated that they were aware of the existence of registered trade partners when they selected their contractor, and just over a quarter said their contractor's inclusion on Xcel Energy's list was a decisive factor in their selection of that particular insulator.

Figure 3-6. Awareness and Influence of Xcel Energy-registered Contractor List.



Trade partners value Xcel Energy as a source of referrals and business. The trade partners that the evaluation team interviewed indicated that the customer acquisition process is going well, and they have sufficient project work. Indeed, some emphasized the importance of the Xcel Energy connection, saying that it is beneficial to their business. One trade partner noted that their trade

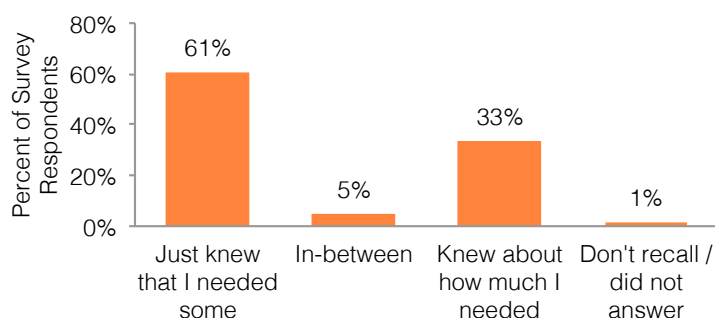
partner status was “... on the table from the get go about being an Xcel Energy trade partner. Xcel (Energy) is who I'm representing first and foremost.”

Five of ten trade partners mentioned that the Xcel Energy website is a very important marketing tool from which a large number of projects originate. The remaining five respondents all mentioned that they do receive customers via the Xcel Energy website, but assigned less importance to this avenue.

Contractor Recommends Scope of Upgrade

Both customers and registered trade partners suggested that the contractor has substantial influence on the nature of the insulation or air sealing upgrade to be completed. Participating customer respondents assigned a median score of 8 (on a 0-10 scale) to the influence of their chosen contractor's recommended project scope (compared to 5 for general Xcel Energy encouragement and 6 for Xcel Energy's rebates). Furthermore, most participating customers did not have specific expectations regarding the degree of insulation needed or how much to tighten their homes through air sealing. As shown in Figure 3-7, 61% of participants only knew they needed some insulation or air sealing when they discussed project scope with their contractor, while 33% had a sense of how much insulation or air sealing they needed or wanted.

Figure 3-7. Participating Customer Sense of Degree of Insulation/Air Sealing They Needed



Trade partners agreed that customers often only know that they need an insulation upgrade, but not how much or even whether they need any air sealing. The ten trade partner respondents provided a somewhat lower estimate of customer awareness of their technical needs than the customers had. Trade partners estimated that between 0 and 20% of customers know their needs, with responses ranging from “nobody knows what they need” to “about 50% know what they want, but a lot of times these people don't know what they need.” Several trade partners noted that when customers are aware of what they need, it is because a contractor or home auditor has inspected their home and told them what they need, rather than the homeowner conducting research themselves.

This market dynamic leaves trade partners thinking of themselves as educators about insulation as well as installers, seeing part of their job as educating customers about best practices for insulation and air sealing. The trade partners see it as part of their responsibility as Xcel Energy trade partners to educate customers on the value of high quality air sealing and insulation as well as providing

recommendations that maximize their energy savings and increase comfort within their available budget. The following are illustrative comments from trade partners:

“We tell customers about the importance of air sealing before insulation. That is key to the Xcel [Energy] rebate program. Explaining to [customers] that you can put all the insulation in the world in the attic but if you have bad air sealing, it [their home] will stay uncomfortable.”

“I sit with them and make sure they understand what we're going to do and how we're going to do it. I explain the advantages of the insulation and what the R value is, what they can get as a minimum and what they can get as a maximum. Once they insulate their house, they have to learn how to manage it, so I try to explain to them how they can manage it as well.”

“Almost everybody we bid on, we have to try to up-sell to get them to do the right job.”

“[Customers] are looking for our recommendations on how far their dollar can go and how it will affect their bottom line and comfort in their home.”

Trade partners' recommendations are based on a home inspection. The trade partners explained that they try to limit the discussion of technical details of the project unless a customer is aware of the technical details such as cubic feet per minute of air infiltration and R values. However, all trade partners stated that they do try to explain concepts such as air leakage, current insulation levels, and penetration sealing, and how these factors influence home comfort and energy use. They also stated that they always discuss potential energy bill reductions, and for eligible customers, the availability of rebates and the rebate process.

Trade partners emphasized that the conversation they have with customers about the scope of the project is most likely to affect the air sealing component of the upgrade. Customers already know they want insulation and the discussion about the rebate or the contractor's scope recommendations may or may not affect the amount of insulation ultimately added. However, trade partners generally did think that participating customers add air sealing due to the Xcel Energy product design, while they would have done most or all of the insulation upgrade anyway even if they had used a non-participating contractor.

3.4 Participant Experience and Satisfaction

Participating customers and trade partners expressed high satisfaction with the Insulation and Air Sealing product. The product's net promoter score (defined below) among participating customers is 63%, but with numerous respondents who count as detractors providing low scores only because they would have no opportunity to promote the product to others. All other customer satisfaction metrics we tracked indicated high satisfaction. Individual critical comments or suggestions provide context for future product adjustments, but do not require intervention on their own account because they are not overly frequent.

Net Promoter Score

The evaluation team also asked customers about their likelihood to recommend the Insulation and Air Sealing product to calculate a net promoter score. Net promoter scores are measures of brand loyalty. To calculate a net promoter score, responses are classified in the following fashion:

- On a 1 to 10 scale, ratings of nine or ten are classified as **Promoters**, as these are customers who are so satisfied with the product that they are likely to actively recommend the product to other customers.
- Ratings of seven or eight are classified as **Passives**, as these are customers who are satisfied with the product, but aren't likely to actively promote it.
- Ratings of one through six are classified as **Detractors**, as these customers likely had some issues with the product and may dissuade other customers from participating.

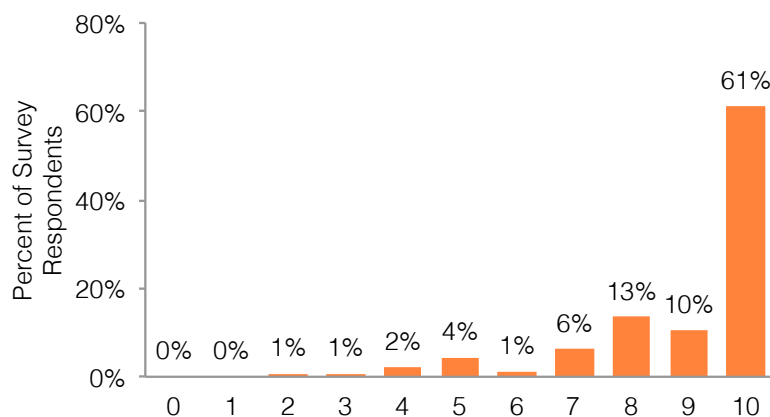
Then, the score is calculated using the following formula:

$$\text{Net Promoter Score} = \% \text{ Promoters} - \% \text{ Detractors}$$

Participating customers gave the product a net promoter score of 63%, as shown in Figure 3-8, with 71% of respondents counting as promoters and 9% as detractors.

It should be noted that numerous detractors commented in a follow-up question that they provided a low score merely because they would have no reason or opportunity to promote the product. For the most part, they were not dissatisfied. Figure 3-8 illustrates the frequency distribution of each potential score on the net promoter question.

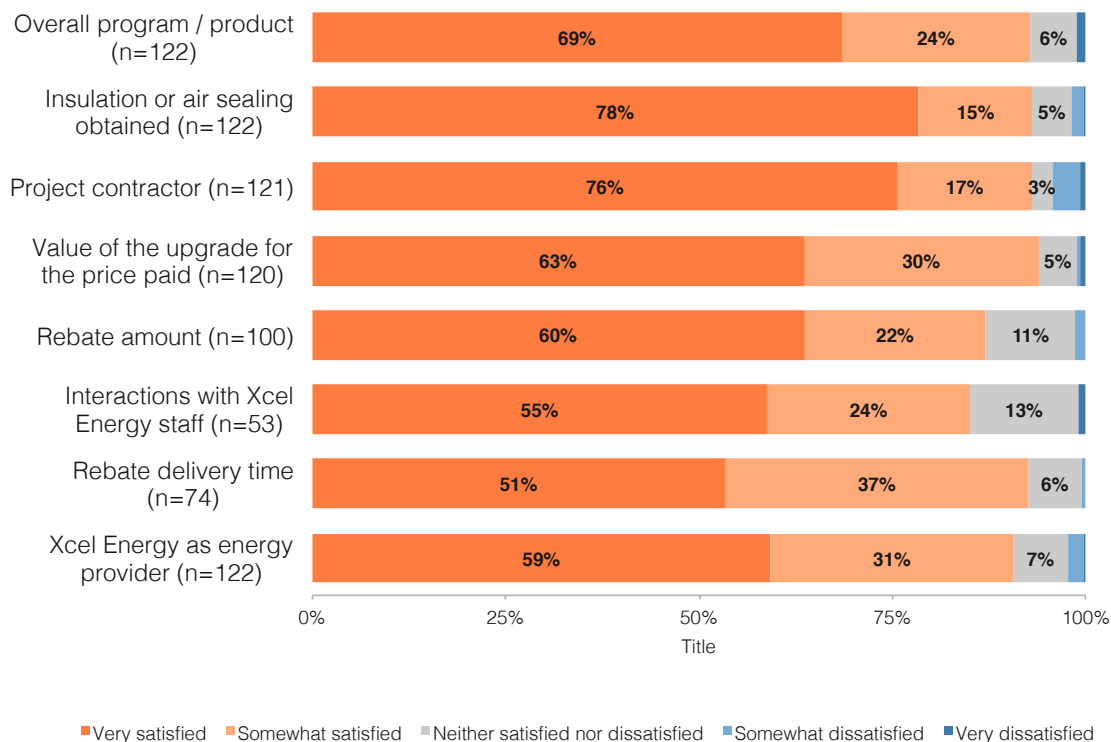
Figure 3-8. Distribution of Net Promoter Scores



High Customer Satisfaction

Customer satisfaction questions explored participant responses to various experiences and interactions. These can be grouped roughly into satisfaction with Xcel Energy overall, with the product and the rebate, and with the contractor and the insulation or air sealing upgrade. Satisfaction scores ranged from 79% to 93% with low numbers of respondents indicating any dissatisfaction. Details are presented in Figure 3-9.

Figure 3-9. Customer Satisfaction by Category



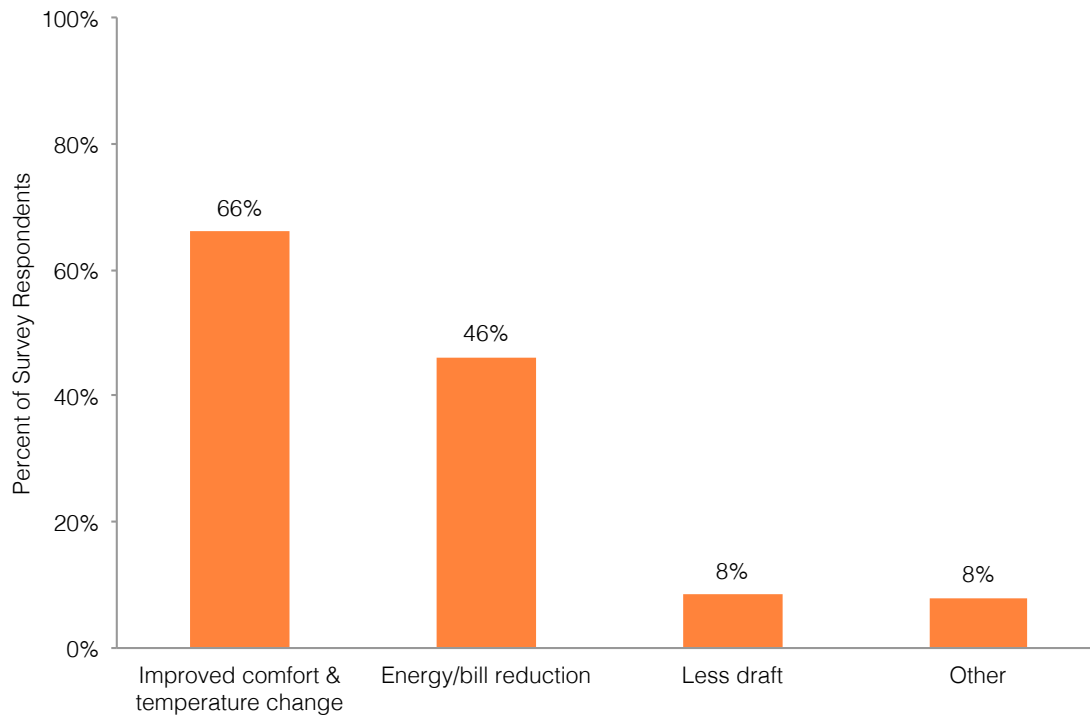
Isolated Critical Comments or Suggestions from Customers

The evaluation team examined responses to follow-up questions asked of participating customers who expressed dissatisfaction on any of the customer satisfaction metrics. Because the level of dissatisfaction was low and not all respondents elaborated, critical comments were generally low in number. They appeared to fall into three general topic areas:

- Respondents who gave low satisfaction scores on the rebate tended to focus on the amount or the turn-around time. Most of these customers acknowledged preferring larger rebates, with some commenting that the amount of the rebate was small in comparison to the total cost or simply commenting that larger rebates are always better. A small number of others commented on not recalling having received the rebate, still waiting on it, or expectations that they would receive it sooner than they did.
- Respondents with critical comments about the trade partners commented that the contractor's on-site conduct or performance was not up to par. These respondents spoke of incomplete work, customer service inadequacies, disorganized contractors, or lack of cleanliness. These comments are difficult to interpret, but could suggest some value in conducting and tracking transactional customer satisfaction surveys as part of Xcel Energy's routine market research and tracking whether any specific contractors tend to receive lower satisfaction scores.
- Respondents who were not entirely happy with the upgrade commented that they were expecting more clear-cut comfort improvements or energy savings than have resulted from the insulation or air sealing upgrades.

A separate section of the participant survey provides some additional context on the respondents who were disappointed with the benefits they were experiencing from their upgrades. When we asked participants overall whether they had experienced a benefit from their insulation or air sealing upgrade, 91% said they had. Sixty-six percent cited improved comfort and temperatures, while 46% indicated they thought they were experiencing bill reductions (Figure 3-10).

Figure 3-10. Perceived Benefits from Insulation and Air Sealing Upgrades



Trade Partner Experience and Satisfaction

Trade partner satisfaction with the Insulation and Air Sealing product is generally high as well. Four of ten trade partners interviewed for this evaluation scored their satisfaction a 5 on a 5-point scale, while the remainder gave it 4s or 3.5s. Trade partners also stated that overall, their customers are also very satisfied with the product (except when they occasionally do not receive rebates they are expecting.)

One particular highlight was Xcel Energy staff. Trade partner responses about product staff and management were overwhelmingly positive with one trade partner stating *“They’re great. Everybody over there is really good. I give them 100%, 5 stars.”*

All Xcel Energy trade partners interviewed stated that the product has created benefits for their business. Specific benefits mentioned were:

- **Association with Xcel Energy gives trade partners credibility with customers and increases customer trust in the trade partners' work.** All ten interviewees noted this benefit in some way. The contractors explained that having the Xcel Energy name behind them gave them credibility, assured customers they would receive high quality work, and communicated that contractors were certified, licensed, and insured.
- **Being a registered trade partner increases the number of insulation projects a contractor gets and encourages customers to do a higher quality insulation project.** All ten trade partners stated that being a registered trade partner increases their overall project volume. Three of the ten contractors also mentioned that the project encourages customers to do a higher quality installation.
- **Availability of the rebate is a useful marketing tool.** All ten trade partners mentioned that the rebate is a good marketing tool to help encourage consumers to choose a high quality insulation project. Seven of ten stated they always mention rebates in their discussion with customers.
- **Listing on the Xcel Energy trade partner website drives customer referrals up and in turn generates more projects.** Four of ten contractors, three with over 100 projects and one with between 10 and 20 projects, specifically mentioned that their customers regularly find them on the Xcel Energy website.
- **Association with the product helps trade partners compete with less scrupulous contractors that offer lower quality insulation work.** Six interviewed contractors mentioned specifically that the product allows them to differentiate themselves and compete on price with insulation contractors that are not trade partners and often provide lower quality insulation work. The six contractors that mentioned this include the five highest volume contractors and one low volume contractor.
- **Product requirements ensure that trade partners maintain a particular level of quality and keep up with certifications.** Three trade partners noted that the product encourages them to maintain certifications and hold their work to a high standard. All three were high volume contractors. Furthermore, four interviewees highlighted the rigorous qualification standards required as a positive aspect of the product. One interviewee thought that Xcel Energy “*could be a little bit harder on the qualifications ... and do more inspections than they do now*”.
- **Xcel Energy rebates provide a good customer service tool in that trade partners can be seen to offer access to rebates from a customer's perspective.** This benefit was mentioned by all ten trade partners.

Despite the many benefits noted by the trade partners, four of the ten also noted specific challenges with the product. Each of the four trade partners noted a separate challenge with no challenge being mentioned by more than one trade partner. The challenges mentioned were:

- **The increased requirements for air sealing for 2017 (from 10% to 20%).** One trade partner explained that they have a hard time justifying charging customers extra to do work that will result in the same rebate amount as before the changes. This contractor stated that their customers “*that need the rebates aren't the people that have \$5,000 to spend on extra work to get to the 20% air leakage requirement, they have \$1,000 to spend and only can afford the insulation.*”
- **The complexity of the product, specifically which households and measures qualify for a rebate.** This contractor stated that “*there are a lot of variables that are involved with the rebate amounts and that makes it difficult for us to effectively relay the information to a customer.*”

- **There are no rebate forms available online making it difficult for contractors to complete paperwork and ensure they are using the correct forms.**

Once projects are complete, all interviewed trade partners complete the rebate forms for the customer. Seven interviewed trade partners only use paper rebate forms, while three use a version available online most of the time. These three trade partners did note that they occasionally have trouble with the online PDF form with numbers not fitting in the allocated boxes.

3.5 Customer Outreach

The high degree of customer-initiated insulation (and air sealing) projects suggests opportunities for greater influence by the product early in the customer's decision-making and consideration of building shell upgrades. Insights from customer surveys and trade partner interviews suggest not only the importance of steering residential customers considering shell upgrades toward registered trade partners, but also offer some suggestions on messaging and customer targeting.

Table 3-3 lists the initial evaluation questions that led the evaluation team to explore product outreach and the research methods employed to address these topics.

Table 3-3. Data Sources Used to Assess Product Outreach

Research Questions*	Data Source					
	Participant Survey	Non-participant Survey	Trade Partner Interviews	Peer Program Interviews	Product Staff Interviews	Other
Participant awareness (and comparable non-participant opportunities)	X	X	X	X	X	
Customer journey and engagement (and implications for product design)	X	X	X	X	X	

* Note: These research questions also framed and informed the market insights topic area.

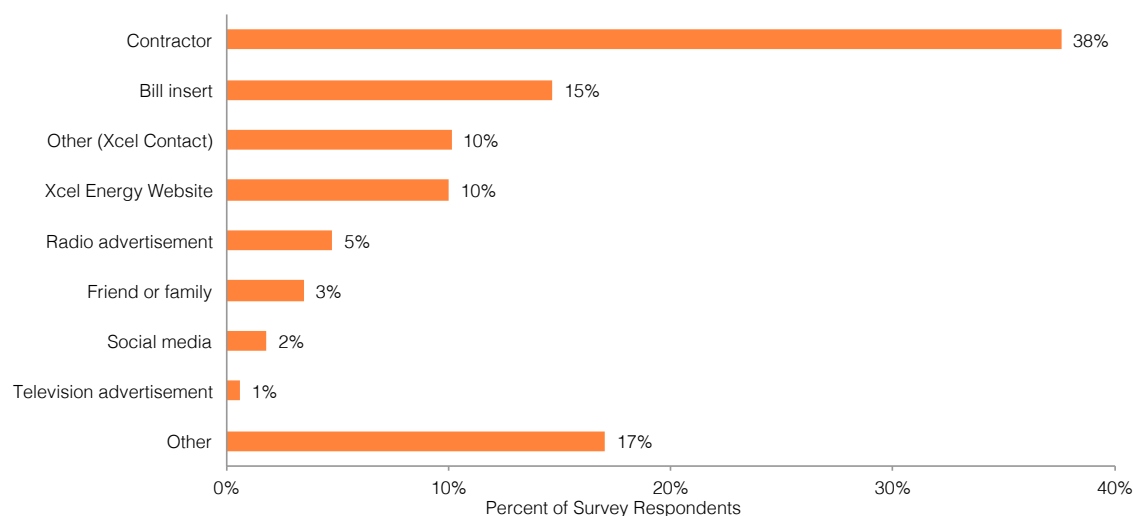
As noted in Section 3.3, insulation and air sealing contractors' recommendations concerning project scopes are highly influential in determining the nature of a home shell upgrade, including whether the project is a light upgrade or a comprehensive one that qualifies for an Xcel Energy rebate. However, the customer's selection of the one, two, or three contractors who have an opportunity to specify an upgrade project is influenced only modestly by Xcel Energy, in part due to limited marketing budgets in past years. The evaluation team analyzed data collected from participating and

non-participating customers, trade partners, and peer utilities⁹ to help inform future outreach and identify opportunities to help drive customers to product participation.

Insights from Participating Customers

Xcel Energy customers that participated in the Insulation and Air Sealing product learned of the product through a wide variety of channels including contractors, television advertisements, Xcel Energy bill inserts, and home energy reports. Figure 3-11 shows the proportion of survey respondents that first learned about the rebate from various channels. Contractors were the most reported single education channel for customers to learn about the product, at 38%. Combined Xcel Energy channels, the website, bill inserts, and other contacts such as direct emails and home energy reports account for 35% of responses.

Figure 3-11. Initial Customer Engagement Channel*



* 'Other' includes city government officials, home inspectors, other contractors, and energy audit programs.

Insights from Non-participants

The evaluation team conducted a survey of residential customers who had not yet participated in the product to obtain additional insights about customer perceptions, information sources, and influencers that would inform product design and outreach. Insights about non-participating customers are valuable because these households represent the pool of potential future participants. The pool of non-participants jointly informed the Insulation and Air Sealing product and the Residential Heating product; the pool comprised two groups:

- 60 randomly selected residential customers who had not participated in the insulation and air sealing or furnace products or had home energy audits completed through Xcel Energy; and

⁹ The insights from peer utilities on outreach efforts were limited and tended to confirm the kind of messaging Xcel Energy is already using. The evaluation team did not include a separate subsection on peer utility outreach in this report for that reason, even though outreach was part of the investigation with peers.

- 60 energy audit participants who had not (yet) upgraded insulation, air sealing, or furnaces.

Results and discussion below focus on responses from the pool of general non-participants, with selected insights from past audit participants included when their responses differed markedly or suggest a unique opportunity.

Disposition Toward Energy Efficiency Upgrades

Majorities of non-participants perceive themselves to be able and motivated to take actions to save energy. Specifically:

- 65% of non-participants think they could reduce their spending from current levels easily (7%), with minor adjustments (31%), or with major adjustments (27%).
- 54% of non-participants self-reported that they would make a substantial effort to save energy if it means saving some money too, with 40% saying they would put up with a little inconvenience and 14% willing to go out of their way. Another 26% would take action only if convenient or if the energy savings are very high.

Among those who think there is an opportunity to save energy in their homes, the vast majority of households think first of low- and no-cost behavioral opportunities. However, insulation and air sealing and heating system upgrades do appear among some of the more common top-of-mind efficiency and home upgrade options. Specifically:

- 59% of respondents who think they can take action to reduce in-home energy use mentioned thermostat adjustments or reducing their use of lights and appliances as the *first thing* they would do; 12% mentioned insulation and air sealing, and 8% mentioned HVAC upgrades.
- 51% mentioned the same behavioral opportunities as the *most impactful realistic step* they could take, while 7% mentioned insulation or air sealing and just 3% cited HVAC upgrades.

The emphasis on behavioral energy savings suggests opportunities for Xcel Energy to promote in-home practices as a customer and public service that may not be tied to specific products or claimed savings. Helping customers identify no- and low-cost energy saving opportunities can enhance customer satisfaction even when these efforts and tips are not associated with claimed energy savings.

However, the relatively low share of customers who think insulation, air sealing, and HVAC upgrades are the most impactful realistic energy saving step they might take points to a potential educational opportunity. It seems likely that the share of residential customers whose most impactful (and cost-effective) next energy efficiency opportunity involves insulation and air sealing or HVAC upgrades is higher than 7% and 3%, respectively.

There may be opportunities to increase awareness of the general population on the prevalence of these opportunities and to give customers some common indicators that would suggest they should explore building shell improvements. For instance, home age is often an indicator of potential shell improvements, and high winter energy bills could point to efficiency upgrades for building shells or

heating equipment as well.¹⁰ Utilities are well positioned to give customers an indication of what a high winter energy bill would be—either overall or for different ranges of home sizes when these can be determined through existing utility data or queries from local property tax systems.

Audit Participants

Customers who had participated in an Xcel Energy audit rated their willingness to take energy-saving actions at a higher level. Thirty-five percent said they would go out of their way to save energy (compared with 14% of general non-participants). They also were substantially more likely than general non-participants to cite insulation or air sealing as either the first next step they would take (cited by a quarter of respondents who identified a clear next step and more than a third as the most impactful realistic next step). Behavioral opportunities were cited less frequently as well, suggesting that the audit sensitizes customers to structural and appliance-oriented opportunities.

Information Sources

Overall, general messaging about energy efficiency from disparate sources tends to support energy efficiency programs in multiple ways as a facilitating influence. It keeps the topic top-of-mind among a cacophony of messaging for consumers, reminds people concerned about energy use of their own priorities (among busy lives), provides concrete steps people can take, and helps drive customers to existing product offerings.

General messages and encouragement to save energy is prevalent in Colorado, and messaging from Xcel Energy plays an important role alongside coverage of energy efficiency in the media and discussions with acquaintances. Specifically:

- 63% of non-participants recalled hearing or seeing suggestions for ways to save energy in the past year or two. As is common in geographies served by utility-based energy efficiency programs, two sources stand out as the main information providers on energy efficiency or savings: the local utility (Xcel Energy, in this case) and mass media (e.g., the news media and articles in periodicals).
- People find Xcel Energy to be the most useful information source about ways to save energy at home. Among respondents who recalled such information, 41% cited Xcel Energy as the most useful information source, far ahead of the second-most common mention, personal acquaintances, which was cited by 16% of respondents.
- Bill stuffers are the most common way customers receive information from Xcel Energy about ways to save energy, cited by over 90% of customers who had recalled energy-saving information from Xcel Energy. (The utility's website placed second, with citations by 31% of respondents.)

When compared with general non-participants, audit participants are substantially more likely to recall information about ways to save energy (cited by 95% versus 63% of general non-participants). However, they are somewhat less likely to cite Xcel Energy as the source of information about ways to save energy or to be the most useful information source. Given that energy audits received

¹⁰ For one example in the literature that cites correlation between insulation opportunities and home age, see: Seventhwave, *Energy Efficiency Opportunities for Homes with High Usage* (St. Paul, MN: Minnesota Department of Commerce, 2016). COMM-20130501-73532.

numerous mentions, it is possible that audit participants give credit first to the home energy auditor and only secondarily (if at all) to Xcel Energy.

Furthermore, the non-participant survey found that:

- 69% had selected an appliance or made a home improvement in the past five years specifically because it was energy efficient. (Interestingly, a third of these customers received a rebate associated with that product—most from a source other than Xcel Energy.)
- Awareness of rebates for energy efficient products and services is high; 79% of respondents recalled seeing or hearing about rebates for energy efficient equipment or home improvements in the past year or two. Slightly more than half of these specifically cited Xcel Energy rebates.

These results suggest that Xcel Energy's general messaging—particularly current efforts through bill stuffers—are noticed, and energy efficiency is a topic of which customers are aware and to which most are likely to respond positively—whether in intention or action.

Insulation-specific Perceptions and Potential Decision Drivers

The evaluation team asked non-participants specifically about their insulation and air sealing levels to inform Xcel Energy about general perceptions. While past research has suggested low accuracy in homeowner awareness of such home characteristics as insulation levels, perceptions can indicate barriers and opportunities to engage homeowners and encourage them to explore their specific options further.

Seventy-seven percent of non-participants think there is some opportunity to upgrade insulation or air sealing in their home. These households are likely to sense at least some value from investigating an insulation or air sealing upgrade and determining its potential benefit for their home, comfort, and energy bills. The amount of opportunity respondents perceived varied, as shown in Figure 3-12, and may not reflect actual opportunity that an assessment by a registered trade partner would find.

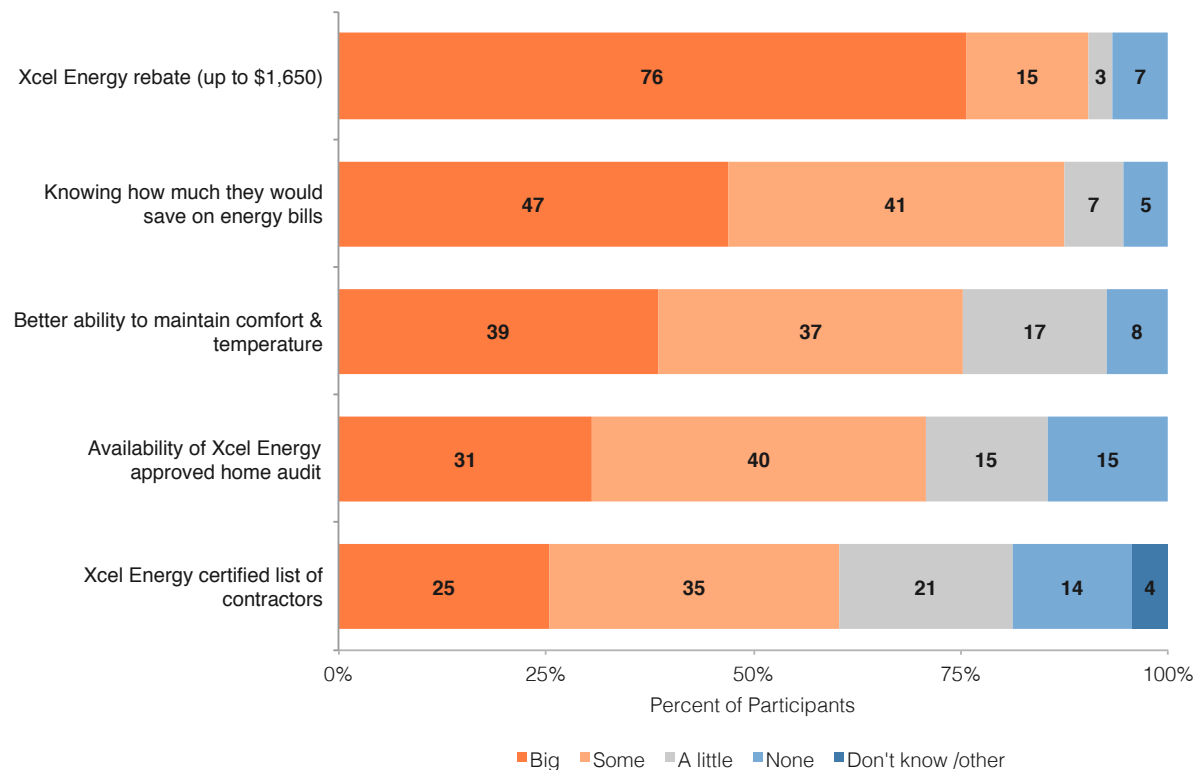
A horizontal stacked bar chart titled "increasing insulation opportunity -->-->-->-->-->-->-->-->". The x-axis is labeled "Percent of Participants" and ranges from 0% to 100%. The y-axis lists five categories of insulation status. The bars are colored as follows: dark orange for "Very well insulated", light orange for "Well insulated - a little improvement possible", blue for "Insulated - could be improved", dark blue for "Really needs insulation or air sealing", and grey for "Don't know". The counts for each category are displayed inside the corresponding segments of the bar.

Insulation Status	Count
Very well insulated	20
Well insulated - a little improvement possible	24
Insulated - could be improved	48
Really needs insulation or air sealing	6
Don't know	3

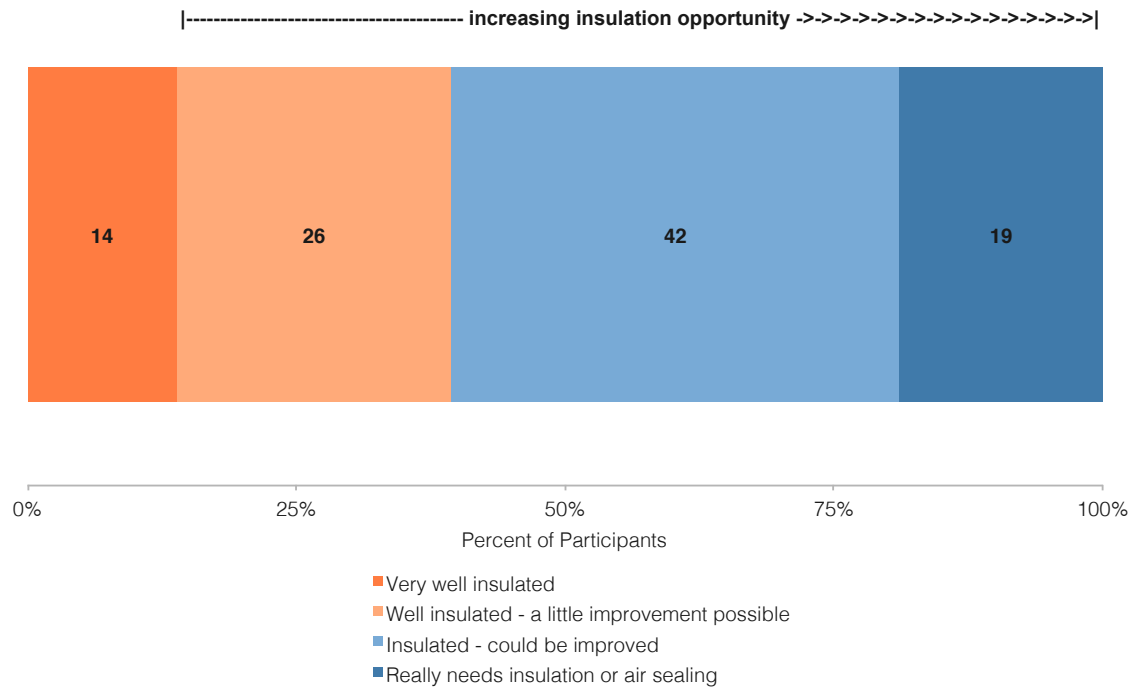


EMI CONSULTING

Figure 3-13. Perceived Influence of Various Product Services and Interventions (for Non-participants Who Believe They Have Insulation/Air Sealing Upgrade Potential)

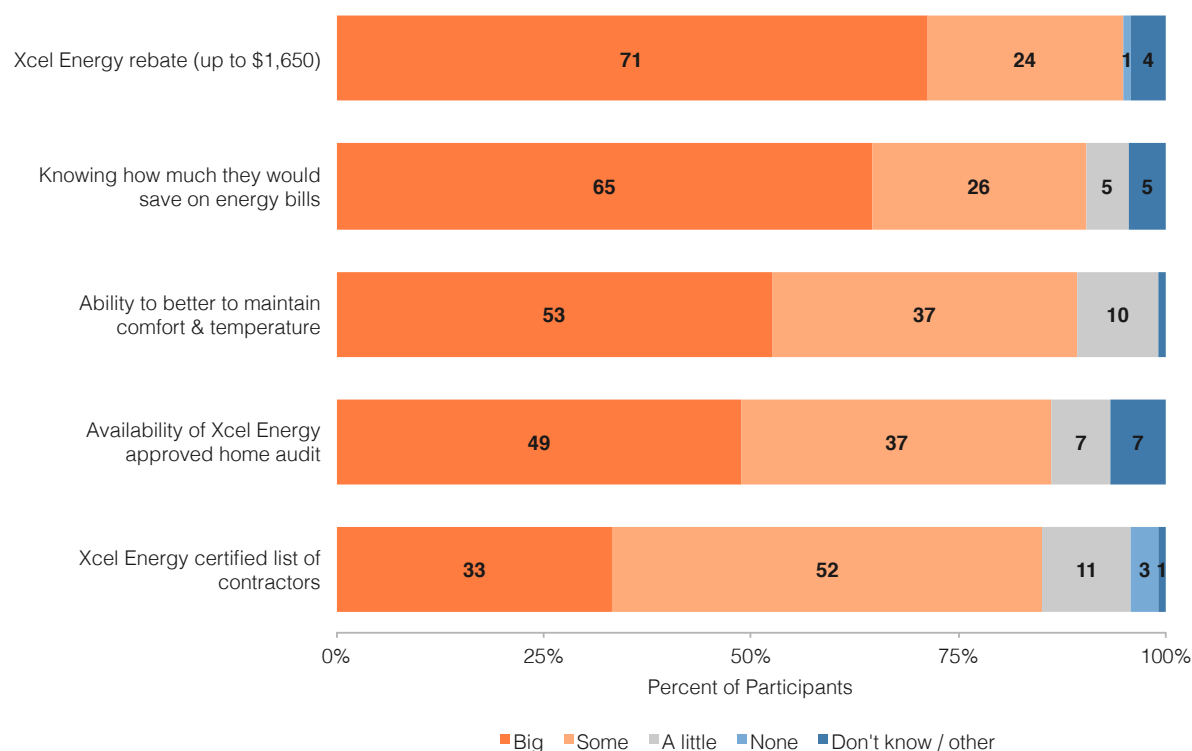


Audit participants reported somewhat greater opportunities to upgrade insulation and air tightness. While only 9% of general non-participants believed they really needed an insulation or air sealing upgrade, 19% of audit participants believed so. Conversely, only 14% of audit participants thought they had no insulation or air sealing opportunities, compared with 20% of general non-participants. While some of the difference could be due to self-selection (with homeowners who have opportunities choosing to do complete audits), it is also probable that the audit itself sensitizes customers on opportunities they did not know they had. Figure 3-14 presents audit participants' self-reports of their insulation and air sealing opportunities.



Past audit participants ranked the potential influence of actual or potential Xcel Energy product offerings to encourage insulation and air sealing upgrades similarly as general non-participants did, giving greatest weight to the maximum possible rebate amount (Figure 3-15). However, they assigned relatively greater weight to all of the factors beyond rebates.

Figure 3-15. Perceived Influence of Various Product Services and Interventions (for Audit Participants Who Believe They Have Insulation/Air Sealing Upgrade Potential)



Insights from Trade Partners

The evaluation team asked trade partners a series of questions aimed at understanding their customer outreach activities and customer awareness of the Insulation and Air Sealing product. As noted above, an important aspect of the Xcel Energy product is the benefits it can provide contractors in marketing insulation projects, and receiving customer contact through the Xcel Energy website. All ten trade partners stated that referrals, either from home auditors, other customers, or the Xcel website were the most important sales avenues for them. Five of ten solely rely on referrals, while five do some additional advertising including online, radio, and print advertising. The ability to refer to Xcel Energy's product and rebates lends credibility to these trade partners, so any support the product can provide to contractor marketing appears likely to drive more business to them and thus increase product participation.

Furthermore, trade partner experience regarding customer awareness of the product varied. At the low end, one trade partner, with the largest number of Xcel Energy projects among the sample, stated that about 20% of customers are aware of rebates upon initial contact with them. At the high end, two trade partners stated that typically most of their customers are aware of the Xcel Energy rebates.

Upon Xcel Energy's request, the evaluation team asked trade partners if there is a sufficient Spanish-only speaking insulation market in the areas they serve that make it worthwhile to have Spanish

informational material available. Four of the ten respondents stated yes to this question. These trade partners indicated that there is a growing Spanish-speaking population, many of whom do not have strong English skills, and that having materials in Spanish would assist in reaching this population, particularly because this segment often lives in lower quality housing and would benefit from insulation and air sealing work. The trade partners who would see Spanish language materials helpful were located primarily in the Denver area, while one serves northeastern Colorado.

Best Practices in Communicating about Insulation and Air Sealing

As noted by product team members and by the evaluation team's investigation, the product's success depends at least in part on whether and how customers exploring insulation upgrades distinguish between the upgrades available from non-participating insulators and those that participating trade partners would complete. Because comprehensive upgrades that adhere to BPI standards generally cost more, it is important that the difference and benefits be clear to customers weighing their options. That means clear messaging on not only the proper level of insulation upgrade, but also the need for air sealing as part of the work.

The Xcel Energy insulation product teams in Minnesota and Colorado showed interest in whether there are best practices for communicating with customers about insulation and air sealing to highlight the need for comprehensive upgrades. In response to that inquiry, the evaluation team conducted secondary research for this report into customer-facing messaging that extolls the benefits of comprehensive insulation and air sealing upgrades. While there does not appear to be a particular best practice, the evaluation team identified elements of marketing and educational messages that could be combined for Xcel Energy's customer messaging.

The type and depth of messaging varies by level of interaction with the customer:

Titles and headings—Inclusion of the term “air sealing” in customer-facing messages on Xcel Energy's product name and on its website, application forms, and product literature already aligns communications with the product's emphasis in Colorado. There may not be any change needed at the title and naming level.

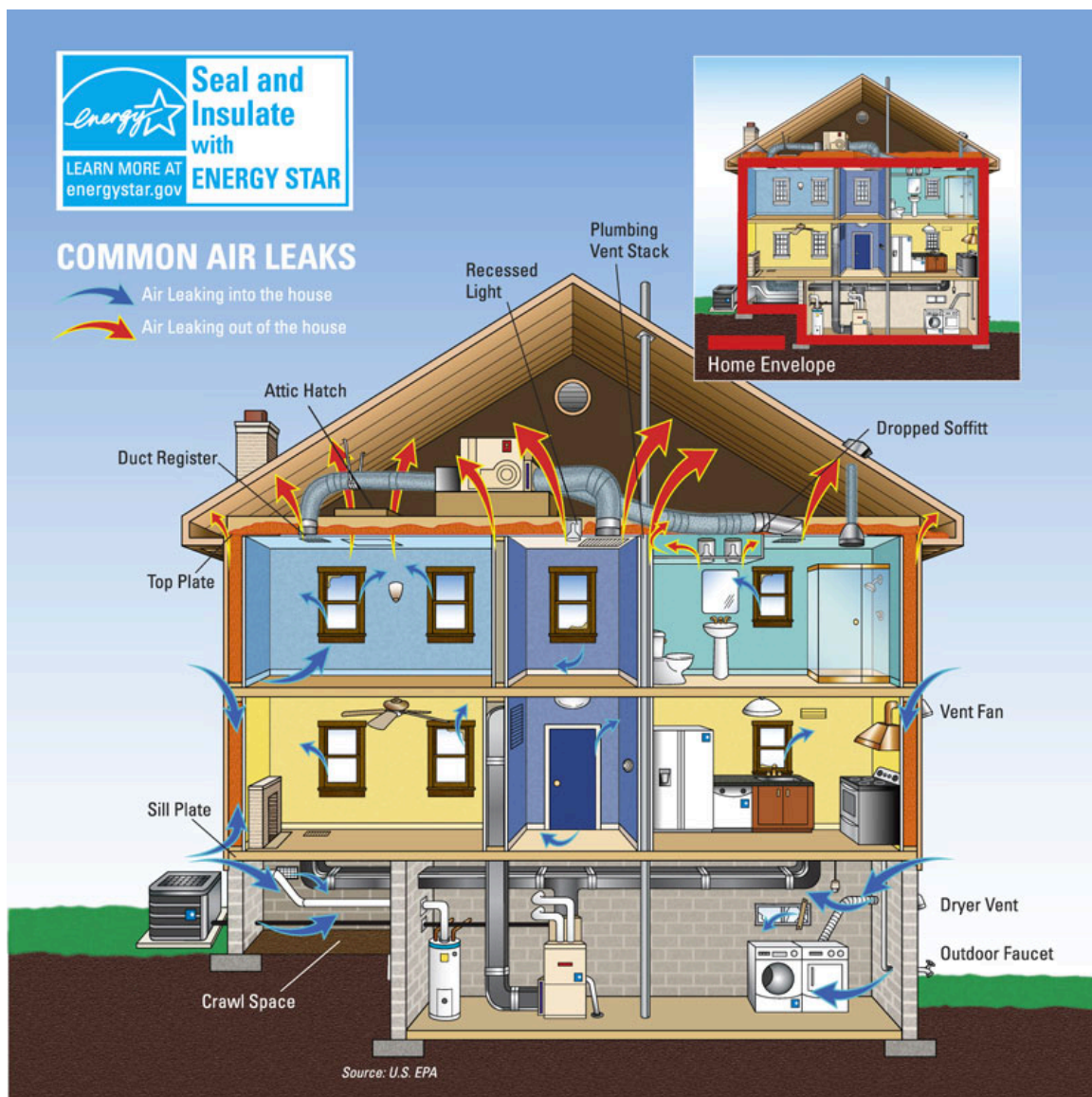
Short messages—Second, create simple-to-understand messaging that directs customers to think not just of insulation, but of insulation and air sealing as a package. The message could include a simple explanation for why the combination is important, such as "While adding insulation in your home—whether in the attic, walls or foundation—can make a difference in reducing your cooling and heating bills, air sealing your home in tandem with insulation can make your home even more energy efficient and comfortable. Doors, windows, chimney framing, pipe openings, and outlets are just a few of the places where air can move in and out of a home, and sealing those openings together with adding insulation is like pulling on a windbreaker over your wool sweater on a cold, windy day." This kind of short messaging would be appropriate for bundled marketing, where space is tight, or as an attention-getter that invites customers to examine a longer, more comprehensive explanation.

Comprehensive explanations—A few customers will be interested in a more comprehensive explanation or even quantification of the energy and cost savings from various types of upgrades. These customers may benefit from a visual explanation showing the building science behind insulation and air sealing (examples of air sealing graphics from ENERGY STAR and the US Department of Energy are below), a comparison table showing the relative effectiveness in heating

costs and savings from a simple insulation upgrade and a comprehensive one, or both. The call to action could be to use a participating trade partner, who will use a blower door test that determines the degree and type of air sealing needed to make the insulation project complete and effective.

Figure 3-16 and Figure 3-17 illustrate two ways that the ENERGY STAR program and the U.S. Department of Energy have illustrated common air leaks in homes. For savings comparisons, Xcel Energy could develop charts that show typical insulation upgrades with and without air sealing at varying home tightness levels based on its internal engineering calculations to show the difference to the customer.

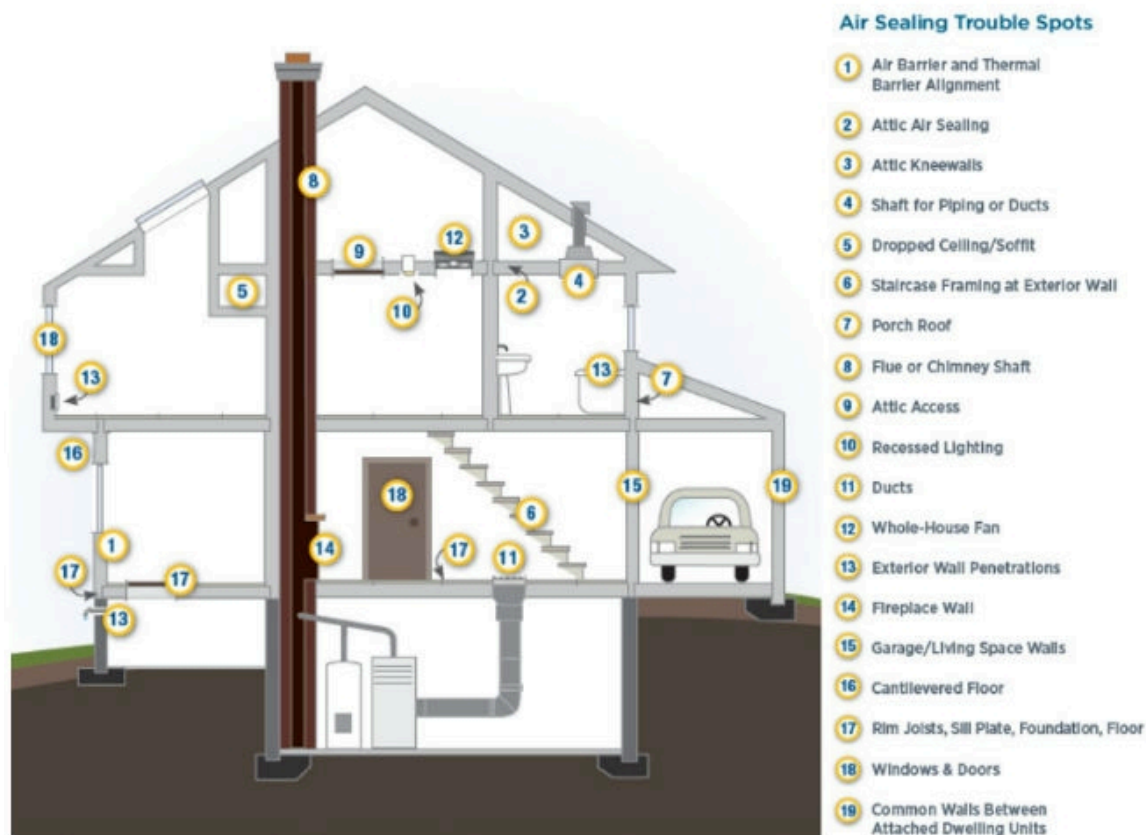
Figure 3-16. ENERGY STAR Common Air Leaks



Source: ENERGY STAR: Why Seal and Insulate?

https://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_sealing

Figure 3-17. U.S. Department of Energy Air Sealing Trouble Spots



Source: US Department of Energy, Air Sealing Your Home. <https://energy.gov/energysaver/weatherize/air-sealing-your-home>

3.6 Product Structure and Operations

The Insulation and Air Sealing product's structure is sound and in line with peers, but challenges with cost-effectiveness may be ameliorated with greater flexibility in measures and measure levels and through more emphasis on strategic customer acquisition. Optimization of the product's cost-effectiveness and impact needs to be balanced against clarity for participating customers and trade partners and ease of administration, however. Although rebate processing time is one of the primary customer and trade partner concerns, there are no obvious red flags in the process or clear operational improvements evident without a more detailed review.

Table 3-4 lists the initial evaluation questions that led the evaluation team to explore product measures and operations and the research methods employed to address these topics.

Table 3-4. Data Sources Used to Assess Product Structure and Operations

Research Questions	Data Source					
	Participant Survey	Non-participant Survey	Trade Partner Interviews	Peer Program Interviews	Product Staff Interviews	Other
Understand the effects of product changes	X		X	X	X	
Identify potential cost effectiveness enhancements	X	X	X	X	X	
Assess opportunities for operational improvements	X		X	X	X	

Cost Effectiveness and Recent Product Changes

Product Structure Overall

To put the product's design (and recent changes) in a broader context of how insulation and air sealing programs operate elsewhere, the evaluation team reviewed peer utility offerings. That review found similar program structures overall based largely on varying tiers of rebates for insulation and air sealing administered by trade partners. There was variation in the degree of measure requirements and complexity, however, with Xcel Energy's product design falling in line with most peer utilities.

On the more complex end of the spectrum of simplicity to complexity, some utilities or program administrators employ performance-based product designs that require a minimum level of energy savings based on a comprehensive home energy assessment and modeling. This model provides for greater screening of likely impacts, but at a cost of uncertainty to the trade partners and customers until the assessment is completed. The assessment requires an up-front investment from the customer, so it may deter potential participants. Actual savings have sometimes been estimated to be less than what was predicted by the model up front, so there is still some risk to the participants and to the program despite the greater up-front screening.

On the more simplistic end of the same spectrum, some utilities or program administrators use product designs that provide assurance of savings based on the insulation upgrade to be installed without air sealing requirements. This model provides the greatest certainty and simplicity to the trade partners and customers, but without the air sealing requirement instituted by Xcel Energy to ensure higher combined impact. These offerings sometimes base measure rebates on the number of square feet of footprint (or wall area) addressed.

Table 3-5 compares the peer utilities on key program design elements.

Table 3-5. Peer Utility Program Structures

Utility	Primary Supporting Market Actor	Measure Types	Rebate Structure	Notes
A	Qualified contractors	- Insulation (wall, attic, floor, rim joist, foundation) - Air sealing (linked)	% of cost up to max	Similar to Xcel Energy Insulation product
B	Qualified contractors	- Insulation (wall, attic) - Air sealing (linked)	% of cost up to max	Similar to Xcel Energy Insulation product
C	Qualified contractors or home assessors	- Insulation (any) - Air sealing (linked) - HVAC	\$ based on tier of modeled energy savings improvement	Performance-based rebate tiers
D	Home energy assessment program	- Insulation (wall, attic, rim joist) - Air sealing (offered, but not required for insulation upgrades) - Various other (whole-home approach)	% of cost up to max	Rebate = 70% of cost Must be recommended by home energy assessment Open to all installers and DIY
E	Approved trade partners or DIY	- Insulation (wall, attic, floor) - Air sealing	\$ based on ft ² addressed	Directed at electric savings only
F	Approved trade partners	- Insulation (wall, attic, floor) - Air sealing (offered, but not required for insulation upgrades) - Other shell (windows, duct sealing)	\$ based on ft ² addressed	Outreach at portfolio level; trade partner support includes QA

Recent Product Changes

Increases in the minimum air sealing improvements instituted for 2017 to increase cost-effectiveness received mixed responses from participating trade partners. Three trade partners stated that they did not feel that the changes have impacted their work or the number of projects that are eligible. (Two of these trade partners were smaller contractors with fewer than 50 projects annually, and one was a larger contractor with between 100 and 200 projects.) Five of the ten interviewed trade partners stated that the new product changes have resulted in a drop in projects for them. Of the remaining two trade partners, one did not have an opinion, and the last did not state any effect on sales but noted that the changes have made the process more complicated and difficult to explain to customers.

Additional Potential Cost Effectiveness Enhancements

Trade partners in general were satisfied with the product offerings, and the evaluation team did not hear any common themes or suggestions for potential cost effectiveness enhancements or changes to product measures. While there were no common themes, two individual trade partners provided the following recommendations:

- Consider a tiered rebate system, based on performance, so the product could cover more customers.
- Consider including unconditioned basement or crawlspace insulation in the product.

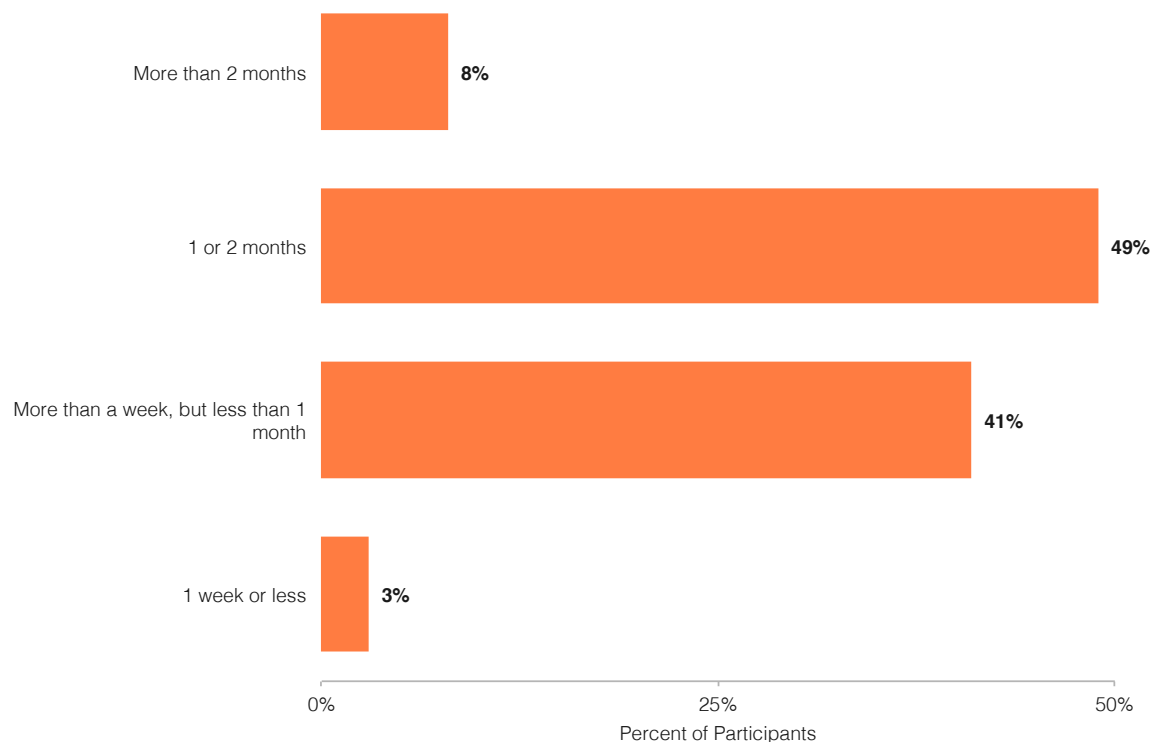
One of the peer programs has structured its rebates to align more closely with performance, as one trade partner suggested. This peer program still uses tiers, as Xcel Energy does, but bases its tiers on energy savings improvements rather than measure inputs. The energy savings are based on a comprehensive assessment and building modeling results. This structure allows the program to base its rebates on anticipated energy performance (\$X if the energy improvements are modeled to result in Y% savings) rather than purely on the measures installed. Inherently, this structure allows for a greater variation in the measures that may be installed with a performance-based screener. Such a structure could direct projects toward those with greater inherent impact, but at the cost of greater complexity and up-front investment. (We should note that this particular program has found some inconsistency between modeled energy savings and evaluation billing analyses, leading to uncertainty about the actual net impacts.)

Rebate Processing

This section discusses rebate operations. As noted in Section 3.4, rebate timing was one of the more common product attributes customers assessed negatively (though in general, customer satisfaction was high, and complaints were infrequent).

On average, customer self-reports suggest rebates were delivered to respondents between one and two months following the project as shown in Figure 3-18. Forty-four percent of respondents stated they received the rebate within one month. A further 49% stated they received their rebate between one and two months after the project, and 8% of customers stated they received the rebate more than two months after the project. While in line with many rebates offered to consumers, these processing times appear to be slower than *some* customers expect either based on their own preferences or expectations set by their contractors.

Figure 3-18. Distribution of Rebate Delivery Times



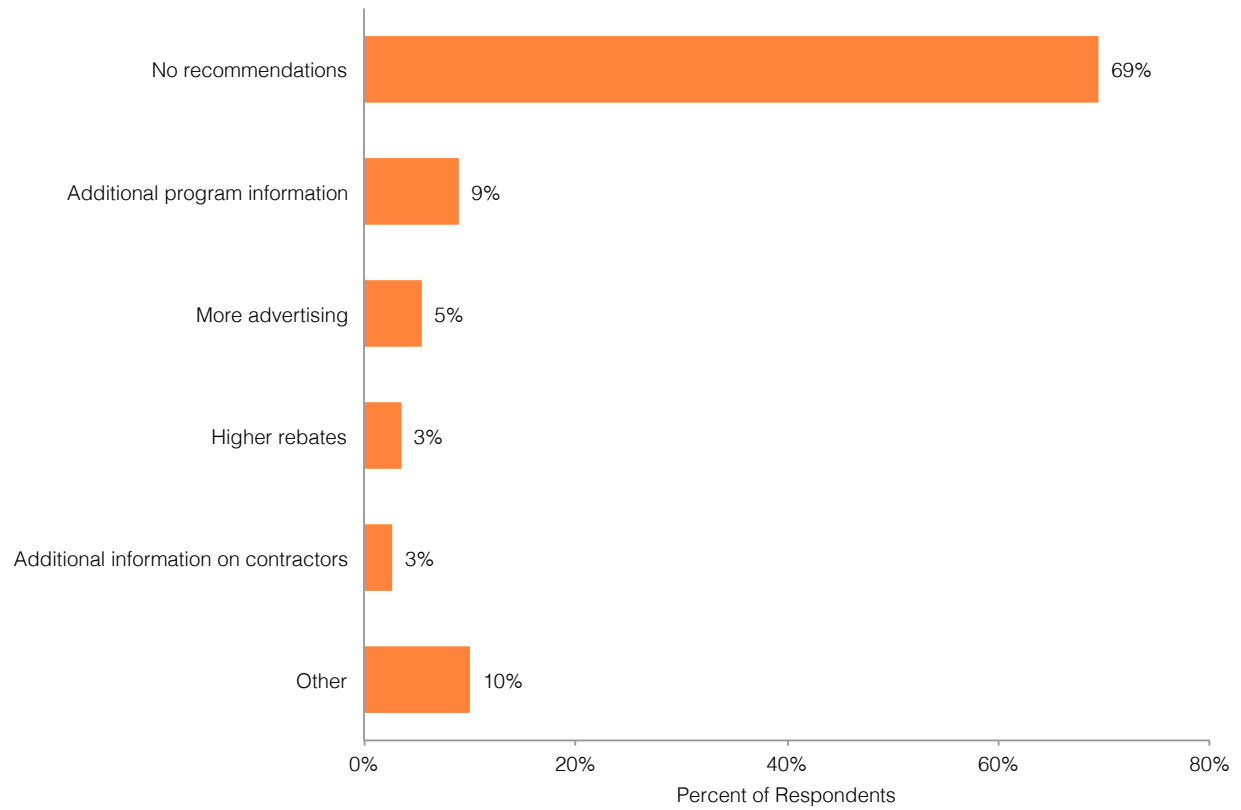
Trade partners expressed high levels of satisfaction with the operational side of the product with respondents praising the rebate process and product staff, but did note that they feel a sense of responsibility toward customers until the rebate arrives because they are the front line representing Xcel Energy.

Staff interviews about rebate processing suggest that delays are due mostly to incomplete or ambiguous applications. Online training and product updates for trade partners are well done and could help address documentation issues going forward.

Greater insights on rebate processing would require a more careful review of rebate records, including quantification of actual rebate processing times, numbers of rebates that are initially rejected, and a closer review of the process to determine whether accountability and efficiency are appropriately balanced. This level of detail was beyond the scope of our review, however.

To put rebate processing concerns into context, the evaluation team notes that participating customers had few recommendations for product improvements when given the opportunity to suggest what Xcel Energy might do differently. As shown in Figure 3-19, the majority of participants had no suggestions, and those who mentioned rebates at all tended to ask for larger rebates rather than faster ones.

Figure 3-19. Participating Customer Recommendations for Xcel Energy.



4. CONCLUSIONS AND RECOMMENDATIONS

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

The research team found that the Insulation and Air Sealing product is well-designed and well-received. It provides energy savings to customers and supports customer satisfaction. The trade partner-focused product design is a good fit for the existing market structure and customer decision-making. BPI certification and standards promote savings and quality.

Specific findings, recommendations and suggestions follow.

- **The Insulation and Air Sealing product was responsible for approximately 72% of gross energy savings computed for 2016.** This “net-to-gross ratio” (NTGR) includes a free-ridership rate of approximately 60% and a spillover rate of about 12%. The product made changes in rebate structures in 2017 that likely increased the NTGR subsequently and has opportunities to make additional changes to increase its attribution rate.
 - **Recommendation 1: The product should use a net-to-gross ratio of 0.85 until revised by substantial product adjustments or future evaluation studies.** This NTG ratio assumes continuation of the 2017 rebate structure and some additional outreach to drive customers to registered trade partners, as described in subsequent recommendations below.
- **The product influences the scope of insulation and air sealing upgrades through its registered trade partners once a customer reaches out to a contractor, but the success of this intervention strategy relies on customers to select a registered trade partner.** Consequently, driving customers who are considering an insulation or air sealing upgrade to participating trade partners is essential, and helping these trade partners differentiate their services from competitors that recommend less comprehensive upgrades is important. Xcel Energy has some success directing customers to participating trade partners, but more could be done to ensure customers considering insulation and air sealing reach out to at least one participating trade partner for a scope recommendation and price quote.
 - **Recommendation 2: Conduct more customer-facing outreach designed to steer customers considering an insulation upgrade to participating trade partners.** The goal of the outreach is to ensure customers receive a house-specific recommended scope for a *comprehensive* and *product-qualified* shell upgrade. The call to action should be to use an Xcel Energy-qualified trade partner. The messaging could focus on the comfort and bill savings benefits, but should also make it clear that not all insulation upgrades are created equal. This messaging could also increase the number of participating customers influenced by Xcel Energy to consider an insulation or air sealing upgrade and thus increase gross savings and the overall net-to-gross ratio.
 - **Recommendation 3: Explore ways to strengthen the market differentiation that participating trade partners receive and facilitate trade partner-based marketing.** To the extent possible, allow co-branding and endorsement of the participating trade partners as a group. Encourage and enable trade partners who currently rely only on Xcel Energy promotion of the product to do their own promotion as well. If needed, enhance quality

assurance efforts so Xcel Energy can stand behind the registered trade partners as fully as possible.

- **The product is not quite cost effective.** To increase cost-effectiveness, the product has adjusted its offerings toward a more impactful mix of measures. Targeting customers with elevated insulation and air sealing potential could further increase cost-effectiveness. Past research has shown that elevated insulation and air sealing potential exists in cold climates among older homes and higher winter fuel users.
 - **Recommendation 4: Increase targeting of customers with the greatest and most cost-effective insulation and air sealing opportunities.** For insulation and air sealing, these customer groups tend to include those in older homes and neighborhoods and those with high winter heating fuel usage. Higher savings from these homes provides greater cost-effectiveness; increasing the share customer projects that were prompted by Xcel Energy outreach within this population increases product influence. Product tracking of cost-effectiveness by home age and usage level could provide data for refinement in customer targeting.
 - **Recommendation 5: Explore ways to increase flexibility in the measure structure without compromising on the product's use of BPI standards or its emphasis of comprehensive shell upgrades.** Greater flexibility could entail an expansion of measures that are deemed to be eligible or a rebate structure that is based on anticipated energy savings rather than a percentage of project cost.

Furthermore, we offer some suggestions that do not rise to the level of a recommendation, but should be discussed and considered by the product team:

- **While product satisfaction is high, participating customers occasionally expressed dissatisfaction with trade partner performance and with the turnaround times for rebates.** Because trade partners are the key to product success and their performance may reflect on Xcel Energy in customers' eyes, it would be valuable for the product to detect any patterns in customer dissatisfaction with individual trade partners as early as possible. The primary issue with rebate turnaround times appears to be an occasional disconnect between customer expectations and actual processing times, especially when rebate forms need to be corrected and resubmitted.
 - **Suggestion: If not already done, include energy efficiency product transactions among follow-up customer satisfaction surveys by Xcel Energy's market research group.** Track customer satisfaction overall, but with particular emphasis on satisfaction with contractor performance. Tracking of customer satisfaction with individual contractors can highlight actionable issues.
 - **Suggestion: As needed, conduct an internal process review of rebate processing that includes greater tracking of rebate times, error rates, and explore greater use of online rebate processing.**

APPENDICES

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APPENDIX A: EVALUATION PLAN

MEMO

XCEL ENERGY CO COOLING EFFICIENCY EVALUATION PLAN
June 15, 2017

To: Nick Minderman, Xcel Energy
Michelle Hurst, Xcel Energy

From: Jeremy Kraft, EMI Consulting
Hannah Justus, EMI Consulting
Ingo Bensch, Evergreen Economics

cc: Jenny Fraser, Evergreen Economics

Date: June 15, 2017

RE: Xcel Energy CO Insulation/Air Sealing Product Evaluation Plan

To support the process and impact evaluation of the 2016 Xcel Energy efficiency programs, members of the EMI Consulting evaluation team from Evergreen Economics will be conducting a process evaluation of the Xcel Energy Colorado Insulation/Air Sealing product. This memo provides an updated plan for the 2016 Xcel Energy Colorado Insulation/Air Sealing evaluation based on the original scope of work, staff feedback during the evaluation kick-off meetings, and staff interview findings.¹ This evaluation plan includes the following sections:

- Product overview
- Study objectives
- Approach
- Next steps

Product Overview

The Colorado Insulation/Air Sealing Rebate product offers downstream rebates to residential customers that have air sealing, wall insulation, and/or attic insulation installed by a BPI-certified contractor. Air sealing is required prior to installing insulation unless the home is already sufficiently tight. The Colorado product has been operating continuously since 2009 and has not been evaluated in the past, which provides a significant opportunity for this evaluation to develop the first actionable recommendations for the product. The product has made changes for 2017, which will increase requirements for air sealing reductions and vary rebates by heating fuel and presence of air conditioning.

Study Objectives

The Colorado Insulation/Air Sealing Rebate product relies on trade ally contractors to raise customer awareness and to conduct quality installations that help ensure product success. For this reason, a key

¹ The original scope of work is included in the evaluation team's contract with Xcel Energy for the 2017-2018 DSM evaluations.

process evaluation objective will be to examine the role of trade allies in the product and determine the successes and challenges they have faced in implementing projects. Other process evaluation objectives will include assessing sources of participant awareness and levels of satisfaction with several aspects of the product including rebate amounts, rebate processing times, contractor interaction, and installation quality. We will also explore how the change to air sealing reduction requirements and rebate structure have affected participation, customer satisfaction, and (potentially) free ridership. To summarize, **objectives of the process evaluation** include:

- Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.
- Assess sources of participant awareness and levels of satisfaction.
- Understand the customer journey path (e.g., what prompts customer projects and participation).
- Understand how product changes have affected participation, customer satisfaction, and free ridership.
- Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.
- Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.
- Assess customer engagement and satisfaction

The impact evaluation will focus on estimating a net-to-gross ratio for the Insulation/Air Sealing product. The current net-to-gross ratio for Colorado is stipulated at 0.89. As this product has not yet been subject to an impact evaluation, our approach will assess the appropriateness of this stipulated value by evaluating current evidence of free ridership and spillover using information collected in surveys of participants and non-participating customers. We will also use interviews with installation contractors as a means for collecting data on possible long term market transformation effects of the product, as well as refine the current net-to- gross ratio values. To summarize, **objectives of the impact evaluation** include:

- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.

Approach

To address these objectives, the evaluation team will conduct interviews with Xcel product staff for the Colorado Insulation/Air Sealing product. These interviews will cover topics such as product design, trade ally outreach, marketing, rebate structures, and any recent, planned, or upcoming changes to product design. Additionally, we will conduct interviews with participating trade ally contractors to discuss product processes, satisfaction with product support and outreach, and impressions of customer motivations. Participant surveys will explore the participation process, awareness of other Xcel Energy products, and the influence of the product assistance. To develop free-ridership and spillover estimates, the survey will include a battery of questions asking about their plans to conduct air sealing or install insulation prior to product participation and the impact Xcel Energy had on their decision to upgrade.

Table 1 below summarizes the data collection and research associated with the Colorado Insulation/Air Sealing Evaluation. The table also proposes additional tasks to the original scope of work which the evaluation team considers to be valuable to conduct based on feedback from staff. As an additional task, the evaluation team shall conduct additional trade partner interviews with highly active trade partners, lightly active trade partners, and non-participating trade partners to understand how to support trade ally promotion of quality insulation and air sealing. Other additional tasks include a limited number of customer interviews to better understand the customer journey, exploratory secondary research and

analysis on product measures and cost-benefit analysis, and customer targeting research to identify eligible non-participants for increased product participation and savings.

Table 1. CO Insulation/Air Sealing Research Summary

Research Task	Sample Size ^a	Objectives
Staff Interviews	2-4 Xcel Energy staff	Explore product design, trade ally outreach, marketing, rebate structures, and any recent or planned product changes.
Participant Surveys	70 telephone surveys with participants	Understand the participation process, awareness of other Xcel Energy products, and the influence of product assistance. Determine evidence of free ridership and spillover.
Non-participant Surveys	70 non-participant surveys	Determine evidence of free ridership and spillover.
Trade Partner Research	10 interviews with participating trade partners	Discuss product processes, satisfaction with product support and outreach, and impressions of customer motivations.
Utility Benchmarking	6 peer utilities	Compare product to peer utility programs.
Exploratory Secondary Research and Analysis on Measures and Cost-Benefit Analysis	N/A	Build on product investigation into measures that could be added for deeper savings and greater cost effectiveness. Research could comprise secondary research, interviews with other insulation products, analysis of non-rebated measures included on submitted invoices, and a sensitivity analysis involving the cost-benefit calculation.

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

Next Steps

The evaluation team plans to conduct the following next steps:

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

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

APPENDIX B: NET-TO-GROSS APPROACH AND INPUTS

This appendix provides additional information on the approach, inputs, and results of the net-to-gross analysis conducted by the evaluation team.

Approach

As noted in Section 2, the evaluation team used a self-report approach for estimating the product's Net-to-Gross Ratio (NTGR) based on participating customer survey results in combination with additional research data inputs (primarily information gathered through trade partner interviews). The methodology used in this evaluation was built from the Residential Prescriptive Rebate (With No Audit) Protocol in the *2016 Illinois Stateline Technical Reference Manual for Energy Efficiency Version 6.0*, in *Attachment A of Volume 4: Cross-Cutting Measures and Attachments*. The evaluation team customized this methodology to the Insulation and Air Sealing product, and supplemented the methodology with additional qualitative and quantitative data characterizing the customer's decision process as well as trends in the market.

The data inputs to the NTGR analysis included the following, all of which are discussed in Section 2:

- Participant surveys – focused on project-level effects;
- Trade partner interviews – focused on overall assessments of market dynamics and product effects;
- Product benchmarking data – providing a point of comparison; and
- Known, anticipated, and recommended product changes since 2016 – factors in implications for future changes in product design.

The evaluation team used self-reported data from participating customers to develop an initial NTGR for 2016. Data from the additional sources listed above were then used in constructing a logical narrative of product attribution and in finalizing the NTGR for the product.

An NTGR consists of a free-ridership (or attribution) component and a spillover component.

Free-ridership and Attribution

Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Free-ridership is assessed on a scale from 0 to 1, where 1 indicates that the product had 100% free-ridership and all product savings would have occurred without any of the product's rebates or assistance. Similarly, attribution is a complementary metric that indicates the share of energy savings for which a product appears to be responsible. Free-ridership and attribution scores combine to equal 1.

To determine free-ridership and attribution, the evaluation team developed a methodology based on the self-report approach specified in the Residential Prescriptive Rebate (With No Audit) Protocol from the 2016 Illinois TRM. The self-report approach involves contacting participants in the

product and asking them a series of questions about components of free-ridership. Specifically, the methodology the evaluation team developed asked respondents specific questions to assess two free-ridership components:

1. A Product Influence score, based on the participant's perception of the product's influence on the decision to carry out the energy-efficient project versus non-product factors. Three factors were considered: (1) general encouragement by Xcel Energy for customers to consider building shell upgrades, (2) insulation and air sealing rebates, and (3) registered contractor recommendations to the customer on the details (scope) of their upgrade.
2. A No-Product score, based on the participant's intention to carry out the energy-efficient project and that upgrade's timing without the three product factors listed above (i.e., in the absence of the product entirely).

Based on the responses to the questions, each component is assessed on a 0 to 10 scale for each respondent. The average of the two component scores comprises the final free-ridership score for each respondent. The evaluation team then scaled the final free-ridership score to a value between 0 and 1, and averaged all respondent scores to arrive at the final basic program level free-ridership score.

To assess the rationality of the free-ridership score described above (and mitigate any inherent concerns with self-reported responses, including recall and social desirability bias), the evaluation team also considered the overall narrative of the program's influence from a broader set of survey questions from the participant survey and interview questions from trade partner interviews. Specifically, these included insights on the customer journey from the customer survey and responses from trade partners about customer choices and behavior. The evaluation team found some inconsistency between the scoring algorithm and qualitative customer journey data, resulting in a post hoc adjustment to the final basic free-ridership score. (In this adjustment, the weight of the Product Influence and No-Product scores was changed from a 50/50 weight to a 70/30 weight in favor of the Product Influence scores, which appeared more consistent with the program theory and overall narrative of how the product influences customers [as revealed by customer journey questions and trade partner interviews].)

Spillover

Spillover is a measure of the amount of energy savings that occur due to the product that are *not* captured in the product's (or other Xcel Energy products') claimed energy savings. For the purposes of this evaluation, only participant spillover was estimated due to the additional data required to estimate non-participant spillover effects.

To capture participant spillover, the evaluation team asked participants for information about any additional energy efficient equipment subsequently installed outside of the product (for which they did not receive a rebate). The surveys also probed for information on the importance of the Insulation and Air Sealing product in participant installation decisions. The evaluation team computed savings estimates for all identified spillover equipment, and the product's spillover ratio was calculated by dividing the total spillover savings by the product's total energy savings.

Determination of Net-to-Gross Ratio

The evaluation team calculated the product's initial net-to-gross ratio using the following formula:

$$\text{Product NTGR} = 1 - (\text{Free-ridership Ratio}) + (\text{Participant Spillover Ratio})$$

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

This process included two adjustments to the quantitative process described above:

1. For the final 2016 NTGR, the evaluation team weighted the Product Influence score and the No-Product score that comprise the free-ridership component of the NTGR. We assigned a weight of 0.70 to the Product Influence score and a weight of 0.30 to the No-Product score to reflect the greater consistency of the Product Influence scores with the program theory and the narrative of the product's influence revealed by customer responses to questions about decision-making concerning their upgrade's scope, as well as trade partner interviews.
2. As noted, the prospective NTGR includes an upward adjustment to address product changes that occurred or appear likely to occur after 2016. These adjustments provide an estimate of the product's NTGR going forward. (Readers should note that the 2016 NTGR is based on the product as it existed in 2016 and as reported by participants during that year and the first quarter of 2017.)

Both of these adjustments draw on empirical data that indicated a need for adjustments, but the actual quantitative changes made were based on professional judgment.

Results and Data Inputs

This section presents individual data inputs computed from customer self-reports and used to compute free-ridership (attribution) and spillover.

Customer-reported Free-ridership

The customer-reported free-ridership was based on two sets of survey questions the evaluation team posed to participants: the first addressed product influence, while the second inquired about what the participant would have done in the absence of the product (i.e., a counterfactual).

Free-ridership Based on Responses to Product Influence Questions

The first step in estimating product attribution (and its counterpart, free-ridership) for the Colorado Insulation and Air Sealing product was to analyze the data collected from four questions that directly asked about product influence. Those questions, shown in Table 1, asked respondents to state, on a scale of 0 to 10, how influential encouragement from Xcel Energy, rebates from Xcel Energy, and recommendations from the insulation contractor were in their decision to conduct the upgrade. Respondents were first asked to consider each of these items separately (Questions E2, E3, and E3a), and then were asked to consider them together as a package (Question E4). As the table shows, among the individual components, the contractor recommendations had the strongest

influence on respondent decisions with a median score of 8, followed by the rebate with a median score of 6. When asked to score the influence of the entire package of customer support and incentives the product provides, the median score was 8. That score is equal to the Product Influence score for contractors alone, while the mean score was 6.75, slightly lower than the mean score for contractors alone. This indicates that in general, contractor recommendations are both the most influential aspect of the program individually, and likely the largest driving influence in the package of customer support.

Table 1. Participating Customer Responses Related to Product Influence

Q	Program Influence questions	Unweighted (n)	Weighted Mean	Weighted Median
E2	How influential was any encouragement you saw from Xcel Energy to consider an air sealing or insulation upgrade in your decision to do an upgrade?	47	5.19	5
E3	How influential was the availability of the rebate from Xcel Energy on your decision to install the amount of air sealing or insulation that you installed?	107	5.84	6
E3a	How influential was the contractor recommendation on your decision to install the amount of air sealing and insulation that you installed?	120	7.24	8
E4	How influential was this package of customer support on your decision to conduct the comprehensive air sealing and insulation project?	118	6.75	8

Following industry standard practice, the four question scores were combined to calculate the Product Influence free-ridership score. For any one respondent, raw scores for each of these values ranged from 0 to 10. The Product Influence score takes the maximum value of the individual Product Influence scores (E2, E3, and E3a) averaged with the overall Product Influence score (E4). The final result was divided by ten to obtain the free-ridership score of between 0 and 1. The resulting values averaged to 0.72 across all sampled participants, which suggests a free-ridership of 0.28 (or 28%).

Free-ridership Based on Responses to Counterfactual Questions

The second step in estimating program attribution (and its counterpart, free-ridership) for the Colorado Insulation and Air Sealing product was to analyze the data collected from two questions that asked what the customer would have done in the absence of the product's influencers. Those questions, shown in Table 2, asked how similar or different their insulation or air sealing upgrade would have been and when it would have occurred, if at all. Two-thirds of respondents indicated that they would have completed the same upgrade or something close but not as extensive, and would have done so at the same time or within a year. These responses suggest a high degree of free-ridership.

Table 2. Participating Customer Responses to Counterfactual Questions

If the Insulation and Air Sealing product had not existed, what would you have done?	When would you have done the project?				
	About the same time	In a year or two	In three or four years	In more than four years	Total
Done the same exact insulation or air sealing project	36%	2%	1%	0%	39%
Done something close, but maybe not as extensive	31%	9%	1%	0%	41%
Done a substantially less involved upgrade	6%	4%	2%	0%	12%
Not done any upgrade in insulation or air sealing yet	0%	0%	5%	3%	8%
Total	73%	15%	9%	3%	100%

For each respondent, we assigned a program attribution score based on the participant's responses to the two questions (see Table 3). Program attribution ranged from zero for respondents who stated they would have done the same project at about the same time, up to 100% for respondents who said they would not have done any air sealing or insulation project. Respondents who stated that they would have done an air sealing and insulation project in more than four years also received an attribution weight of 100%.

Table 3. Program Attribution Scores Assigned to Counterfactual Questions

If the Insulation and Air Sealing product had not existed, what would you have done?	When would you have done the project?			
	About the same time	In a year or two	In three or four years	In more than four years
Done the same exact insulation or air sealing project	0%	30%	70%	100%
Done something close, but maybe not as extensive	30%	50%	85%	100%
Done a substantially less involved upgrade	70%	80%	90%	100%
Not done any upgrade in insulation or air sealing yet	100%	100%	100%	100%

This analysis suggests a relatively low level of program attribution (and thus high free-ridership). Average attribution when computed this way was 0.33 (suggesting a 67% free-ridership rate).

Hence, the two standard analytical approaches for computing free-ridership point to substantially different degrees of free-ridership and program attribution. One suggested program attribution of 0.72 and free-ridership of 0.28, while the other indicated program attribution of only 0.33 and free-ridership of 0.67. To determine how to weight the results of the two alternative approaches to calculating program attribution and free-ridership, we analyzed customer journey responses from the

customer surveys and trade allies responses to several questions about the influence that the product has on customers' decisions.

Combining Product Influence and Counterfactual Scores

For reasons described below, the team used a 70/30 weight, accounting for the likely difficulty participating customers had in reliably indicating a hypothetical action they did not take and in making technically inaccurate assessments of whether the project they did not do would have been technically equivalent, similar, or inferior to the one they did do. Using a 70/30 weight, the evaluation team computed an attribution score of 0.60 (suggesting a 40% free-ridership rate). This value ultimately fed into our 2016 NTGR computations.

The evaluation team's consideration of the appropriate weight for the Product Influence and No-Product scores included the following insights from both the participating customer surveys and trade partner interviews:

- Customer respondents gave high credit for the product components, in particular the contractor recommendations (median influence score = 8) and product rebates (median influence score = 6).
- 74% of customer respondents stated they relied on trade allies for recommendations of the scope of projects.
- Trade partner respondents acknowledged the important role of credentialing and rebates in customer decisions.
- The majority of trade partner respondents (9 of 10) were of the opinion that the rebate and contractor recommendations had an influence over customer decision making.
- The four points above combine to suggest that customers may have difficulty differentiating between comprehensive insulation and air sealing projects, and projects with a smaller scope.

The evaluation team also notes that this approach to estimating a product NTGR examines a customer's insulation and air sealing upgrade as a single unit. Survey questions inquired about insulation, air sealing, or both, depending on the scope of the customer's rebated shell upgrade. The questioning did not parse product influence for insulation and air sealing components of the product separately, although the evaluation suggests that the product may be more influential in prompting customers to add air sealing than in affecting the degree of insulation they add in substantial ways. Exploring these nuances of product influence further would require deeper exploration of customer decision-making than is possible with a telephone survey of participants that focuses on closed-ended, quantitatively oriented questions. In-depth interviews with customers who recall the decision-making process in detail could provide more depth and distinction between insulation and air sealing upgrades in future evaluations.

Customer-reported Spillover

The evaluation team estimated spillover based on a comprehensive set of questions asked of program participants regarding other energy efficiency measures customers installed after participating in the Insulation and Air Sealing product. If a customer did install another energy efficiency measure, the energy savings from that measure is regarded as spillover to the Insulation and Air Sealing product if the following two conditions are met:

1. The customer did not receive a rebate from Xcel Energy or any other organization.

2. The customer reported that, on a scale of 1 to 10, participation in the Insulation and Air Sealing product had an influence of 3 or higher.

For those participants of the Insulation and Air Sealing product that met these two conditions, the evaluation team computed spillover as follows:

$$\text{Spillover} = \frac{\sum ((\text{Influence score} * \text{Number installed} * \text{Deemed Savings per Unit}))}{(\text{Total Gross Savings from Insulation and Air Sealing Product})}$$

The evaluation team then computed the average spillover across all participants, which equaled 0.12 or 12% of gross product savings. Participating customers who had upgraded windows during or after the insulation and air sealing work on their home were more likely to attribute their additional upgrades to their participation in the Insulation and Air Sealing product than those whose subsequent upgrades focused on lighting or in-home appliances. As a result, 63% of the spillover savings were associated with window upgrades.

Scenario and Sensitivity Analysis

Xcel Energy expressed a desire to better understand the sensitivity of the NTGR to various factors and situations that would allow the product to make strategic adjustments and optimize its impact. The evaluation team offers the following additional information and assessment to assist Xcel Energy in interpreting the NTGR and making product choices. However, we also note that the NTGR is based primarily on participant assessments of product influence. Future participants' responses to questions about a revised product's influence cannot be predicted with sufficient precision to allow for quantitative analysis. Hence, our discussion is limited at times to hypothetical and directional insights.

Weighting of Product Influence and No-Product Scores in the Free-ridership Calculation

As noted in Section 2, we combined two free-ridership scores for an overall assessment of free-ridership and product attribution. We used a 70/30 weight for the Product Influence and No-Product scores because our confidence in the product influence scores was higher, and they matched the narrative from other parts of the evaluation more closely (but not completely). To test the sensitivity of this weight, we also ran the computation using the 50/50 weight we had initially intended and a 100/0 weight that discounts counterfactual responses completely. This analysis shows that:

- A 50/50 weight would have resulted in an overall NTGR of .64.
- A 100/0 weight would have resulted in an overall NTGR of .83.
- As noted in the report, our 70/30 weight resulted in an NTGR for 2016 of 0.72.

Influence of Increased Air Sealing Requirement

The evaluation team included a 10 percentage point adder to the NTGR to acknowledge an increase in air sealing requirements made after the majority of survey respondents had participated. The increased air sealing requirement is likely to have weeded out some projects that were free riders under the earlier product requirements measured by the 2016 NTGR. The chosen value of 10

percentage points was based on professional judgment and would need to be confirmed by future evaluation work. However, we offer the following sensitivity analysis concerning this adder.

In order to have achieved a 10 percentage point increase in attribution, the product's increased air sealing requirements would have needed to weed out 36% of its full free riders. If the changed requirements had weeded out 10% of full free riders, the increased attribution would have been 3 percentage points. If the changed requirements had weeded out 50% of full free riders, the increased attribution would have been 14 percentage points.

Differentiating Between Insulation and Air Sealing

Product influence appears to be higher for air sealing improvements than insulation improvements, mostly because customers initiate their shell upgrades with the intent to increase their insulation. Those customers who reach out to non-participating contractors will increase their home's insulation values, but are less likely to conduct any air sealing. Hence, participating customers' energy savings from air sealing are more likely to have been the result of product influence than their energy savings from insulation, which can be attributed to the product only in part. Customer responses to product influence questions should take into account this mixed product influence, but customers' abilities to appropriately weigh the relative impact of insulation and air sealing are likely limited.

This study was not designed to distinguish between the insulation and air sealing impacts separately, but treated them as a unit. Future NTGR assessments could attempt to distinguish between the product influence on insulation and air sealing by interviewing a sample of customers about the decision-making process that led to the details of their insulation and air sealing choices. These interviews would be in addition to a standard NTG survey battery asked of a larger number of customers.

In the meantime, product staff could consider shifting more attention on promoting air sealing over insulation to increase product influence. Product influence is likely to be closer to 1 for air sealing and noticeably lower than 0.72 for insulation (for 2016), although it is unclear how customers would respond to the NTG survey questions that distinguish between the two components of many shell upgrades. Shifting the product's attention to air sealing, for instance by offering rebates exclusively for air sealing or ones that are higher for air sealing than insulation, would increase the product's influence on the projects that are completed.

However, the product would need to weigh the benefit of greater product influence with a potential decrease in participation from customers who are seeking insulation upgrades. As noted, customers generally initiate the search for a contractor thinking that they will upgrade their insulation. If they find that Xcel Energy offers only small or no rebates for the insulation they were seeking, customers may be less likely to engage a participating trade partner in this scenario, thus reducing participation levels while increasing product influence.

Net-to-Gross Ratios for Future Interventions

One of the evaluation team's recommendations is to increase outreach to customers who might be considering an insulation and air sealing upgrade—especially those whose homes have a higher

probability of benefitting from one. Product staff expressed interest in better understanding the impact of such outreach on the product's NTGR.

The benefit of outreach that reaches customers earlier in their consideration process is a higher influence on their decisions and the ability to better direct them to participating trade partners. As noted in this report, most participating customers currently report that the idea of upgrading insulation (or air sealing) begins with them; the product's influence lies in the difference between the scope of the upgrade they would have done with a non-participating contractor and the scope of the upgrade they do with a participating trade partner that meets product requirements.

Conceptually, the earlier intervention with customers will have the following effects:

- Some customers will be prompted to conduct insulation and air sealing who would otherwise not have considered it. Such prompting would arguably give the product full credit for the insulation and air sealing because it would not have otherwise occurred.
- Some customers who were considering insulation upgrades would be prompted to reach out to a participating trade partner, so their selection of a contractor would be directed rather than "random." For these customers, the product's influence would be the difference between the current and future rates at which customers call participating trade partners over non-participating contractors.

The first of these effects is easier to assess than the second. A 20 percentage point increase in product participation from outreach would result in the 3 percentage point increase in the NTGR we calculated for the prospective ratio.¹¹ A 10 percentage point increase in product participation from outreach would result in a 1.6 percentage point increase in the NTGR. A 30 percentage point increase in product participation would result in an increase in the NTGR of 4.2 percentage points.

Assessing the impact of increased traffic to participating trade partners would require market size data that we do not currently have.

¹¹ This calculation assumes the 10 percentage point adder we already included for increased air sealing requirements.

APPENDIX C: SAMPLING PLAN

MEMO

SAMPLING PLAN
July 25, 2017

To: Nick Minderman, Xcel Energy
Michelle Hurst, Xcel Energy

From: Jeremy Kraft, EMI Consulting
Hannah Justus, EMI Consulting
Ingo Bensch, Evergreen Economics

cc: Jenny Fraser, Evergreen Economics

Date: July 25, 2017

RE: Xcel Energy CO Insulation/Air Sealing Evaluation: Sampling Plan

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency programs, the EMI Consulting evaluation team will be conducting a process and impact evaluation of the CO Insulation and Air Sealing program. The evaluation objectives are to:

- Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.
- Assess sources of participant awareness and levels of satisfaction.
- Understand the customer journey path (e.g., what prompts customer projects and participation).
- Understand how product changes have affected participation, customer satisfaction, and free ridership.
- Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.
- Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.
- Assess customer engagement and satisfaction
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.

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

Participating Customer Characteristics and Sample Design

The evaluation team defined a participating customer as any customer that closed a project in 2016 or the first quarter of 2017. Using an abstract from the Xcel Energy program database, the evaluation team identified 1,575 participating customers during this timeframe. Table 1 shows the distribution of



participating customers by CAMEO residential segment, which was included in the data extract.¹ CAMEO is a consumer segmentation scheme that characterizes neighborhoods based on the predominant demographic, lifestyle and socio-economic characteristics of the neighborhood.² Xcel Energy assigns each residential customer to a CAMEO residential segment based on the customer's address and can then use this information to better understand their customers and to communicate more effectively with them. The use of consumer segmentation based on demographic characteristics and lifestyle and presumed psychological traits, though growing in popularity, is still relatively uncommon among electric and gas utilities.

Xcel Energy conducted a targeted marketing campaign in 2016 based on PRIZM codes, which are similar in nature to the CAMEO codes shown here. As Table 1 shows, there is substantial variability in the proportion of participants from each of the respective segments. For many of the segments, there is substantial variation between the rate of customer participation in the Insulation and Air Sealing program and the proportion of Xcel Energy customers within that segment. For example, 18.5 percent of program participants are in the "American Aristocracy" CAMEO residential segment, but this segment only comprises about 9.0 percent of residential customer base. Comparatively, only 1.8 percent of participants are in the "Stretched Tenants" segment, but this segment comprises about 7.2 percent of Xcel Energy's residential customers.

Table 1: Colorado Insulation/Air Sealing Participant Segmentation

CAMEO Residential Segment	Participants	Proportion of Participants	Proportion of Xcel Energy Residential Customers
01 - American Aristocracy	291	18.5%	8.97%
02 - Exclusive Society	231	14.7%	8.22%
03 - Prosperous Families	332	21.1%	17.19%
04 – Enterprising Households	242	15.4%	14.59%
05 - Comfortable Communities	142	9.0%	12.19%
06 - Aspiring Consumers	91	5.8%	9.07%
07 – Dynamic Neighborhoods	108	6.9%	9.18%
08 - Diverse Communities	31	2.0%	4.64%
09 – Stretched Tenants	28	1.8%	7.17%
10 - Strained Society	38	2.4%	4.16%
Missing or Refused (N/A)	41	2.6%	N/A
Total	1,575	100%	100%

We intend to use the CAMEO residential segments to stratify participants for sampling. We believe that the CAMEO residential segmentation is the best variable for stratifying participants for the process evaluation because each segment consists of customers with similar lifestyle and socio-economic characteristics that Xcel Energy is familiar with. Table 2 shows our proposed sample design. The evaluation team expects to sample 70 participants, which will provide a 90% level of confidence with a

¹ Psychographic segmentation was included in the data set provided by Xcel Energy.

² See the CAMEO USA Handbook for detailed information on the CAMEO residential segments.

minimum of +/- 10% relative precision on key questions related to the Insulation and Air Sealing program.³ We propose to survey an approximately equal number of participants in most strata, with some adjustments up or down based on the available number of participants and a reduced number for the strata that represent lower income communities. The evaluation team believes this is justified because this approach allows us to include all strata and get a sufficiently large number of sample points from each stratum with a meaningful number of actual and potential participants, not just those with the greatest (current) representation in the Insulation and Air Sealing program. This may allow the evaluation team to understand why program participation varies so greatly by CAMEO customer segment.

Table 2: Participant Sample Design

CAMEO Residential Segment	Participants	Percent of Participants	Participants w/Phone #	Sample Quota	Percent of Segment
01 - American Aristocracy	291	18.5%	288	9	3.1%
02 - Exclusive Society	231	14.7%	231	9	3.9%
03 - Prosperous Families	332	21.1%	332	9	2.7%
04 – Enterprising Households	242	15.4%	240	9	3.8%
05 - Comfortable Communities	142	9.0%	142	8	5.6%
06 - Aspiring Consumers	91	5.8%	91	8	8.8%
07 – Dynamic Neighborhoods	108	6.9%	108	8	7.4%
08 - Diverse Communities	31	2.0%	31	5	16.1%
09 – Stretched Tenants	28	1.8%	28	2	7.1%
10 - Strained Society	38	2.4%	38	3	7.9%
Missing or Refused (N/A)	41	2.6%	41	0	0.0%
Total	1,575	100%	1,570	70	4.5%

In our subsequent analysis of net-to-gross results, we will weight participant responses by stratum to mirror the actual participant population.

Non-Participant Characteristics and Survey Sample Design

The evaluation team proposes to conduct a single residential non-participant survey for Colorado to support the process evaluation of the Residential Heating Products and the Insulation and Air Sealing programs. Based on conversations within the EMI team and with substantial input from Xcel Energy program staff, the non-participant sample will focus on the following three groups of customers:

1. **“Near Participants”** are residential customers that received an energy audit, but did not participate in either the Residential Heating Products or the Insulation and Air Sealing programs. By having an energy audit conducted, these customers indicated an interest in energy efficiency, but their interest stopped short of participating in either the Residential Heating Products or the Insulation and Air Sealing programs. Through the non-participant survey, we will try to gain insight into why these customers, often referred to as “near-participants,” did not ultimately

³ Assumes an ex ante proportion of approximately 50%.

participate in the Residential Heating Products or the Insulation and Air Sealing programs. We will allocate 60 sample points to this group in order to develop estimates that have a level of statistical confidence and precision of 90/10.

2. **“General Population”** consists of residential customers that did not receive an energy audit and did not participate in either the Residential Heating Products or the Insulation and Air Sealing programs. These customers have not expressed interest in energy efficiency or Xcel Energy’s energy efficiency programs. Through the non-participant survey, we will try to gain insight into these customers’ perception of energy efficiency, their awareness of the energy audit and energy efficiency programs operated by Xcel Energy, and their interest in participation in the Residential Heating Products or the Insulation and Air Sealing programs. We will allocate 60 sample points to this group in order to develop estimates that have a level of statistical confidence and precision of 90/10.
3. **“ECM-Only Customers”** Residential customers that receive both electricity and natural gas from Xcel Energy, participated in the Residential Heating Products program during the 2016 program year, but chose to install a minimally efficient furnace with a variable speed (ECM). We will allocate 20 sample points to this group in order to obtain qualitative insight about this group. While this subsample is intended primarily to meet the needs of the Colorado residential heating program, we will ask most of our standard non-participant questions and be able to include responses in our analysis when the customer’s ECM-only purchase is unlikely to be a distinguishing factor.

For the General Population group, we will follow a similar approach as the participant survey, by stratifying the sampling universe by CAMEO residential segment and completing six surveys for each of the 10 CAMEO residential segments. Table 3 **Error! Reference source not found.** shows the approximate distribution of non-participants by CAMEO residential segment

Table 3: Non-Participant Sample Design – Count of Residential Customers With Phone Number

CAMEO Residential Segment	Customers w/Phone #	Percent of Customers
01 - American Aristocracy	22,703	6.8%
02 - Exclusive Society	18,782	5.7%
03 - Prosperous Families	37,211	11.2%
04 – Enterprising Households	32,562	9.8%
05 - Comfortable Communities	32,185	9.7%
06 - Aspiring Consumers	24,632	7.4%
07 – Dynamic Neighborhoods	29,713	8.9%
08 - Diverse Communities	17,833	5.4%
09 – Stretched Tenants	34,379	10.4%
10 - Strained Society	16,482	5.0%
Missing or Refused (N/A)	65,680	19.8%
Total	332,162	100.0%

For the Near-Participant group, we will also, to the extent practicable, stratify the sampling universe by CAMEO residential segment and complete six surveys for each of the 10 CAMEO residential segments. For the ECM-Only group, we will attempt to stratify by contractor.

In drawing the sample of residential customers for the non-participant survey, we will select only records from the customer database that meet the following criteria:

- Had a “Do Not Contact” flag of 0 in the Xcel Energy residential customer database
- Had a “Do Not Call” flag of 0 in the Xcel Energy residential customer database
- Had a “Do Not Mail” flag of 0 in the Xcel Energy residential customer database
- Had a “Email Opt Out” flag of 0 in the Xcel Energy residential customer database
- Had a complete home telephone number in the Xcel Energy residential customer database

We do not intend to use information from the non-participant survey in developing our estimates of net-to-gross for the Residential Heating Products program.

Trade Partner Sampling Plan

We plan to interview 10 of the most active trade partners in the CO Insulation and Air Sealing program for the 2016-2017 period. In total, there were 35 registered trade partners during this time period, with only 21 completing more than 10 projects during this time. We plan to contact all 21 of these contractors with the goal of completing 10 interviews. Table 4 provides a summary of the most active and less active contractors for the 2016-2017 time period.

Table 4: Distribution of Trade Partners by Number of Projects

Number of Projects	Trade Partners	Percent of Trade Partners	Projects Completed	Percent of Projects
Most Active: 10 or More	21	60%	1,757	96%
Less Active: Less than 10	14	40%	68	4%
Total	35	100%	1,825	100%

Risks to Sample Plan

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

Respondents that choose to participate in the interviews or surveys may be systematically different than those that do not participate. We may miss gathering information due to these “unknown” differences in experiences between participants in the study and those who decline. If there is a high response rate, the likelihood of non-response bias is smaller. To mitigate non-response bias, the evaluation team will provide a \$25 incentive for participant respondents, a \$25 incentive for non-participant respondents, and a \$50 incentive for trade partner respondents.

APPENDIX D: STAFF INTERVIEWS

Xcel Energy 2017-2018 DSM Programs: Staff Interview Guide Insulation & Air Sealing Program – Colorado Product Manager

Introduction

- Introduce Jenny
- Thank interviewee for their time and input to the evaluation process
- Describe the purpose of today's interview as continuing to get to know the program, understand how it works, get your input to it, and talk about evaluation study priorities
- Indicate that we have scheduled an hour and may continue the conversation as we go
- We want you to feel comfortable speaking candidly. Normally in interviews, we promise confidentiality. That's a bit harder for program manager interviews, but do let us know if you want to share something that we should be careful about discussing or not attributing back in some way.

Section A: Key Staff and Stakeholders

- A1. We talked about key staff in the program at the kick-off meeting. I'd just like to confirm that the following list captures the key internal staff for the program.

Role	Minnesota	Colorado
Product manager	Shari Kelley	Michelle Hurst
Trade ally manager		
Engineer	Joe Krekeler	Joe Krekeler
Channel manager	Greg Olson	Ann Kirkpatrick
Team lead	Jean Hammer	David Hueser

- A1a. Do any of these staff have a particularly rich and long history with the program in case we have historical questions?

A2. I'd also like to briefly talk about who else is key to the program. Here is who seems to be essential so far:

- Xcel Energy staff
- Participating trade allies

Are we missing anyone? Any trade ally or other associations? Other stakeholder groups that are key?

How can we get a sense of what trade allies are involved? Do you have a list of participating trade allies? A dataset that shows who was qualified and projects by trade ally by year?

Section B: Program Goals

B1. What are quantifiable goals for the program?

What are the specific energy-savings or participation goals for 2017?

How are they set?

Where are they documented?

Do you have any formal non-energy goals?

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

What was the rationale for changing them?

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

B3. What are "indicators of success" that serve as an early indication whether the program is on track to meet its goals?

Do you track these indicator metrics?

What are they telling you this year?

B4. What influences, if any, do you think this program has had on the insulation or air sealing market?

Section C: Program Design and Activities

- C1. The trade ally presentation was very helpful to understand some of the mechanics and requirements of the program. Are there any other resources we should review to get up-to-speed?
- C2. What does program participation look like from the perspective a project? (If the question does not work, ask: What does it look like from the perspective of a customer? a trade ally?)

Do you have a sense of what share of projects start as an Xcel Energy rebate participation or as a standard insulation or air sealing project? Any statistics?

Comparatively speaking, how important are Xcel Energy's own outreach and the trade ally interaction with customers on the program's behalf? Is one more important?

- C3. I'd like to confirm the selling points you stress to customers to encourage them to engage in insulation and air sealing. There is energy savings and comfort. Is there anything else?

Comparatively speaking, how effective and motivating do you think these benefits are for customers?

How much and how well do trade allies use these benefits to motivate customer participation?

- C4. Have any of the fundamental program activities changed in the last few years?

What was the rationale for changing them?

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

- C5. Can you tell us more about the deemed savings that were presented in the trade ally presentation? Are they one deemed value for each heating type?

Where do they come from?

Do they take into account gas furnace electrical usage and the blower motor type?

Have you ever explored differentiating by pre-intervention usage?

- C6. What can you tell us about the BPI certification requirement? What is the purpose? What does that involve? When was that implemented? Do you know how trade ally participation changed when it was?

- C7. As part of our evaluation, we will likely want to speak to "non-participants." Customers that were eligible to participate in the program but didn't for whatever reason. Should I expect to see all "lost opportunities" listed in Salesforce?

Section D: Resources

D1. What resources do you rely on to implement the program?

Program, implementer, sales staff?

Management and program direction?

IT tools and data tracking tools?

Other resources?

D2. Are these resources sufficient to implement the program as designed?

D2a. [IF NO] What additional resources would help you implement the program as designed?

D3. Have any of these program resources changed in the last few years?

What was the rationale for changing them?

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

Section E: Program Tracking and Reporting

E1. What kind of documentation is available for the program? Implementation plans? Program manuals? Process maps?

E2. What kind of data is collected for the insulation rebate program?

E3. Is there any data that you would like to collect for the insulation rebate program, but haven't been able to?

E4. Is there any data/documentation not available in Salesforce that might be helpful for the evaluation?

E5. [For Engineering Staff] What kind of baseline does the program use to estimate energy savings,? [PROBE FOR CODE VS. COMMON PRACTICE]

Section F: Issues and Concerns

F1. In your opinion, what are the strengths of the insulation rebate program as it is currently designed and being run?

- F2. What are the most significant challenges for this program at this point?
- F3. What feedback, if any, do you receive from customers and/or market partners on the program?
- F4. What do you believe are the biggest barriers to getting customers and/or market partners to participate in this program?
- F5. Are there any specific opportunities for improvement in the design or implementation of the program that you think are worth considering? Please describe.
- F6. Is there anything in particular that frustrates you or holds back what the program could do for energy savings or for customers?
- F6a. Do you think there are any roadblocks preventing these changes from happening?

Section G: Evaluation Scope and Direction

- G1. Based on the kickoff meeting, we are planning to prioritize the following research questions? (See table.) Does align with your understanding and needs? Do you have anything you would like to add to these priorities, remove from this set of priorities, or change about these priorities?

Research priorities	Minnesota	Colorado
Understanding trade ally barriers for BPI training	X	
Understanding barriers to understanding quality installation / opportunities to drive interest in quality installation among customers	X	X
Identify complementary measures or other ways to increase cost effectiveness		X

- G2. Do you have any other particular questions that you would like to see answered by the evaluation? Why are these questions important?
- G3. Do you have any other comments, concerns or suggestions about the program that we didn't discuss that you would like to make sure I know about?

Closing

- Mention that we will follow up on peer utilities and performance indicators.
- Thank and discuss next steps.

Xcel Energy 2017-2018 DSM Programs: Staff Interview Guide

Insulation & Air Sealing Program – Colorado Team Lead

Introduction

- Thank interviewee for their time and input to the evaluation process
- Describe the purpose of today's interview as continuing to get to know the program, understand how it works, get your input to it, and talk about evaluation study priorities.
- We have already gotten a lot of good background information, so we are using this conversation to confirm a few things and build on our knowledge.
- We want you to feel comfortable speaking candidly. While we don't plan to attribute anything to specific individuals in the report, we realize that there is only a limited number of program staff so we can't promise anonymity in the same way that we will to customers and trade allies. If there is something you want to share that should be treated in confidence, please just say so and we will respect that.

Section A: Staff / Interviewee Role

- A1. Let's start by confirming your role. I have you listed as the residential team lead. What does that mean? How long have you been team lead?

Section B: Program Strengths, Weaknesses, and Direction

- B1. Overall, how do you feel the program is doing?
- Why do you say that?
- B2. When you think of the insulation and air sealing rebate program, what do you see as its key strengths?
- B3. What are its biggest challenges?
- B4. How important are the energy savings goals for the programs?
- What happens if the program meets the goals?
 - What happens if the program does not meet the goals?

B5. What else, other than energy savings goals, do you look at in assessing how well the program is doing?

B6. Where do you see the program going in the future?

- What challenges do you see?

Section C: Internal and External Stakeholders

C1. In what ways, if at all, do you see this program connected with other residential offerings?

C2. What kind of feedback, if any, do you get from residential customers?

C3. What kind of feedback, if any, do you get from trade allies?

C4. What influences, if any, do you think this program has had on the insulation or air sealing market, trade ally practices, or consumer demand?

Section D: Evaluation Scope and Direction

D1. Do you have any particular research questions that you think would be helpful for us to address as part of our study?

D2. One of our study tasks will be a customer survey that involves both participating and non-participating customers. Ideally, non-participating customers would not be just a random sample of anyone, but households that have either done an insulation or air sealing project outside the program or that have a need for an upgrade but aren't choosing to do one. What ideas do you have for identifying non-participating customers that fit that description?

D3. One of our other study activities is to look at peer utilities and benchmark Xcel Energy's portfolio against them. Thinking about the insulation program for a moment, what other utilities would make a good peer to compare against with similar context?

Closing

- Thank and discuss next steps.

Xcel Energy 2017-2018 DSM Programs: Staff Interview Guide

Insulation & Air Sealing Program – Colorado Trade Ally (Channel) Manager

Introduction

- Thank interviewee for their time and input to the evaluation process
- Describe the purpose of today's interview as continuing to get to know the program, understand how it works, get your input to it, and talk about evaluation study priorities
- We will focus on your role as trade ally manager in the first part of the interview, but also would like to get your historical perspective on the program as the prior product manager after we talk about the trade ally topics
- We want you to feel comfortable speaking candidly. Normally in interviews, we promise confidentiality. That's a bit harder for staff interviews, but do let us know if you want to share something that we should be careful about discussing or not attributing back in some way.

Section A: Trade Allies' Role

How would you describe the trade allies' roles in the insulation and air sealing program?

What kinds of trade allies are we talking about? What does a typical participating trade ally look like?

How do trade allies use or incorporate the program into what they do? How does it affect their business or their client interactions?

Section B: Trade Ally Engagement

What do you do in your work with trade allies? Who else at Xcel Energy engages with the relevant trade allies for insulation and air sealing?

What resources do you have to implement your part of the program? What share of your time do you spend? Are the resources sufficient?

What metrics do you follow in managing the trade ally engagement?

What kinds of feedback do you get from trade allies?

Section C: Program Stats and Impact

How many trade allies participate? How has that changed?

Do you have a sense of what kind of market share you have defined as...

- share of total insulation and air sealing contractors who participate in the program?
- share of insulation and air sealing projects completed by participating trade allies?

What kind of influence do you think Xcel Energy has on...

- how many insulation and air sealing projects customers do?
- the nature / specifics of insulation and air sealing projects done?
- Trade ally practices?

How long has the BPI certification requirement been in place in Colorado? What is your perspective on that requirement?

- What are the advantages?
- What are the disadvantages?

Section D: Broader Observations and History

What other observations and thoughts do you have about the program?

- What are its greatest strengths?
- What are its biggest immediate and future challenges?
- Are there any particular opportunities you see that would be worth investigating?

Michelle referred us to you on a couple of historical items or past program activities that came up when we talked. I'd like to ask about those...

- Could you tell us more about any customer targeting you had explored or done to reach out to promising customer groups -- for example, customers with higher usage or particular CAMEO groups?
- Michelle mentioned the Customer Insights team. Could you tell us how they fit in and what insights they have shared?

Section E: Evaluation Priorities

If there is something you could find out from or about the trade ally part of the program as part of this evaluation, what would it be?

What about the program as a whole ... do you have any research questions you think are worth pursuing as part of our study to help inform the program and provide useful insights to Michelle and the rest of the team?

Closing

- Thank and discuss next steps.

APPENDIX E: PARTICIPANT SURVEY

Colorado Insulation and Air Sealing Rebates: Participant Survey Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency programs, the EMI Consulting evaluation team will conduct telephone surveys with participants. The survey will assess participant experiences and satisfaction with the program (including an inquiry into the customer journey), and it will provide data to help determine free ridership and spillover. Targeted respondents are customers who completed a qualifying insulation or air sealing project during the evaluated period and have received their rebate.

The remainder of the introduction provides the research questions that the participant survey is designed to address, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The objectives for the Insulation and Air Sealing Rebate program evaluation are to:

- Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.
- Assess sources of participant awareness and levels of satisfaction.
- Understand the customer journey path (e.g., what prompts customer projects and participation).
- Understand how product changes have affected participation, customer satisfaction, and free ridership.
- Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.
- Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.
- Understand customer barriers and opportunities for quality installation.
- Assess customer engagement and satisfaction
- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.

Specific research questions which this participant survey is designed to address are the following:

- What is the role of trade partners in the Insulation/Air Sealing program?
- What are the sources of customer awareness?
- How satisfied are customers with the program?

- How are program-qualifying projects typically initiated (by the customer or by the contractor)?
- How have program changes affected satisfaction among customers?
- How have program changes affected free ridership?
- How is the application and rebate process working and are there any suggestions for improvement?
- What barriers do customers face in pursuing a quality insulation/air sealing project?
- How can Xcel help customers appreciate and demand quality installation via the program vs. non-program insulation jobs?
- How engaged are customers with the program?
- How satisfied are customers with the program?
- What is the evidence of free ridership?
- What is the evidence of spillover?

The following table presents the link between each evaluation objective, research question, and survey question.

Evaluation Objective	Research Question	Survey Question Number(s)
Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.	What is the role of trade partners in the Insulation/Air Sealing program?	A1-A15
Assess sources of participant awareness and levels of satisfaction.	What are the sources customer awareness?	A3, A4, A6, A9, A12, B1
	How satisfied are customers with the program?	C1-C2, G1
Understand the customer journey path (e.g., what prompts customer projects and participation).	How are program-qualifying projects typically initiated (by the customer or by the contractor)?	A1-A15
Understand how product changes have affected participation, customer satisfaction, and free ridership.	How have program changes affected satisfaction among customers?	current satisfaction only (see above) – program changes addressed through trade ally interviews and analysis
	How have program changes affected free ridership?	current free ridership only (see below) – program changes addressed through trade ally interviews and analysis
Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.	N/A - this will be addressed via secondary research and peer benchmarking	n/a
Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.	How is the application and rebate process working and are there any suggestions for improvement?	B1-B4, C1d, C2, G1
Understand customer barriers and opportunities for quality installation.	What barriers do customers face in pursuing a quality insulation/air sealing project?	mostly relying on trade ally interviews, but also A3, A9, A11, A15
	How can Xcel help customers appreciate and demand quality installation via the program vs. non-program insulation jobs?	D1, D2
Assess customer engagement and satisfaction	How engaged are customers with the program?	A4, A6, A9, A11, A12, A15, B2, B4, C1-C2, E6
	How satisfied are customers with the program?	C1-C2, G1
Develop a net-to-gross ratio documenting the product's influence on customer's decisions.	What is the evidence of free ridership?	A4-A15, E1-E7
	What is the evidence of spillover?	F1-F8

Sample Variables

The survey house will use the following variables in fielding the survey:

Variable Name	Description
Program contact	Name of customer shown in Salesforce
Customer address	Physical address at which rebated project was completed
Project date	Month and year listed in Salesforce as project completion
Rebate date	Month and year that Salesforce indicates rebate was paid
Project type	Variable to indicate whether the project involved insulation, air sealing, or insulation and air sealing (for piping into question text)

Fielding Instructions

The survey house will use the following guidelines in completing the survey

- Open new sample in batches not to exceed a quarter of the available sample (to minimize the number of sample points that have been opened and not exhausted when survey quota is met).
- Attempt each record six times on different days of the week and at different times before abandoning that sample point as unreachable.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals (e.g., "I'm not interested", immediate hang-ups) at least once.
- The survey is considered complete when all questions preceding the demographic module are answered.
- After completing 10 surveys, hold calling and output a preliminary SPSS dataset and recordings of the pretest interviews. Resume calling after EMI Consulting checks the data (usually with 1-2 working days).
- Monitor at least 10 percent of the interviews to ensure proper interview protocols (e.g., reading questions verbatim, proper probing, accurate data entry).
- Calling hours are Monday through Friday Noon to 9 PM local time (in respondent's time zone) and Saturday Noon to 6 PM.
- For mobile telephones, verify that the respondent is in a place where they can safely take a survey call (note: CO laws on telephone use while driving may differ from CA) and follow any requirements for the Telephone Consumer Protection Act.

Survey Sections

- **Introduction**
- **A.** Project initiation, Customer Journey, and Role of Contractor
- **B.** Program Implementation, Delivery, and Market Response
- **C.** Awareness and Satisfaction (Programs and Components)
- **D.** Motivations for Participation
- **E.** Free-ridership
- **F.** Spillover, and Market Effects
- **G.** Net Promoter
- **Gen.** Household Characteristics and Demographics
- **Closing**

Survey

Introduction

Introduction

Intro: Hello, this is <INTERVIEWER NAME> calling from [SURVEY FIRM] on behalf of Xcel Energy. May I please speak with [PROGRAM CONTACT]?

[When connected with correct respondent]: Hello. This is <INTERVIEWER NAME> calling from [SURVEY FIRM] on behalf of Xcel Energy. I'm calling because our records show that you recently completed an [PROJECT TYPE] project at your home at [ADDRESS] and received a rebate through Xcel Energy's Insulation and Air Sealing program and I'd like to ask a short set of questions about your experience with the insulation or air sealing project and with the Xcel Energy rebate program. Your answers will help us improve this program for other customers like you. As a token of our appreciation, we will send you a \$25 gift card. Are you the best person in your household to talk to about this?

1. Yes (CONTINUE)
2. No (SAY:) Who would be the best person to talk to? (REPEAT INTRO WHEN CORRECT PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)

[IF NEEDED] Xcel Energy would like to better understand how households like yours think about and manage their energy use. The Insulation and Air Sealing program is designed to help households with energy saving efforts. Your input is very important to help Xcel Energy improve its energy programs and rebates.

Section A: Project Initiation, Customer Journey, and Role of Contractor

A1. To start, about how long have you lived in this home? [DO NOT READ]

1. Less than a year
2. 1-2 years
3. 3-5 years
4. 6-10 years
5. 11-20 years
6. More than 20 years
7. NOT PRIMARY HOME
88. DON'T KNOW
99. Prefer not to answer

A2. Approximately how long ago would you estimate you first started thinking that you might want to upgrade your [PROJECT TYPE]? [PROBE IF NEEDED: About how many years ago?]
[RECORD: # of years.]

- _____ years
88. Don't know

99. Prefer not to answer

A3. What do you remember made you begin to start thinking about it? [INTERVIEWER NOTE: Record response. Okay to summarize, but listen for and record any mention of Xcel Energy or the utility company without prompting.]

A4. Do you recall seeing any encouragement from Xcel Energy to upgrade your [PROJECT TYPE] prior to completing your upgrade, such as information in bill stuffers or other messaging from the utility?

1) Yes

2) No

88) DON'T KNOW

99. Prefer not to answer

A5. Before you talked to any insulation contractors, did you have a sense for about *how much* [PROJECT TYPE] you needed or just the general sense that you needed *some*?

1. Knew about how much

2. Just knew I needed some

3. In-between

88. DO NOT RECALL

99. Prefer not to answer

A6. Do you recall seeing any lists of qualified insulation contractors on Xcel Energy's website prior to completing your upgrade?

1. Yes

2. No

88. DON'T KNOW

99. Prefer not to answer

A7. About how long was it from when you first thought about doing an [PROJECT TYPE] upgrade until you first started talking with a contractor? Was it...

1. Less than a month?

2. Between 1 and 6 months?

3. Between 7 months and 1 year?

4. A year or two?

5. More than two years?

88. DON'T KNOW

99. Prefer not to answer

A8. Did you initiate the first contact with a contractor, or did a contractor first reach out to you and suggest an [PROJECT TYPE] upgrade? [INTERVIEWER NOTE: This could be any contractor with whom the household discussed the project they did; not just the one who did the work.]

1. I contacted a contractor about this project

2. A contractor contacted me [skp A10]

3. OTHER – DESCRIBE: _____ [skp A10]

88. DO NOT RECALL / DON'T KNOW [Skp A10]

99. Prefer not to answer [skp A10]

[If A8 = 1 ("I contacted a contractor about this project")]

A9. How did you decide which contractor or contractors to contact? [RECORD VERBATIM]

88. Don't know

99. Prefer not to answer

A10. With how many different contractors did you ultimately discuss the project or get bids?

1. 1

2. 2

3. 3

4. 4

5. 5

6. More than 5

88. DON'T KNOW

99. Prefer not to answer

A11a. Xcel Energy identifies certain insulation contractors as qualified trade partners. This requires the contractor to follow industry best practices and go through specific training to ensure customers receive a quality project. Were you aware of this part of Xcel Energy's program when you selected your contractor?

1. Yes

2. No [skp A12]

88. DON'T KNOW [skp A12]

99. Prefer not to answer [skp A12]

A11b. How important was your insulation contractor's participation with this program when you selected them?

1. Made no difference

2. Was a bonus for a contractor you would have selected anyway

3. Was one of several factors you considered

4. Was a decisive factor in your choice of contractors

88. DON'T KNOW

99. Prefer not to answer

A12. Do you recall your contractor mentioning the availability of Xcel Energy rebates?

1. Yes

2. No

88. DON'T KNOW

99. Prefer not to answer

[IF A12 = 1]

A12a. Did the contractor mention the rebates before or after you had decided to work with them for this project, or after you had decided to work with them?

- 1. Before
- 2. After
- 88. DON'T KNOW
- 99. Prefer not to answer

A13. Did you receive a rebate check directly from Xcel Energy, a reduced project cost because of incentives from Xcel Energy, or neither one?

- 1. Rebate directly from Xcel Energy
- 2. Reduced project cost from the contractor
- 3. Neither one
- 4. BOTH
- 88. DON'T KNOW
- 99. Prefer not to answer

[PROGRAMMING NOTE: CREATE VARIABLE RCVD_REB. SET TO 1 IF A13 = 1 OR 2 OR 4. SET TO 0 IF A13 = 3. SET TO 8 IF A13 = 88 or 99.]

A14. Did the contractor you selected talk with you about different options of how much [PROJECT TYPE] to do, or was the conversation always just about one level of [PROJECT TYPE]?

- 1. Different options
- 2. One option only
- 88. DON'T KNOW
- 99. Prefer not to answer

A15. Did the availability of an Xcel Energy rebate cause you to modify *how much* [PROJECT TYPE] you did as part of this project?

- 1. Yes, in what way? [Record verbatim] _____
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

Section B: Program Implementation, Delivery, and Market Response

[PROGRAMMING INSTRUCTIONS: SKIP TO C1 IF A13 = 2 OR 3 OR 88 or 99]

B1. This next group of questions is about the rebate you received from Xcel Energy. How do you first remember hearing about Xcel Energy's rebates and support for insulation and air sealing upgrades? [DO NOT READ, MULTI-RESPONSE]

- 1. Bill insert
- 2. Xcel Energy Website
- 3. Billboard or other outdoor advertisement
- 4. Digital / web advertisement (not on the Xcel Energy Website)

- 5. Television advertisement
- 6. Radio advertisement
- 7. Contractor
- 8. Friend or family
- 9. Social media
- 10. Other Xcel Rep (calls etc.)
- 11. Other _____
- 88. Don't know
- 99. Prefer not to answer

B2. During any phase of your [PROJECT TYPE] project, did you have any questions for your contractor about the rebate program or about the rebate itself?

- 1. Yes
- 2. No [skp B3]
- 88. Don't know [skp B3]
- 99. Prefer not to answer [Skp B3]

B2a. Was your contractor able to answer your questions to your satisfaction?

- 1. Yes
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

B3. About how long did it take to receive your rebate after your project was completed?

- 1. 1 week or less
- 2. More than a week, but less than 1 month
- 3. 1 or 2 months
- 4. More than 2 months
- 77. Not applicable - HAVE NOT RECEIVED REBATE YET
- 88. DON'T KNOW
- 99. Prefer not to answer

B4. Did an Xcel Energy representative attempt to contact you concerning your [PROJECT TYPE] project or your rebate?

- 1. Yes
- 2. No [skp C1]
- 88. DONT KNOW [skp C1]
- 99. Prefer not to answer [skp C1]

B4a. How did the Xcel Energy representative attempt to contact you? [READ ONLY IF NEEDED. MULTI-RESPONSE]

- 1. Email
- 2. Phone
- 3. In-person
- 4. Mail

- 5. Web (chat or help form submission)
- 88. Don't know
- 99. Prefer not to answer

B4b. Why did the Xcel Energy representative contact you?

- 1. Incomplete application form
- 2. Missing invoice information
- 3. Inspection to verify installation of insulation or air sealing
- 4. Other – specify
- 88. DON'T KNOW
- 99. Prefer not to answer

B4c. How would you prefer to be contacted by an Xcel Energy representative? [READ ONLY IF NEEDED. MULTI-RESPONSE]

- 1. Email
- 2. Phone
- 3. In-person
- 4. Mail
- 5. Web (chat or help form submission?)
- 77. Prefer not to be contacted
- 88. Don't know
- 99. Prefer not to answer

Section C: Awareness and Satisfaction (Programs and Components)

C1. For each of the following, please tell me if you were very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied or very dissatisfied.

- C1a. The program overall
- C1b. The insulation or air sealing you obtained
- C1c. The contractor who conducted your insulation or air sealing work
- C1d. Xcel Energy as an energy provider
- C1e [IF A13 = 1 OR 4]. The amount of time it took to receive your rebate for your insulation or air sealing upgrade
- C1f [IF A13 = 1, 2, OR 4]. The dollar amount of the rebate
- C1g. Interactions with program staff
- C1h. The overall value of the insulation and air sealing you received (for the price you paid)

- 1) Very Dissatisfied
- 2) Somewhat Dissatisfied
- 3) Neither Satisfied Nor Dissatisfied
- 4) Somewhat Satisfied
- 5) Very Satisfied
- 77. Not applicable

- 88. Don't know
- 99. Prefer not to answer

[FOR ANY RESPONSES IN C1 WITH A RATING OF 1-3, FOLLOW UP WITH]
C1x_detail. Can you tell me why you gave that rating? [RECORD VERBATIM]

- C2. Do you have any recommendations for improving the insulation and air sealing program?
- 1. Yes, what are your recommendations or suggestions? {RECORD VERBATIM}
 - 2. No
 - 88. DON'T KNOW
 - 99. Prefer not to answer

Section D: Motivations for Participation

- D1. Next, I will read a list of factors that may have influenced your decision to upgrade your [PROJECT TYPE]. For each, please tell me if it was: Not at all important, a little important, somewhat important, very important or extremely important. How important was....
- a. Reducing environmental impact of your home
 - b. Upgrading out-of-date equipment/old insulation
 - c. Improving home comfort
 - d. Improving air quality
 - e. Receiving financial incentive
 - f. Reducing energy bills
 - g. The Contractor recommendation
-On your decision to upgrade your %PROJECTTYPE%?

- 1) Not at all important
- 2) A little important
- 3) Somewhat important
- 4) Very important
- 5) Extremely important
- 77) NOT APPLICABLE
- 88) DON'T KNOW
- 99. Prefer not to answer

- D2. What impacts or effects have you experienced as a result of the [PROJECT TYPE] work you had done?
- [RECORD VERBATIM]
- 88. DON'T KNOW
 - 99. Prefer not to answer

Section E: Free-ridership

- E1. Before participating in the insulation and air sealing program, do you recall receiving any other rebates from Xcel Energy for making energy efficiency upgrades at your home?

- 1. Yes
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

[IF A4 = 1]

E2. Thinking of the [PROJECT TYPE] project, how influential was any encouragement you saw from Xcel Energy to consider an insulation or air sealing upgrade in your decision to do an upgrade? Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “very influential.”

- 0) not at all influential
- ...
- 10) Very influential
- 88. Don't know
- 99. Prefer not to answer

[IF RCVD_REB = 1]

E3. How influential was the availability of the rebate from Xcel Energy on your decision to install **the amount of** [PROJECT TYPE] that you installed? [IF NEEDED, Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “very influential.”]

- 0) not at all influential
- ...
- 10) Very influential
- 88. DON'T KNOW
- 99. Prefer not to answer

E3A. And how influential was the contractor recommendation on your decision to install **the amount of** [PROJECT TYPE] that you installed? [IF NEEDED, Please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “very influential.”]

- 0) not at all influential
- ...
- 10) Very influential
- 88. DON'T KNOW
- 99. Prefer not to answer

E4. Now, please think about all of the items we have talked about – information from Xcel Energy, rebates from Xcel Energy, and the Xcel Energy registered contractor you used—together as a package. How influential was this package of customer support on your decision to conduct the comprehensive [PROJECT TYPE] project that you did, as opposed to no upgrade at all or a less comprehensive upgrade? [IF NEEDED, Again, please use a scale from 0 to 10 where 0 means “not at all influential” and 10 means “very influential.”]

- 0) not at all influential
- ...
- 10) Very influential
- 88. DON'T KNOW
- 99. Prefer not to answer

E5. Still thinking about this same package of customer support and rebate, if this package had not existed, do you think you would have... [AS NEEDED, REMIND RESPONDENT THAT WE ARE TALKING ABOUT ANY ENCOURAGEMENT FROM XCEL ENERGY THAT THE CUSTOMER MIGHT HAVE SEEN TO UPGRADE INSULATION OR AIR SEALING, THE XCEL ENERGY REBATE, AND THE XCEL ENERGY REGISTERED CONTRACTOR.] [REVIEWER NOTE: FOR ANALYSIS, WE WILL APPLY VALUES OF 0, 3, 7, AND 10 TO ITEMS 1, 2, 3, AND 4 BELOW]

1. Done the same exact insulation or air sealing project
2. Done something close, but maybe not as extensive
3. Done a substantially less involved upgrade
4. Not done any upgrade in insulation or air sealing yet
88. DON'T KNOW
99. Prefer not to answer

E6. Now I would like you to think about timing of the project. If this Xcel Energy consumer support and rebate package did not exist, do you think you would have done the project...? [REVIEWER NOTE: FOR ANALYSIS, WE WILL APPLY VALUES 0, 3, 7, AND 10 TO ITEMS 1, 2, 3, AND 4 BELOW]

1. About the same time as the insulation or air sealing project you did
2. in a year or two
3. Three or four years from now
4. longer than four years from now
88. DON'T KNOW
99. Prefer not to answer

E7. In your own words, how would you describe the influence the package of customer support from Xcel Energy had on your decision to upgrade your [PROJECT TYPE]. [RECORD VERBATIM]

Section F: Spillover and market effects

F1. Since your [PROJECT TYPE] work, have you made any other energy efficiency upgrades to your heating or cooling system, other home appliances, windows or doors, light bulbs or lighting fixtures, or any other aspect of your home's energy efficiency?

- 1) Yes
- 2) No [skp G1]
- 88) DON'T KNOW [skp G1]
99. Prefer not to answer [skp G1]

F2. What did you do? [DO NOT READ. MULTI-RESPONSE. PROMPT LIGHTLY WITH "ANYTHING ELSE?" SELECT EQUIPMENT THAT WAS INSTALLED OFF LIST BELOW OR SPECIFY IN OTHER]

1. Efficient **light bulbs** (CFLs or LEDs)

2. Efficient **lighting fixtures**
 3. More efficient **primary heating system** (heat pump, furnace, boiler)
 4. More efficient **primary cooling system** (heat pump, air conditioning, evaporative cooler)
 5. **Programmable or smart thermostat**
 6. More efficient **refrigerator**
 7. More efficient **dishwasher**
 8. More efficient **clothes washer**
 9. More efficient **clothes dryer**
 10. Efficient **windows**
 11. Efficient **doors**
 12. **Other** (specify) _____
- Don't know [skp G1]
Prefer not to answer [skp G1]

[PROGRAMMING NOTE: F3 THROUGH F8 FORM A LOOP THAT WE GO THROUGH FOR EACH OF THE FIRST THREE MENTIONS IN F2. (MOST RESPONDENTS WILL HAVE FEWER THAN THREE.) PIPE IN RELEVANT RESPONSE FROM F2 AS efficiency_measure FOR EACH ROUND THROUGH THE LOOP.]

F3_x. Did you receive a utility rebate for the [INSERT efficiency_measure]?

1. Yes
2. No
88. DON'T KNOW
99. Prefer not to answer

[IF F3_x = 1]

F4_x. How influential was installing the [PROJECT TYPE] in your consideration of a(n) [INSERT efficiency_measure]? Please answer using a scale from 0, meaning not at all influential, to 10, meaning very influential.

- 0) not at all influential
- ...
- 10) Very influential
88. DON'T KNOW
99. Prefer not to answer

[IF F3_x = 1 AND (F4_x > 6 AND < 88)]

F5_x. In a sentence or two, can you describe how the [PROJECT TYPE] upgrade affected your choice to install or acquire (a) [INSERT efficiency_measure]?

_____ [RECORD VERBATIM]

[IF F3_x = 1 AND (F4_x > 6 AND < 88)]

F6_x. How do you know that the [INSERT efficiency_measure] you installed or acquired was energy efficient?

_____ [RECORD VERBATIM]

88. Don't know

99. Prefer not to answer

[IF F3_x = 1 AND (F4_x > 6 AND < 88)]

F7_x. How many [INSERT efficiency_measure] did you install? [INTERVIEWER NOTE: WORD IN THE PLURAL. IF RESPONDENT OFFERS A RANGE, INSERT THE MIDPOINT.]

_____ [RECORD NUMBER]

88. DON'T KNOW

99. Prefer not to answer

[IF F3_x = 1 AND (F4_x > 6 AND < 88)]

F8a_x. What is the main reason you installed or acquired (a) [INSERT efficiency_measure]?

_____ [RECORD VERBATIM]

88. Don't know

99. Prefer not to answer

[PROGRAMMING NOTE: RETURN TO F3 FOR A SECOND AND THIRD ROUND THROUGH F3-F8 FOR OTHER MENTIONS IN F2, IF NEEDED. MAXIMUM OF THREE TOTAL LOOPS THROUGH F3-F8.]

Section G: Net Promoter

G1. How likely are you to recommend the insulation and air sealing program to a friend, family member, or colleague? Would you say...

0) Not at all likely

...

10) Very likely

88. DON'T KNOW

99. Prefer not to answer

[If G1 < 9]

G1.a. Please provide a sentence or two explaining your rating. [RECORD VERBATIM]

88. Don't know

99. Prefer not to answer

Section Gen: Household Characteristics and Demographics

Gen1. Finally, we have a few demographic questions for classification purposes only. Do you own or rent your home where the [PROJECT TYPE] was installed?

1. Own
2. Lease / Rent
3. Other _____
88. DON'T KNOW
99. Prefer not to answer

[If Gen1 <> Own]

Gen1a. Do you pay your Xcel energy bill, or does someone else (e.g., a landlord)?

1. Pay own
2. Other pays
88. DON'T KNOW
99. Prefer not to answer

Gen2. Is your home a single-family home or a structure with more than one housing unit, such as a duplex, triplex, or quad?

1. Single family home [skp Gen3]
2. More than one unit
88. DON'T KNOW [skp Gen3]
99. Prefer not to answer [skp Gen3]

Gen2a. How many units are in the structure? [RECORD #]

- _____ DON'T KNOW
9999) Prefer not to answer

Gen3. Approximately what is the total square footage of your home? [CODE RESPONSE. READ ONLY IF NEEDED]

1. Less than 500 square feet
2. between 500 and 749 square feet
3. Between 750 and 999 square feet
4. Between 1,000 and 1,499 square feet
5. Between 1,500 and 1,999 square feet
6. Between 2,000 and 2,499 square feet
7. Between 2,500 and 2,999 square feet
8. Between 3,000 and 3,999 square feet
9. 4,000 or more square feet
88. DONT' KNOW
99. Prefer not to answer

Gen4. Approximately what year was your home built? [CODE RESPONSE. READ ONLY IF NEEDED]

1. 1939 or earlier
2. 1940 to 1949

3. 1950 to 1959
4. 1960 to 1969
5. 1970 to 1979
6. 1980 to 1989
7. 1990 to 1999
8. 2000 to 2009
9. 2010 to 2013
10. 2014 and later
88. Don't know
99. Prefer not to answer

Gen5. How many people live in your household? [RECORD]

99. Prefer not to answer

Gen6. What is your current age? [RECORD – IF NEEDED, ACCEPT THE DECADE THE RESPONDENT IS IN: 20s, 30s, 40s, ETC. AND RECORD AS SUCH]

99. Prefer not to answer

Gen7. And this is my last question. Please indicate which of the following ranges best reflects your household's total income before taxes last year. Feel free to stop me when I get to the appropriate range. Was it...? [READ RANGES]?

1. Less than \$20,000
2. \$20,000 to \$39,000
3. \$40,000 to \$59,000
4. \$60,000 to \$79,000
5. \$80,000 to \$99,000
6. \$100,000 to \$119,000
7. \$120,000 or over
88. Don't know
99. Prefer not to answer

Closing

Closing1. These are all the questions I have. As a thank you for your input, we'd like to send you a \$25 Amazon gift card.

Let me ask the information we need to email your gift card instructions to the intended recipient—this could be you, personally, or anyone else of your choosing.

Name of recipient:

Email address of recipient:

[READ BACK ONE LETTER AT A TIME]

APPENDIX F: NON-PARTICIPANT SURVEY

Colorado Insulation and Residential Heating: Combined Non-participant Survey Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy energy efficiency programs, the EMI Consulting evaluation team will conduct telephone surveys with non-participants. The survey will assess customer awareness of the program and any prior participation in Xcel Energy programs as well as potential barriers to participation and what might motivate customers to participate. Targeted respondents are residential customers who own the home (of up to four units) they occupy and have either 1) received an energy audit from Xcel Energy in the last two years but have not participated in either the Insulation and Air Sealing program or the Residential Heating program, 2) never participated in any Xcel Energy programs, or 3) installed an electronically commutated fan motor (“ECM.”) on a new gas furnace.

The remainder of the introduction provides the research questions which the non-participant survey is designed to address, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The objectives for the two program evaluations are to:

Insulation and Air Sealing:

- Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.
- Assess sources of participant awareness and levels of satisfaction.
- Understand the customer journey path (e.g., what prompts customer projects and participation).
- Understand how product changes have affected participation, customer satisfaction, and free ridership.
- Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.
- Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.
- Understand customer barriers and opportunities for quality installation.
- Assess customer engagement and satisfaction
- Develop a net-to-gross ratio documenting the product’s influence on customer’s decisions.

Residential Heating:

- Identify measures Xcel Energy can take so that customers think specifically about high

efficiency and rebates when an event occurs requiring new energy consuming equipment;

- What information sources do they rely on to make purchasing decisions;
- Are customers satisfied with the program and how are they engaged;
- How do customers view the trade-offs between higher and lower efficiency furnaces;
- How do participating contractors present the options to customers?

Specific research questions which this non-participant survey is designed to address are the following:

- What is the level of non-participant awareness?
- What are the sources of awareness?
- What are the barriers to participation?
- How satisfied are customers with Xcel Energy in general?

The following table presents the link between each evaluation objective, research question, and survey question.

Evaluation Objective (based on insulation program; heating program items are similar)	Research Question (for both insulation and heating programs)	Survey Question Number(s)
Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.	N/A - Will be covered in trade partner interviews	n/a
Assess sources of participant awareness and levels of satisfaction.	What is the level of non-participant awareness?	B1-B8
	What are the sources of awareness?	B1-B8
Understand the customer journey path (e.g., what prompts customer projects and participation).	N/A - will be covered in participant surveys	n/a
Understand how product changes have affected participation, customer satisfaction, and free ridership.	N/A - will be covered in participant surveys and trade partner interviews	n/a
Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.	N/A - this will be addressed via secondary research and peer benchmarking	n/a
Determine whether there are rebate process efficiencies to be achieved, and if so, what and	N/A - will be covered in participant surveys and trade partner interviews	n/a

how.		
Understand customer barriers and opportunities for participation and quality installation.	What are the barriers to participation?	A1-A5, C1-C6, D1-D5
Assess customer engagement and satisfaction	How satisfied are customers with Xcel Energy in general?	E1-E3
Develop a net-to-gross ratio documenting the product's influence on customer's decisions.	N/A - will be covered in participant surveys	n/a

Sample Variables

The survey house will use the following variables in fielding the survey:

Variable Name	Description
Customer contact	Name of customer shown in data
Phone 1	Primary phone number
Phone 2	Secondary phone number
Customer address	Physical address that is served by Xcel Energy
CAMEO category	CAMEO category used for sampling and survey quota purposes
Audit	Binary variable indicating customer received an audit (0=no, 1=yes)
Audit_Year	Year that customer received an energy audit
ECM	Binary variable indicating customer installed an ECM (0=no, 1=yes)
ECM_Year	Year that customer installed an ECM

Fielding Instructions

- Open new sample in batches not to exceed a quarter of the available sample (to minimize the number of sample points that have been opened and not exhausted when survey quota is met).
- Attempt each record six times on different days of the week and at different times before abandoning that sample point as unreachable.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals (e.g., "I'm not interested", immediate hang-ups) at least once.
- The survey is considered complete when all questions preceding the demographic module are answered.
- After completing 10 interviews, hold calling and output a preliminary SPSS dataset and recordings of the pretest interviews. Resume calling after EMI Consulting checks the data (usually with 1-2 working days).
- Monitor at least 10 percent of the interviews to ensure proper interview protocols (e.g., reading questions verbatim, proper probing, accurate data entry).
- Calling hours are Monday through Friday Noon to 9 PM local time (in respondent's time zone) and Saturday Noon to 6 PM.

- For mobile telephones, verify that the respondent is in a place where they can safely take a survey call (note: CO laws on telephone use while driving may differ from CA) and follow any requirements for the Telephone Consumer Protection Act.

Survey Sections

- **Introduction**
- **Screening**
- **A.** Overall Disposition toward Energy Efficiency
- **B.** Program Awareness
- **C.** Prior Participation and Efficiency Upgrades
- **D.** Opportunities and Barriers to Participation
- **E.** Customer Satisfaction
- **Gen.** Household Characteristics and Demographics

Introduction

Intro: Hello, this is <INTERVIEWER NAME> calling from [SURVEY FIRM] on behalf of Xcel Energy. May I please speak with [CUSTOMER CONTACT]?

[When connected with correct respondent]: Hello. This is <INTERVIEWER NAME> calling from [SURVEY FIRM] on behalf of Xcel Energy. Xcel Energy would like to better understand how households like yours think about and manage their energy use. If you qualify for this survey and participate, we will send you a \$25 Amazon gift card as a token of our appreciation for your time. Are you the best person to talk to about energy use at your home?

1. Yes (CONTINUE)
2. No (SAY:) Who would be the best person to talk to about energy use at your home? (REPEAT INTRO WHEN CORRECT PERSON COMES ON LINE; ARRANGE CALLBACK IF NECESSARY)

[IF NEEDED] Xcel Energy would like to better understand how households like yours think about and manage their energy use. Xcel Energy provides programs designed to help households with energy saving efforts. Your input is very important to help Xcel Energy improve its energy programs and rebates.

Screening

Screen1. First we have a few qualifying questions. Do you own this property at [ADDRESS] and live there most of the year?

- 1) Yes
- 2) No ==> [Thank and Terminate survey]
- 88) DON'T KNOW ==> [Thank and Terminate]
99. Prefer not to answer [TERM]

Screen2. Is this home a single-family home, a townhouse, a duplex, a triplex, a fourplex, or part of a building with more than four units?

- 1) Single-family home
- 2) Townhouse
- 3) Duplex
- 4) Triplex
- 5) Fourplex
- 6) Home in a building with more than four units ==> [Thank and Terminate]

- 88) DON'T KNOW ==> [Thank and Terminate]
99. Prefer not to answer [TERM]

Screen3. Is it correct that you receive [FUELSRECEIVED] service at this home from Xcel Energy?

1. Yes, that is correct [skp A1b]
2. No, not correct
88. DON'T KNOW
99. Prefer not to answer

[If Screen3 > 1

Screen3a. Which service do you receive from Xcel Energy?

1. Electricity
2. Gas
3. Both
4. NEITHER ==> [Thank and Terminate survey]
88. DON'T KNOW ==> [Thank and Terminate survey]
99. Prefer not to answer [TERM]

[Programming Note: If respondent provides a different answer in Screen3a than the sample variable FuelsReceived, please replace piped content in NEWFuelsReceived with the response from Screen3a.]

A. Overall Disposition toward Energy Efficiency

A1a) Great. You qualify for the survey. This should only take about [15] minutes. About how much do you think you spend on [NEW FUELS RECEIVED] for your home in an average month? We are most interested in your experience over the past year, including all four seasons. A top-of-mind estimate is fine. [Note to reviewers: XX to be determined in pre-test.]

[RECORD WHOLE NUMBERS ONLY. ENTER DON'T KNOW AND MOVE ON IF RESPONDENT DOESN'T KNOW OFFHAND]

8888. DON'T KNOW
9999. PREFER NOT TO ANSWER

A1b) Great. You qualify for the survey. This should only take about [15] minutes. About how much do you think you spend on [FUELS RECEIVED] for your home in an average month? We are most interested in your experience over the past year, including all four seasons. A top-of-mind estimate is fine. [Note to reviewers: XX to be determined in pre-test.]

[RECORD WHOLE NUMBERS ONLY. ENTER DON'T KNOW AND MOVE ON IF RESPONDENT DOESN'T KNOW OFFHAND]

8888. DON'T KNOW
9999. PREFER NOT TO ANSWER

A2. Do you think you could reduce your spending on home energy use from current levels...? [READ RESPONSE OPTIONS BELOW]

1. easily
2. with minor adjustments
3. with major adjustments
4. not at all
88. DON'T KNOW

99. PREFER NOT TO ANSWER

A3) Which of the following best describes how far your household is willing to go to save energy if it means saving some money too? Would you...?

1. reduce consumption only if the cost savings are very high
2. reduce consumption only when it is convenient
3. put up with a little inconvenience to reduce your consumption
4. go out of your way to cut down your electric and/or natural gas consumption
5. Not do anything differently to reduce your electricity and/or natural gas consumption [skp B1]
6. OTHER – PLEASE SPECIFY: _____ [skp B1]
88. DON'T KNOW [Skp B1]
99. PREFER NOT TO ANSWER [skp B1]

[PROGRAMMER NOTE: IF A3 > 4, SKIP TO B1]

A4) If you made a deliberate choice to reduce your home's energy usage or your energy utility bills, what would be the **first thing** you would do? [RECORD VERBATIM]

-
88. DON'T KNOW
 99. PREFER NOT TO ANSWER

A5) What would be the step you could realistically take that would save you **the most energy** if you tried to reduce your home's energy usage or utility bills? [RECORD VERBATIM]

-
88. DON'T KNOW
 99. PREFER NOT TO ANSWER

B. Program Awareness

B1) Do you remember seeing or hearing any suggestions for things you can do to save energy in the past year or two?

1. yes
2. no [skp B3]
8. DON'T KNOW [skp B3]
9. PREFER NOT TO ANSWER [skp B3]

B2) From whom have you heard about things you can do to save energy? [READ LIST. ALLOW MULTIPLE RESPONSES]

1. the local utility / Xcel Energy
- b.2. the news media
- c. 3. articles in magazines / periodicals
- d.4. contractors or retailers
- e.5. local / state government
- f. 6. friends / family
- g. 7. other – please describe: _____
88. Don't know
99. Prefer not to answer

[IF MULTIPLE RESPONSES TO B2 OR IF B1 > 1]

B3) Which of these do you consider to be the most useful source of information about how to save energy at home overall? [REREAD, IF NEEDED. ONE RESPONSE ONLY]

1. the local utility
2. the news media
3. articles in magazines / periodicals

- 4. contractors or retailers
- 5. local / state government
- 6. friends / family
- 7. OTHER – SPECIFY: _____
- 88. DON'T KNOW
- 99. PREFER NOT TO ANSWER

B4) Do you remember seeing or hearing about any rebates for energy efficient appliances or home upgrades in the past year or two?

- 1. yes
- 2. no ==> SKIP TO B6
- 88. DON'T KNOW ==> SKIP TO B6
- 99. PREFER NOT TO ANSWER ==> SKIP TO B6

B5) Please list what organizations or types of companies offer such rebates, as best as you know or can remember. These companies don't have to be a utility. [DO NOT READ. ALLOW MULTIPLE RESPONSES]

- a. 1. product manufacturers
- b. 2. retail stores
- c. 3. contractors
- d. 4. utility companies – general reference
- e. 5. utility company – Xcel Energy specifically mentioned
- f. 6. utility companies – other than Xcel Energy
- g. 7. other – please describe: _____
- 88. Don't know
- 99. Prefer not to answer

[IF Xcel Energy NOT chosen in B5 or B2 (i.e., B5E <> 1 AND B2A <> 1)]

B6) Prior to today, have you had seen any information from Xcel Energy on services they provide to customers to help them save energy?

- 1. yes
- 2. no ==> SKIP TO C1
- 88. DON'T KNOW ==> SKIP TO C1
- 98. PREFER NOT TO ANSWER ==> SKIP TO C1

B7. About how often would you say you see tips or information from Xcel Energy on ways to save on energy or rebate offers the company provides? Is it generally...

- 1) daily
- 2. weekly
- 3. monthly
- 4. a few times a year
- 5. yearly
- 6. less than yearly [skp C1]
- 7. NOT AT ALL [skp C1]
- 88. DON'T KNOW [Skp C1]
- 99. PREFER NOT TO ANSWER [skp C1]

[If B7 < 6]

B8. Where do you see information from Xcel Energy about saving energy?

[DO NOT READ. Select all that apply]

- a) 1. Bill insert
- b) 2. Home energy report
- c. 3. Xcel Energy Website
- d. 4. Billboard or other outdoor advertisement
- e. 5. Digital / web advertisement (not on the Xcel Energy Website.
- f. 6. Television advertisement
- g. 7. Radio advertisement
- h. 8. Contractor
- i. 9. Colleague
- j. 10. Social media
- k. 11. Xcel Energy representative
- l. 12. Other _____
- 88. Don't know
- 99. Prefer not to answer

Section C: Prior Participation and Efficiency Upgrades

The next questions are about energy efficiency improvements or upgrades you may have made in the past five years, if any.

C1. Have you bought any appliances or made any home improvements in the past five years specifically because they were energy efficient? (IF NEEDED: Examples would include buying an energy-efficient refrigerator, selecting a high-efficiency furnace, upgrading your home's insulation, or similar upgrades in the efficiency of your home's energy-using equipment and your home's structural efficiency.)

- 1. Yes, specify if mentioned by respondent:
- 2. No [skip C3]
- 88. DON'T KNOW [skip C3]
- 99. Prefer not to answer [skip C3]

[IF C1=1]

C2. Did you receive a rebate for any of these appliances or upgrades?

- 1. Yes
- 2. No [skip C3]
- 88. DON'T KNOW [skip C3]
- 99. Prefer not to answer [skip C3]

[If C2=1]

C2a. Was the rebate from Xcel Energy, or someone else?

- 1. Xcel Energy [skip C2a2]
- 2. Someone else
- 3. Both Xcel Energy and someone else
- 88. DON'T KNOW [skip C3]
- 99. Prefer not to answer [skip C3]

[IF C2a = 2 or 3 (someone else or both)]

C2a1. Who other than Xcel Energy provided the rebate? [RECORD VERBATIM]

[C2a = 2] skip C3

[If C2a = 1 or 3]

C2a2. For what did you receive an Xcel Energy rebate? [RECORD VERBATIM]

-
- 88. Don't know
 - 99. Prefer not to answer

[If Audit=1]

C3. Our records show that you received a home energy audit from Xcel Energy in [AUDIT_YEAR], is that correct?

- 1. Yes
- 2. No [skip C7]
- 88. DON'T KNOW [skip C7]
- 99. Prefer not to answer [skip C7]

[If Audit=1]

C4. Do you recall any of the specific recommendations that were made during the audit?

- 1. Yes
- 2. No [skip C6]
- 88. DON'T KNOW [skip C6]
- 99. Prefer not to answer [skip C6]

[If C4 = 1]

C4a. What recommendations do you recall? [MULTI-SELECT, DO NOT READ]

- 1. insulation
- 2. air sealing
- 3. heating system upgrade / replacement
- 4. air conditioning / evaporative cooling
- 5. water heating
- 6. other appliance upgrades / appliance recycling
- 7. other
- 88. Don't know
- 99. Prefer not to answer

C4b. [a SKIP IF C4a = 1] Did the auditor recommend any insulation or air sealing for your home?

- 1. Yes
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

C4c. [SKIP if C4a = 3] Did the auditor recommend any upgrades to the heating equipment in your home?

- 1. Yes
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

[If Audit=1]

C5. Did you implement any of the recommendations?

- 1. Yes [skip C5b]
- 2. No
- 88. DON'T KNOW [skip C6]
- 99. Prefer not to answer [skip C6]

[If C5 = 2]

C5a. Why did you decide not to implement any of the recommendations? [RECORD VERBATIM]

C5ai. What, if anything, would encourage you to implement some or all of the recommendations from your energy audit? [RECORD VERBATIM]

[Skp C6]

[If C5 = 1]

C5b. Which recommendations did you implement? [RECORD VERBATIM]

[If Audit=1]

C6. During your audit or in the audit report, did your auditor explain the benefits of making energy upgrades to your home?

- 1. Yes
- 2. No
- 88. DON'T KNOW
- 99. Prefer not to answer

[If ECM=1]

C7. Our records show that you received a rebate from Xcel Energy for installing an electronically commutated motor, or ECM, on your heating equipment in [ECM_YEAR], is that correct?

- 1. Yes
- 2. No [skp D1]
- 88.. DON'T KNOW [skp D1]
- 99. Prefer not to answer

[If ECM=1]

C8. How many different contractors did you meet with in the process of shopping for that furnace?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. More than 5
- 88. Don't know
- 99. Prefer not to answer

[If ECM=1]

C9. Why did you select the contractor you chose? [RECORD VERBATIM]

[If ECM=1]

C10. How many different furnaces did this contractor present to you when you first discussed your options with them?

- 1. 1 [skp C12]
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. More than 5
- 88. Don't know [skp C12]
- 99. Prefer not to answer[skp C12]

[If ECM=1 & C10 != 1, 88 or 99]

C11. What were the primary differences between the furnaces the contractor presented to you? [RECORD VERBATIM]

[If ECM=1]

C12. Why did you select the furnace you chose? [RECORD VERBATIM]

[If ECM=1]

C13. Which of the following best describes the extent to which the contractor discussed the energy efficiency of the various furnace options?

1. The contractor mentioned the energy efficiency of the furnace options
2. The contractor emphasized energy efficiency as the main difference between furnaces
3. The contractor encouraged me to purchase the highest efficiency available
4. I do not recall the contractor discussing the energy efficiency of the furnace options

88. Don't know

99. Prefer not to answer

[If ECM=1]

C14. Do you recall whether you chose a standard efficiency or a high-efficiency furnace?

1. I chose a Standard-efficiency furnace
2. I chose a high-efficiency furnace
3. I do not recall the energy efficiency of the furnace I chose

88. Don't know

99. Prefer not to answer

D. Opportunities and Barriers to Participation

Now, I'd like to ask specifically about the heating system and insulation in your home.

D1. About how long do you think it will be before you next replace your current heating system? [DO NOT READ.]

1. less than a year
2. 2-3 years
3. 4-5 years
4. more than 5 years

88. DON'T KNOW

99. PREFER NOT TO ANSWER

D2. What kind of heating system do you currently have? Is it...

1. a forced air furnace
2. a gas boiler
3. a propane furnace
4. an electric baseboard heater
5. something else – please describe: _____

88. DON'T KNOW

99. PREFER NOT TO ANSWER

D3. Most heating systems come in a variety of efficiency levels. Please tell me how influential each of the following would be in influencing your decision about what efficiency level to get for your next heating system? Would ... have a big influence, some influence, a little bit of influence, or no influence on your choice of your next heating system's efficiency level?

- a. the cost of purchasing the system (assuming cost differences between systems of, say, \$500)
- b. the availability of a rebate of, say \$100, from Xcel Energy for a more efficient system

- c. the operating costs (assuming that more efficient systems cost, say \$75 less per year to operate)
- d. your chosen contractor's recommendation
- e. Xcel Energy's recommendation
- f. increases in comfort from such things as better air distribution and quieter operation

- 1) a big influence
- 2) some influence
- 3) a little bit of influence
- 4) no influence
- 5) OTHER –SPECIFY: _____
- 88) DON'T KNOW
- 99) PREFER NOT TO ANSWER

D4. Which of the following best describes the insulation and air tightness of your home?

- 1. Our home is pretty well insulated and tight. There is just a bit of improvement possible.
- 2. Our home is insulated, but I know it could be improved.
- 3. Our home really needs insulation and/or air sealing.
- 4. Our home is very well insulated and tight. There is no improvement needed. [skip E1]
- 88. Don't know [skip E1]
- 99. PREFER NOT TO ANSWER [skip E1]

[IF D4 = 1 OR D4 = 2 OR D4 = 3]

D5. How much difference would the following make in encouraging you to hire a contractor to upgrade your insulation? For each one, please indicate whether that item would make a big difference, some difference, a little bit of difference, or no difference at all.

- a. the availability of an Xcel Energy approved home audit that tells you whether you need more insulation and how much
- b. having an Xcel Energy certified list of contractors that adhere to industry best practices
- c. knowing you could save on your heating and cooling costs throughout the year.
- d. the availability of a rebate from Xcel Energy that reimburses up to \$1,650 of the cost of your insulation project when you install insulation through a certified contractor
- e. being able to maintain better comfort and even temperatures in your home than you currently have

- 1) a big difference
- 2) some difference
- 3) a little bit of difference
- 4) no difference
- 5) OTHER –SPECIFY: _____
- 88) DON'T KNOW
- 99) PREFER NOT TO ANSWER

Section E: Customer Satisfaction

E1. Which of the following statements best captures how you feel about Xcel Energy's support of energy efficiency for residential customers like you?

- 1. I like what they do and they should keep on doing the same thing
- 2. They should do more of it or do it better.
- 3. They should do less and focus on other things with their time and resources. [skip E3]
- 4. I don't know enough to have an opinion.
- 5. Something else – please specify: _____ [RECORD VERBATIM]
- 88. Don't know
- 99. Prefer not to answer

[IF E1 <> 3]

E2. What else, if anything, could Xcel Energy do to help customers like you make energy efficiency upgrades?

[RECORD VERBATIM]

E3. How would you rate your overall satisfaction with Xcel Energy as an energy provider?

- 1 - Very dissatisfied
- 2 – Somewhat dissatisfied
- 3 - Neither dissatisfied nor satisfied
- 4 – Somewhat satisfied
- 5 - Very satisfied
- 88. Don't know
- 99. Prefer not to answer

E4. How likely are you to recommend Xcel Energy's rebate programs to a friend, relative, or colleague? Please answer using a scale of 0 to 10, where 0 is not at all likely and 10 is extremely likely.

- 0) not at all likely
- ...
- 10) extremely likely
- 88. DON'T KNOW
- 99. Prefer not to answer

Section Gen: Household Characteristics and Demographics

Gen1. Approximately what is the total square footage of your home? [CODE RESPONSE. READ ONLY IF NEEDED]

- 1. Less than 500 square feet
- 2. Between 500 and 749 square feet
- 3. Between 750 and 999 square feet
- 4. Between 1,000 and 1,499 square feet
- 5. Between 1,500 and 1,999 square feet
- 6. Between 2,000 and 2,499 square feet
- 7. Between 2,500 and 2,999 square feet
- 8. Between 3,000 and 3,999 square feet
- 9. 4,000 or more square feet
- 88. DONT' KNOW
- 99. Prefer not to answer

Gen2. Approximately what year was your home built? [CODE RESPONSE. READ ONLY IF NEEDED]

- 1. 1939 or earlier
- 2. 1940 to 1949
- 3. 1950 to 1959
- 4. 1960 to 1969
- 5. 1970 to 1979
- 6. 1980 to 1989
- 7. 1990 to 1999
- 8. 2000 to 2009
- 9. 2010 to 2013
- 10. 2014 and later
- 88. Don't know
- 99. Prefer not to answer

Gen3. How many people live in your household? [RECORD]

Gen4. What is your current age? [RECORD – IF NEEDED, ACCEPT THE DECADE THE RESPONDENT IS IN:
20s, 30s, 40s, ETC. AND RECORD AS SUCH]

Gen5. And this is my last question. Please indicate which of the following ranges best reflects your household's total income before taxes last year. Feel free to stop me when I get to the appropriate range. Was it...? [READ RANGES]

1. Less than \$20,000
2. \$20,000 to \$39,000
3. \$40,000 to \$59,000
4. \$60,000 to \$79,000
5. \$80,000 to \$99,000
6. \$100,000 to \$119,000
7. \$120,000 or over
88. Don't know
99. Prefer not to answer

Closing

Closing1. These are all the questions I have. As a thank you for your input, we'd like to send you a \$25 Amazon gift card. Let me ask the information we need to email your gift card instructions to the intended recipient—this could be you, personally, or anyone else of your choosing.

[IF RESPONDENT REFUSES OR DECLINES GIFT CARD, WRITE "REFUSED" IN NAME BOX AND CLICK NEXT]

T: 10 5

Name of recipient:

Email address of recipient:

[READ BACK ONE LETTER AT A TIME]

APPENDIX G: TRADE PARTNER INTERVIEWS

EMI Consulting Xcel Energy Trade Partner Interview Guide

Introduction

To support the process and impact evaluation of the 2016 Xcel Energy efficiency programs, members of the EMI Consulting evaluation team are conducting in-depth telephone interviews with Trade Partners. This guide presents the questions to be covered in the in-depth interviews for the CO Insulation and Air Sealing Product.

The Colorado Insulation/Air Sealing Rebate product offers downstream rebates to residential customers that have air sealing, wall insulation, and/or attic insulation installed by a BPI-certified contractor. Air sealing is required prior to installing insulation unless the home is already sufficiently tight. The Colorado product has been operating continuously since 2009 and has not been evaluated in the past, which provides a significant opportunity for this evaluation to develop the first actionable recommendations for the product. The product has made changes for 2017, which will increase requirements for air sealing reductions and vary rebates by heating fuel and presence of air conditioning. The targets of these interviews are currently **active** trade partners with the Insulation/Air Sealing product.

The remainder of the introduction provides the research questions which this guide is designed to address and fielding instructions for the interviewees.

Evaluation Objectives

The objectives for the CO Insulation and Air Sealing evaluation are to:

- Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.
- Assess sources of participant awareness and levels of satisfaction.
- Understand the customer journey path (e.g., what prompts customer projects and participation).
- Understand how product changes have affected participation, customer satisfaction, and free ridership.
- Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.
- Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.
- Understand customer barriers and opportunities for quality installation.
- Assess customer engagement and satisfaction.

- Develop a net-to-gross ratio documenting the product's influence on customer's decisions.

Specific research questions which this trade partner interview guide is designed to address are the following:

- What is the role of trade partners in the Insulation/Air Sealing program?
- What successes and challenges have trade partners faced in implementing projects?
- How can Xcel best support trade allies to implement high quality insulation/air sealing projects?
- What is the trade partner's perception of customer awareness, engagement, and satisfaction with the program?
- How is the application and rebate process working and are there any suggestions for improvement?
- How are program-qualifying projects typically initiated (by the customer or by the contractor)?
- How have program changes affected participation and satisfaction among customers?
- How can Xcel help customers appreciate and demand quality installation via the program vs. non-program insulation jobs?
- Has participating in the program changed the trade partner's approach to non-program projects?

The following table presents the link between each evaluation objective, research question, and survey question.

Evaluation Objective	Research Question	Interview Question Number(s)
Explore the role of trade allies, successes and challenges they have faced in implementing projects, and whether/how Xcel Energy can better support them.	What is the role of trade partners in the Insulation/Air Sealing program?	D1-D8
	What successes and challenges have trade partners faced in implementing projects?	C1, C2
	How can Xcel best support trade allies to implement high quality insulation/air sealing projects?	D5, rest of D and E sections
	Has participating in the program changed the trade partner's approach to non-program projects?	D8
Assess sources of participant awareness and levels of satisfaction.	What is the trade partner's perception of customer awareness, engagement, and satisfaction with the program?	D1, D3, E3, G5
Assess customer engagement and satisfaction		
Understand customer barriers and opportunities for quality installation.	How can Xcel help customers appreciate and demand quality installation via the program vs. non-program insulation jobs?	D5, rest of D section
Determine whether there are rebate process efficiencies to be achieved, and if so, what and how.	How is the application and rebate process working and are there any suggestions for improvement?	E2, G1
Understand the customer journey path (e.g., what prompts customer projects and participation).	How are program-qualifying projects typically initiated (by the customer or by the contractor)?	D1, D2
Understand how product changes have affected participation, customer satisfaction, and free ridership.	How have program changes affected participation and satisfaction among customers?	E3
Identify potential measures that could be added to the product or customer targeting that could be implemented to improve cost effectiveness.	N/A - this will be addressed via secondary research and peer benchmarking	N/A
Develop a net-to-gross ratio documenting the product's influence on customer's decisions.	N/A - this will be addressed via customer surveys	N/A

Fielding Instructions

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

- Attempt to reach each participant four times on different days of the week and at different times.
- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals [e.g., "I'm not interested", immediate hang-ups] at least once.
- Commercial customer calling hours are 7 AM to 5 PM MDT.
- Record interviews
- Definitions: COMPANY NAME = Update COMPANY NAME with Trade Partner's company name

If feasible, complete the following table before the interview based on information from the sample and a brief review of the company's web page.

Company Name:	
Lead Contact, if any, provided by Xcel Energy	
Contact name identified on web site and title	
Telephone number	
Location (city/ies)	
Area served (as defined on website)	
Last year of participation in Xcel Energy program	
Prior level of activity (range of # of projects /yr)	
Notes from review of website	

Record call attempts here

Date / time	Attempted contact	Telephone	Result

Interview Questions

Introductory text (use or modify as appropriate):

Hello, my name is _____ calling from Evergreen Economics on behalf of Xcel Energy. We are conducting an evaluation of Xcel Energy's insulation rebate program to provide input to their program team on the offerings and services. According to Xcel Energy records, you participate in the insulation program as a registered trade partner. Who could best tell me about that and about your experience with the program?

[If needed, transfer to a different contact and re-introduce]

I would like to conduct a brief interview with you about the program, your experiences with it, and your perspectives and practices generally. We are offering a [incentive] as a thank you for your time. Your insights and perspectives will help Xcel Energy improve its services to trade allies and residential customers. Would you have [20-30 minutes] now?

Section A: Company Overview

A1. To start, please tell me a bit about your company.

Probe, as needed:

- What kinds of services do you provide?
- What region do you serve?
- How long have you been in business?
- What is your role?

A2. What share of your work is insulation upgrades in existing homes?

Probe, as needed:

- Has this changed over time?
- In what way?

Section B: Awareness

B1. How did you initially get involved with the Xcel Energy as a trade partner for the insulation and air sealing program?

Probe, as needed:

- How did you become aware of the program?
- What prompted you to register?
- How was that beneficial for your company?
- Were there any drawbacks?

B2. Do you have any comments or suggestions about the *process* of becoming a registered trade partner?

Probe, as needed:

- Are there ways Xcel Energy could improve the process?

Section C: Motivations/Barriers Registered Trade Partner

C1. In what ways is the Xcel Energy insulation program helpful to you in your business?

Probe, as needed:

- rebate
- ability to mention the connection with the Xcel Energy program
- Xcel Energy messaging to customers on benefits of insulation and air sealing

C2. Have there been any challenges in being a registered trade partner with the Insulation rebate program?

Probe:

- If so, what?
- What suggestions do you have to address those issues?

Section D: Program Role in Customer Interaction and Project Choices

D1. Next, I would be interested in hearing a little more about how your typical insulation or air sealing projects work beginning with that initial customer contact. How do you tend to find your single family insulation or air sealing customers?

[Listen for sales techniques: brochures, cold calls, ads, door to door, etc.]

Probe on:

- What are your customers usually trying to accomplish?

- Do they already know how much insulation they want or just that they want some?
- Are they aware of the Xcel Energy rebates?

D2. What are the main things you discuss with customers when they are considering a project?

Listen for / probe on:

- one project spec or discuss various options?
- discuss R values and CFMs or not that technical?
- bottom line costs only or feature Xcel Energy rebate specifically?
- mention connection with Xcel Energy trade partner connection?

D3. What role, if any, does the Xcel Energy rebate play in:

- spurring the customer to do the insulation or air sealing upgrade in the first place
- helping you get the work
- prompting the customer to do more than they would have done otherwise?

D4. Do any other aspects of Xcel Energy's support for trade allies help you with these things?

D5. What else, if anything, could Xcel Energy's insulation program do to help prep or prompt customers to conduct comprehensive insulation and air sealing work?

D6. Are there ever instances when you don't mention rebates/incentives during sales discussions with customers?

Probe on:

- In what situations?
- Why?

D7. Do you sell any eligible projects without applying incentives/rebates? If so, why?

D8. Has participating in the Insulation program changed your approach to projects that are not rebated by the program?

Section E: Motivations / Barriers to Installing EE through Xcel Energy

E1. Now I have a few questions about your direct interaction with the program. About how many projects do you submit to Xcel Energy per year?

Probe on:

- How has that changed over the years? Why?
- Has the nature of the projects you submit changed of the year? How? Why?

E2. Let's talk about the rebate application process itself. Do you fill out the application for the Insulation program on behalf of the customer?

- Do you use the digital application?
- Do you just complete the application for the customer or do you use the alternative rebate section so the payment goes to you to offset project costs?
- How does the rebate process work for you? Are there any changes you would like to see?

E3. Have the program changes for 2017 (change in eligible measures) had any effect on program participation or customer choices? In what way?

Section F: Evolving Market Place

F1. Thinking more broadly beyond the Xcel Energy program, have you noticed any change in demand from customers for high quality insulation and air sealing over time?

Probe on:

- In what way?
- What is causing that?

F2. What do you see as the main trends in the market place for Insulation? [Probe on and listen for measures.]

F3. Do you think there is a sufficient Spanish-only speaking insulation market in the areas you serve that it's worthwhile to have Spanish informational material available?

If so, probe on:

- For you?

- For Xcel Energy's insulation program? *(relevant for trade ally interviews, not peer interviews)*
- Do you already have Spanish language marketing and sales capability?

Section G: Satisfaction

- G1. Finally, I'd like to ask about your and your customers' satisfaction with the Xcel Energy insulation program. Please rate your overall satisfaction with the program on a 1 to 5 scale where 1 is not satisfied and 5 is extremely satisfied?
- [IF G1<5] What could Xcel Energy do to increase your satisfaction with the Insulation program?
- G2. Do you have experience with other utility insulation programs?
- G2a. How does your experience with other insulation programs compare to your experience with Xcel's Insulation program?
- G2. (time permitting) What has your experience with Xcel Energy Insulation program staff been?
- G3. (time permitting) What do you think of the specific insulation upgrades and air sealing improvements that are covered by the program?
- G4. (time permitting) What do you think of the rebate levels?
- G5. Have you had any feedback from your customers about their experiences with the Insulation product that you think Xcel Energy should know?

Section H: Closing

- H1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences with the Xcel Energy Insulation program?
- H2. And do you have a preference for receiving your [incentive] via US Post Office mail or via e-mail? [Get or verify appropriate address.]

Thank you. Those are all the questions I have. Xcel Energy appreciates your thoughtful responses and insights. You should be receiving [the incentive] in about [#] weeks.

APPENDIX H: BENCHMARKING INTERVIEWS

Xcel Energy Insulation Best Practices: Utility Interview Guide

Introduction

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

This interview is being conducted with a set of 8 of Xcel Energy's peer utilities for the Minnesota Insulation and Colorado Insulation and Air Sealing rebate products. Due to similarities in their program designs and to take advantage of economies of scale, we will use the same peer utilities for the Minnesota and Colorado products. Target respondents are managers of insulation and/or insulation and air sealing energy efficiency programs. Table 1 below lists the targeted utilities and their corresponding programs.

Table 1: Peer utilities and programs

Utility	Program Name	Reason for Inclusion
NorthWestern Energy (Montana)	Efficiency Plus	product manager recommendation (CO)
Minnesota Energy Resources Corporation	Conservation Improvement Program	product manager recommendation (CO and MN)
Rocky Mountain Power (Wyoming)	Wattsmart Weatherization	product manager recommendation (CO)
Dominion Energy / Questar Gas (Utah)	ThermWise Weatherization Program	product manager recommendation (CO)
CenterPoint Energy (Minnesota)	Air Sealing and Insulation Rebates	product manager recommendation (MN)
Alliant Energy (Iowa)	Home Sealing and Infiltration	product manager recommendation (MN)
Focus on Energy	Whole Home Improvements	product team recommendation (MN)
Nicor Gas	Energy SMART - air sealing and insulation rebates	product team recommendation (MN)

This document presents the in-depth interview guide for peer utility insulation and air sealing rebate products. Table 2 identifies the interview questions related to each key performance indicator. Table 3 identifies the interview questions related to each contextual theme.

Table 2: Mapping of interview questions to indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings goals	2016 program energy savings goals (MWh and Mcf) 2016 program's savings (MWh and Mcf) 2016 total energy efficiency portfolio goal (MWh and Mcf)	B3, B5, B6
Program budget cost of acquisition (e.g. \$/MWh, \$/Mcf)	2016 program budget 2016 total gross energy savings for each peer program	B7
Trade Ally Participatation Levels	- Number of active trade allies - Number of trade allies that complete the majority of program projects	C2b
Savings per project	Average kWh and/or therm savings per insulation project	B2
Net-to-gross ratios (NTGRs)	- Method for developing NTG ratios - NTG values estimated at program level, measure level, or both.	B4
Cost effectiveness of program measures	- Method used to calculate cost effectiveness - Which measures are most cost effective	B8

Table 3: Mapping of interview questions to contextual themes

Contextual themes	Data Needed	Interview Question
Program description	- Overall program objectives, implementation approach, role of trade allies - Overall scale/size of program (number of projects completed in 2016)	A1, B1
Net-to-gross (NTG) savings approach	NTG approach, ratio applied, and calculation details.	B4
Customer engagement practices	Methods used to engage customers	C1
Trade partner engagement practices	Methods to engage trade partners	C2
Measure types and incentives	List of measures and their efficiency levels, incentive levels, and (if available) incremental costs	A2a, A2c, A2d
Method for establishing energy savings	Savings method – estimated, deemed, or combination	A2b

Recruiting Instructions

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

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

Interview

Introduction/Recruitment

- INTRO 1 Hello, this is INTERVIEWER NAME, calling from Evergreen Economics on behalf of Xcel Energy. Is CONTACT NAME available?
- INTRO 2 We are working with Xcel Energy on a benchmarking and best practices study for PRODUCT energy efficiency programs. As part of this study, we are reaching out to leaders of PRODUCT programs to learn about innovative programs and best practices in the field.
- We would like to include UTILITY in this study, as your PRODUCT has been identified as an [innovative/peer] program. We would like to spend some time [add estimated time once final/tested] talking with you about your PRODUCT's design and implementation, as well as your successes and challenges with the PRODUCT.
- [IF NEEDED:]** We will not be requesting any customer or participant data.
- INTRO 3 Can we include your utility in the study?
- a. Yes **[RECORD CONTACT INFORMATION; SETUP INTERVIEW TIME; EMAIL INTERVIEW TOPICS]**
 - b. No **[DISCUSS CONCERNS; ANSWER QUESTIONS]**

Section A: KPIs/Program Design

- A1. First, we'd like to talk through the basic design and organization of your program. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**
- Can you describe your program at a high level?
- a. What are the program's overall objectives?
 - b. Is your program run by utility staff or a third-party implementer?
 - c. How many PROGRAM STAFF OR IMPLEMENTER STAFF members support the program?
 - d. **[IF NOT ALREADY MENTIONED]** Do trade allies play a major role in the program delivery?
- A2. Next, I'd like to talk about your program's efficiency incentives. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

- a. What specific measures are offered? [**PROBE:** types/locations of insulation, air sealing, others?]
- b. Are the measure savings estimated, deemed or some combination?
 - a. What measures have deemed vs. calculated savings?
 - b. Do you have measures for both electric & gas or just one fuel type?
- c. What are the incentive levels for each measure?
- d. What are the incremental costs for each measure?
- e. Do you do measurement and verification on your program? Is this information reported to your state PUC?

Section B: Savings goals/cost

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

- B1. How many projects were completed in 2016?
 - a. How many of these were for insulation only versus insulation and air sealing together?
- B2. What was the average savings per insulation project in 2016?
- B3. What were the program's energy savings goals in 2016? (MWh and Mcf)?
- B4. Are these goals based on gross or net savings?
 - a. Did/will you apply a NTG ratio to these savings?
 - b. What NTG ratio do you use?
 - c. What methods are used to calculate NTG ratio?
 - d. Are NTG ratios estimated at the program level, measure level, or both?
- B5. How much net/gross energy savings did the program report in 2016?
- B6. What was the total energy efficiency portfolio goal in 2016?
- B7. We'd like to know more about the budget or total operating costs of your program to get a sense of the utility cost of energy savings. Ideally, this includes program incentives, salaries of program staff (including support staff who may not work on the project full-time), marketing, consulting, and other overhead.
 - a. What is the program's total operating budget?

- b. [If air sealing/insulation are one part of a larger home upgrade program] How does this break down specifically for air sealing and insulation?

B8. What type of cost effectiveness test is applied to the program?

- a. If TRC, what was the TRC in 2016?
- b. Which measures have you found to be the most cost effective?

Section C: Program Participation

Next, I'd like to talk about program outreach and marketing. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH ON PROGRAM]**

C1. What kind of outreach and marketing does the utility conduct to increase awareness and engage potential program participants?

- a. What has been the most effective?

C2. Next, I'd like to talk about the program's trade allies.

- a. What activities do program staff conduct to engage trade allies?
- b. Do you pay your trade allies an incentive for participating in your program? If yes what or how is the incentive plan structured?
- c. Approximately how many trade allies are active in the program?
 - a. How many trade allies conduct the majority of program projects?
- d. What roles do trade allies play in driving participation in the program?
- e. What requirements or certification, if any, do you have for trade allies to be eligible to participate in the program?
- f. What support do provide trade allies in terms of training? What do you provide in terms of marketing/outreach support?
- g. What have you found to be the most effective ways of engaging trade allies to drive participation in the program?

Section D: Closing

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

CO Insulation and Air Sealing

2017 Program Evaluation: Recommendations and Responses

The Xcel Energy Insulation and Air Sealing product in Colorado offers residential customers rebates to upgrade insulation and improve air sealing in their homes to reduce their heating and cooling energy consumption. The product uses registered trade partners who must be Building Performance Institute (BPI) certified and follow BPI practices for quality installation. Rebated projects must meet product requirements for installed insulation levels and air sealing improvements (or pre-existing home tightness).

Xcel Energy (The Company) engaged a team of researchers led by EMI Consulting to conduct a process and impact evaluation of the Insulation and Air Sealing product. The evaluation team was asked to assess the following:

- Customer satisfaction with the product
- Xcel Energy's influence on customers' decisions to upgrade insulation and improve air sealing and the customer journey paths that lead to such upgrades
- The roles, successes, and challenges faced by participating trade partners
- Opportunities to increase product cost effectiveness and influence on customer decisions
- The impact of customer free ridership on product savings

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

Recommendation	Response
1) Conduct more customer-facing outreach designed to steer customers considering an insulation upgrade to participating trade partners.	The Company will include the insulation product in bundled marketing campaigns throughout 2018. These campaigns will include email and direct-mail tactics with messaging focused on the importance of using a participating contractor to participate in the insulation product, and rebate products in general.
2) Explore ways to strengthen the market differentiation that participating trade partners receive and facilitate trade partner-based marketing.	Starting in Q1 of 2018, the Company will change the call to action on all insulation-related materials to "Find a Participating Contractor". The Company will also explore the possibility of offering co-branded marketing materials to top performing trade partners.
3) Increase targeting of customer with the greatest and most cost-effective insulation and air sealing opportunities, such as those in older homes or with high usage.	The Company will attempt to better use tools such as Salesforce customer relationship management and CAMEO customer segmentation software to target likely participants based on home age, customer segment and/or usage. The Company also has a Customer Insights team and will explore that avenue as a resource for geo-targeting and heat mapping.
4) Explore ways to increase flexibility in the measure structure without compromising on the product's use of BPI standards or its emphasis on comprehensive shell upgrades.	Xcel Energy will take these recommendations into account when filing the 2019-2020 DSM plan. This is the best opportunity for larger-scale product modifications as The Company looks at the residential program as a whole.
5) Impact Results: Use of 0.85 NTGR	Xcel Energy will use the recommended NTG of 0.85% as recommended by EMI Consulting, starting from 1/1/2018 and moving forward.