Notification Date: April 12, 2022

➢ Summary of 60-Day Notice: Energy Star New Homes

Public Service Company of Colorado ("the Company") posts this 60-Day Notice to make changes to the Energy Star New Homes product in response to the 2021 Comprehensive Evaluation.

The evaluation provided key findings in the areas of Net-to-Gross Ratio ("NTGR") for the product, expanding market capitalization, HERS rater compensation, marketing, high performance housing, and beneficial electrification. The Company will implement the following recommendations in 2022:

- Update the NTGR for the product to 73%;
- Provide targeted trainings to large-volume builders targeted to non-participating builders outside of front range communities;
- Addition of tiered HERS rater incentives to encourage Raters to influence builders to build higher performance homes;
- Develop targeted marketing materials for homeowners;
- Consider creating an alternative offering based on high-performance building certifications to improve product influence among participating builders;
- Add heat pump water heaters as a prescriptive measure for all-electric homes at the same incentive levels as for combination gas & electric homes

In addition to implementing the above recommendations from the 2021 evaluation, the Company is also making the following modifications to the product:

- Participating homes will be required to use modeling software that complies with ANSI 301-2019, and
- The Company is adding an incentive table for performance better than IECC 2021 in response to jurisdictions adopting updated energy codes.

Table 1: Summary of Forecasted Impacts: Energy Star New Homes

	2022	
	As Filed	*Revised per 60-day*
Electric Savings (kWh)	10,361,702	8,844,080
Electric Demand Reduction (kW)	2,716	1,933
Budget*	$2,255,349	$2,413,158
MTRC Test Ratio	1.13	1.08
Gas Savings (Dth)	154,836	138,984
Budget*	$1,770,053	$1,992,430
MTRC Test Ratio	1.01	0.96

*Rebates only. While the anticipated expenditure impacts are forecasted, the Company acknowledges that this Notice does not change the filed budget.

Detailed responses to each of the Comprehensive Evaluation recommendations can be found in the matrix included with the report.

Included with this Notice are the following documents:

- Redlined Product Write-up;
- Redlined Deemed Savings worksheet;
- Redlined Technical Assumptions worksheets; and
- Updated cost-benefit analyses.

These documents can be found on our website at the following link:
http://www.xcelenergy.com/Company/Rates_&_Regulations/Filings/Colorado_Demand-Side_Management

January 28, 2022

Xcel Energy

Colorado ENERGY STAR New Homes Product Impact & Process Evaluation

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EXECUTIVE SUMMARY

2021 Colorado ENERGY STAR New Homes Product

Introduction

Xcel Energy contracted with TRC to evaluate the 2020 ENERGY STAR® New Homes Product in Colorado. This product provides incentives and training to encourage home builders to exceed local building codes and to understand and encourage home designs that go beyond common construction practices. During construction, Home Energy Rating System (HERS) raters consult with participating builders on energy-efficient equipment to help builders incorporate these measures into home design and ensure proper installation. Builders of single-family and small multifamily homes (duplexes, triplexes, fourplexes, and townhomes) may participate. Homes achieving total energy savings of at least 10% better than code in their respective jurisdiction are eligible for rebates.

As part of the process evaluation, TRC researched builder awareness of the product, assessed product experiences and satisfaction, identified opportunities to support jurisdictional energy-related goals such as electrification, and identified motivations and barriers for homeowners to purchase energy-efficient homes. For the impact evaluation, TRC assessed the impact of the product on builder decision-making. This summary includes the key findings and recommendations from our evaluation.

Methods

Participating builder survey (n=14)

Lapsed small-volume builder survey (n=6)

Non-participating builder interview (n=8)

Homeowner survey (n=85)

Trade partner (HERS rater) interview (n=7)

Peer utility interview (n=4)

Fielding:
June – August 2021

Summary of Findings

The evaluation team estimated a retrospective **NTGR of 0.63** for the product, based on participating builder, non-participating builder, and HERS rater responses. The team recommends Xcel Energy could apply a prospective **NTGR of 0.73** if recommendations are met.

When asked about satisfaction with their product experience, homeowners were **least satisfied with the training they received from builders,** indicating a need for improved homeowner engagement on their energy-efficient homes.

HERS raters struggled with product administrative requirements. One HERS rater mentioned the rater incentive was insufficient to cover administrative tasks, while another described a desire for the **incentive to scale with the project.**

Homeowners rated comfort the most important factor on their decision to purchase a home with energy-efficient equipment and/or materials. This indicates that participating **homeowners associate energy efficiency with non-energy benefits.**

Achieving an ENERGY STAR certification was a key motivator for participating builders to build above code, more so than the Xcel Energy product. Two peer utilities have either made or are considering changes to program design to **align with stretch codes or high-performance building certifications.**

Participating builders and HERS raters indicated that **costs remain a barrier to energy-efficient building practices,** specifically to including electrification technologies in the new home. Both participating builders and HERS raters recommended including more prescriptive measures.

Product Influence

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

0.63 = (1- **0.42**) + (**0.00**) + (**0.05**)

Almost all (12 of 14) participating builders reported it was somewhat or extremely likely that they would have built the new homes to the exact same efficiency level above code without the product.

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

The product **influenced HERS rater business practices,** making some more likely to recommend energy efficiency measures.

EXECUTIVE SUMMARY

2021 Colorado ENERGY STAR New Homes Product

Awareness & Barriers to Participation

Awareness

Non-participating builders (6 of 8) were largely aware of the product.

Participating builders (current and lapsed) primarily heard about the product through **interactions with HERS raters.**

Barriers

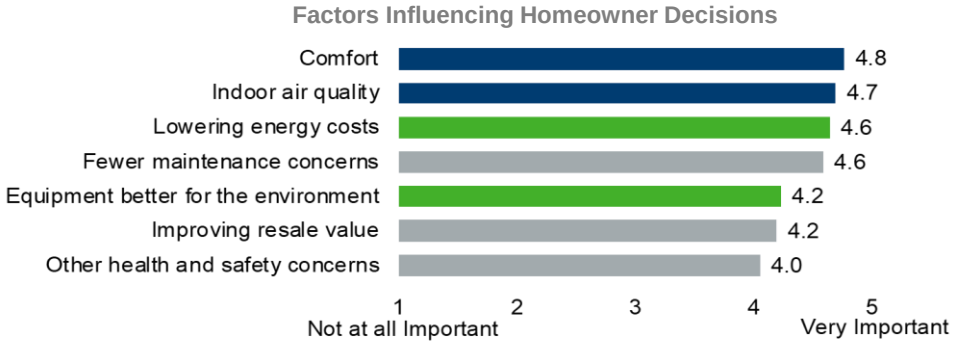
Participating builders pointed to **cost** as the primary barrier to building to a standard greater than their average standard above code.

4 of 6 non-participating builders who were aware of the product expressed a desire **for higher rebate amounts and faster rebate timelines.**

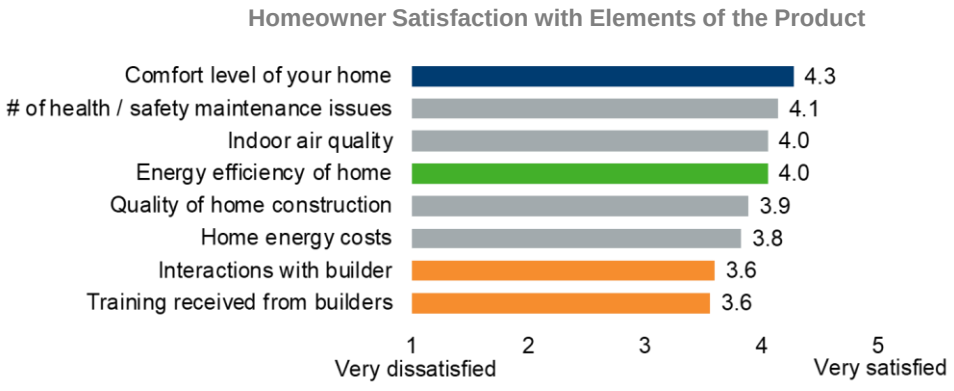
HERS raters echoed builder cost concerns, citing **upfront costs** (2 of 7), **appraisals** that don't fully recognize the value of energy efficiency (2 of 7), and **small rebates** (2 of 7).

Homeowner Experiences

Homeowners rated **comfort** as the **most important factor** in their decision to purchase a home with energy-efficient equipment and/or materials, followed by indoor air quality.



Homeowners were **least satisfied with their interactions with their builder** (3.6 out of 5.0) and the **training they received** from builders on energy-efficient equipment and/or materials.



EXECUTIVE SUMMARY

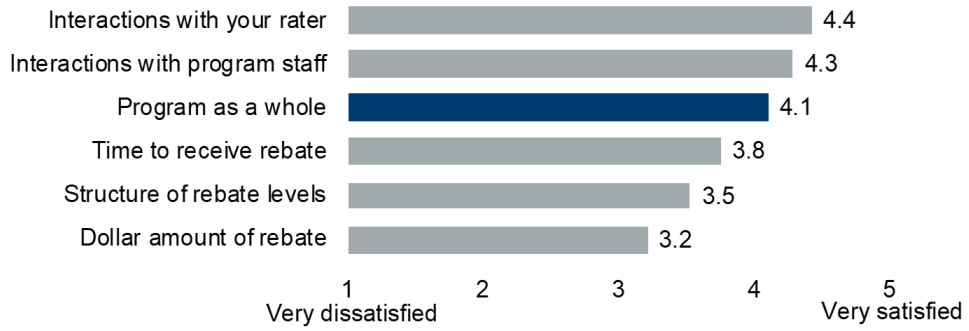
2021 Colorado ENERGY STAR New Homes Product

Experience & Satisfaction

Builders

Participating builders were **satisfied** with the product as a whole.

Participating builder satisfaction was **highest** with their **interactions with HERS raters and product staff**.



HERS Raters

3.9 out of 5

On average, **HERS raters** were **satisfied** with their product experience as a whole, where 1 means "not at all satisfied" and 5 means "very satisfied."

5 HERS raters described their **interactions with Xcel Energy staff** and the product implementer as a **strength** of the product.

4 HERS raters described **data and administration requirements** made it **difficult to participate** in the product.

2 HERS raters discussed **lack of builder interest** as a barrier to participation.

Electrification

Builders

Participating builders who were familiar with electrification expressed **neutral attitudes.**

4 participating builders highlighted technological **concerns in cold climate zones** when explaining their electrification hesitations.

> *We're in an extreme climate zone, and we don't think the technology currently exists to provide the adequate comfort level to eliminate gas fuel appliances.*

HERS Raters

HERS raters were unanimous in their **positive opinion of electrification.**

3 HERS raters described **builder distrust** of electrification**.**

3 HERS raters described **concerns** with promoting electrification in **cold climate zones.**

> *There are heat pumps that now work in those very cold climates, but there's a lot of distrust from the building community on them, even if they claim to be able to work below zero.*

Conclusions & Recommendations

The evaluation team estimated a **retrospective NTGR of 0.63** for the product, based on participating builder, non-participating builder, and HERS rater responses. The team recommends Xcel Energy could apply a **prospective NTGR of 0.73** if recommendations are met.

The NTGR could increase to 0.73 if the following recommendations are met:

- **Provide targeted trainings and outreach to large-volume builders.** These trainings could include information on general building science principles, specific above code technologies, and information specific to electrification technologies and practices to help support jurisdictions with their electrification goals.
- **Dilute free-ridership by targeting non-participating builders, including non-ENERGY STAR builders and builders outside of front range communities.** This should include improving communication between product representatives and builders, including training and marketing activities targeted toward these groups.
- **Scale HERS rater incentives with savings to encourage participation from higher savings projects.** HERS raters are currently a major driver of product participation. Scaling HERS rater incentives with savings could account for the additional administrative burden associated with submitting complex projects and encourage HERS raters to promote additional energy efficiency upgrades.

HERS raters struggled with product administrative requirements. One HERS rater mentioned that the rater incentive was insufficient to cover administrative tasks, while another described a desire for the incentive to scale with the project.

Collaborate with the product implementer to explore pain points in administrative requirements, including clarifying HouseRater documentation as applicable. Assessing the usability of HouseRater could uncover improvements to mitigate HERS rater difficulties with administrative requirements and help to avoid commonly requested edits. Further, clarifying processes and requirements could improve HERS rater product experience.

Homeowners rated comfort the most important factor influencing their decision to purchase a home with energy-efficient equipment and/or materials.

Homeowners were **least satisfied with the training they received from builders,** indicating a need for improved homeowner engagement on their energy-efficient homes.

Develop targeted marketing materials for homeowners. Homeowners value the non-energy benefits of their energy-efficient home over financial considerations such as lowering energy costs. Developing collateral that highlights the non-energy benefits of product homes may increase demand for energy efficiency among potential home buyers. Marketing collateral should also include builder leave-behinds that describe features of the energy-efficient home to help ensure that homeowners receive sufficient information about the energy-efficient features of their new homes.

Conclusions & Recommendations

The recommendations we have identified to address the remaining key findings, if implemented, would result in more substantial product changes. These changes could result in changes to the prospective NTGR; however, we have not estimated a prospective NTGR associated with these changes. **If these recommendations are implemented, Xcel Energy should conduct additional research to determine the impact on the NTGR.**

Achieving an ENERGY STAR certification was a key motivator for participating builders to build above code, more so than the Xcel Energy product. Two peer utilities have either made or are considering changes to program design to **align with stretch codes or high-performance building certifications.**

Consider creating an alternate offering based on high-performance building certifications to improve product influence among participating builders. This credential could be based on a single high-performance building certification, such as Zero Energy Homes or Passive House, or could combine components of several certifications to create a credential tailored to Xcel Energy's Colorado service territory. Xcel Energy could consider future versions of ENERGY STAR if changes represent sufficient energy efficiency improvements.

Participating builders and HERS raters indicated that **costs remain a barrier to energy-efficient building practices,** specifically to including electrification technologies in the new home. Both participating builders and HERS raters recommended including more prescriptive measures.

Consider expanding prescriptive new construction rebate offerings, including incentivizing technologies and practices for all-electric homes to support jurisdictions in achieving their electrification goals. The evaluation team recommends that these incentives be offered as a "bonus," so that participating builders are still required to achieve a minimum level of above code performance. Providing specific incentives for electrification technologies may help to overcome the cost concerns cited by builders and homeowners and provide an opportunity to clarify misconceptions around the readiness of electrification technologies, particularly in cold climate zones.

1 Introduction

Xcel Energy offers a comprehensive array of energy services and products to its customers, including demand side management (DSM). For its 2021 product evaluations, Xcel Energy sought to understand the role each evaluated product plays in changing the marketplace, to analyze that influence on customer choices, and to use the findings to improve customer experience and ensure industry-leading product performance. To accomplish this, Xcel Energy contracted with TRC to evaluate eleven products offered in Colorado and Minnesota in 2021.[1] This included the Colorado ENERGY STAR® New Homes Product, discussed in this report. This introduction includes an overview of the product, the evaluation approach, and organization of the report.

1.1 Product Overview

The Colorado ENERGY STAR New Homes Product provides incentives and training to encourage home builders to exceed local building codes and to understand and encourage home designs that go beyond common construction practices. Additionally, during construction Home Energy Rating System (HERS) raters consult with participating builders on energy-efficient equipment to help builders incorporate these measures into their home design and ensure proper installation. Builders of single-family and small multifamily homes (duplexes, triplexes, fourplexes, and townhomes) may participate. Homes that achieve total energy savings of at least 10% better than code in their respective jurisdiction are eligible for rebates. From January to December 2020, the ENERGY STAR New Homes Product claimed over 4 GWh in energy savings in Colorado (Table 1-1).

Table 1-1. CO ENERGY STAR New Homes Savings, January – December 2020

kW	kWh	Electric Participants	Dth	Gas Participants
728	4,350,331	2,397	81,892	4,398

In 2020, the product's three main offerings included builder envelope improvement rebates, two builder add-on rebates, and an incentive for HERS raters:

- **Builder envelope improvement rebate.** Xcel Energy provides builder envelope improvement rebates for gas/electric combination, electric-only homes,[2] or natural gas-only homes that achieve energy savings of at least 10% above their jurisdiction's energy code. Rebates are offered to encourage builders to build energy-efficient new homes by

[1] The products selected for evaluation include: ENERGY STAR New Homes (CO), C&I New Construction (CO), High Efficiency AC (CO), Home Lighting (CO), Compressed Air (CO), Compressed Air (MN), Commercial Efficiency (MN), Process Efficiency (MN), Low-Income Home Energy Squad (LIHES), Home Energy Savings Program (HESP), and Multifamily Energy Savings Program (MESP)

[2] Electric-only homes incentives still permit for gas service to the home. Incentives require electric space heating and water heating. Ancillary gas uses like emergency heat or food preparation are allowed.

lowering the upfront premium costs associated with the building and testing of these homes.

- **Add-on builder rebates.** Builders can achieve additional rebates for installing qualifying appliances and pursuing an ENERGY STAR certification.
  - *ENERGY STAR-certified rebate.* Gas/electric combination homes that achieve 10% above energy code can receive an additional $100 certification rebate if (1) the HERS Rater confirms all certification requirements have been met, and (2) an ENERGY STAR label was posted on the home's electrical breaker box.
  - *Appliance rebates.* ENERGY STAR-rated clothes washers and heat pump water heaters are eligible for rebates in homes successfully participating in the product. Homes that receive natural gas-only service from Xcel Energy are not eligible for the lighting rebates.
- **HERS rater incentive.** HERS Raters receive an incentive for each eligible home they submit to the product.

To better understand this report's findings in future contexts, it is important to recognize modifications to the product design that Xcel Energy implemented in 2021:

- In 2021, Xcel Energy began proactively encouraging and supporting jurisdictions in adopting newer building energy codes.
- In 2021, envelope improvement rebates were offered in five categories depending on the local jurisdiction's adopted code and the Xcel Energy service type (e.g., a gas-only home, electric-only, or combination). Incentives were highest for electric-only homes in jurisdictions that have adopted 2012 IECC or higher, with envelope improvement rebates starting at $500 and reaching up to $6,700. Incentives were lowest for gas-only homes in jurisdictions that have adopted 2009 IECC or lower, starting at $200 and reaching up to $1,400.

1.2 Evaluation Overview

The evaluation team designed a comprehensive evaluation of the ENERGY STAR New Homes Product to provide information on five key research objectives:

1. Estimate product influence on builder decisions (net-to-gross ratio).
2. Assess builder and HERS rater experiences to understand what is working well, what the most important or valuable aspects of the product are, and identify what they would like to see included in the product.
3. Assess product awareness and identify builder barriers to participation in the product.
4. Identify opportunities to support smart connected homes and support jurisdictional energy-related goals, such as electrification.
5. Understand the impacts of jurisdictional goals (e.g., electrification) and updated energy codes on the product. This includes understanding the relationship with and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
6. Identify motivations and barriers of homeowners/end-users to purchasing an energy-efficient home.

Figure 1-1 presents an overview of the research topics and data sources used in this evaluation of the Colorado ENERGY STAR New Homes Product.

Figure 1-1. ENERGY STAR New Homes Product Evaluation Objectives

Primary Research Objectives	Staff Interviews (n=4)	Participating Builder Surveys (n=14)	Participating Builder Surveys – Small Volume (n=6)	Non-Participating Builder Interviews (n=8)	Homeowner Surveys (n=85)	Trade Partner (HERS Rater) Interviews (n=7)	Peer Utility Benchmarking Interviews (n=4)
Assess perceptions and awareness of energy-efficient technologies or awareness of the product	X	X	X	X	X	X	
Identify motivations and barriers to participation in product or purchase of energy-efficient homes	X	X	X	X	X	X	
Assess product experience and satisfaction		X	X		X	X	
Identify opportunities for smart home technologies or to support jurisdictional goals (e.g., electrification)		X	X	X	X	X	X
Estimate an overall NTG ratio including the major drivers of free ridership, spillover, and market effects		X		X		X	X

1.3 Report Organization

The following chapters organize the evaluation findings into two components: impact and process evaluation results. Further detail on the evaluation approach is presented in the following chapters.

- Chapter 2 reviews the approach and results of the net impact evaluation and the attribution of product impacts using a standard net-to-gross ratio (NTGR) analysis.
- Chapter 3 discusses the process evaluation components, including product awareness; motivations and barriers; product satisfaction and experiences; perceptions of electrification and high-performance building certifications; and homeowner experiences.
- Chapter 4 presents conclusions and recommendations.
- The appendices provide supporting documents, such as the evaluation plan, data collection instruments, and task-specific findings.

2 Impact Findings

A central component of this evaluation was the estimation of the net-to-gross ratio (NTGR) for the Xcel Energy ENERGY STAR® New Homes Product in Colorado. For demand-side management (DSM) products, the NTGR is a metric that estimates the influence of the product on the target market. It is used both as a benchmarking indicator of effectiveness and to adjust reported gross energy savings to account for energy efficiency that would occur in the absence of a product. NTGR results can indicate opportunities for Xcel Energy to adjust the design and implementation of its products to increase the cost-effectiveness of both individual products and the broader portfolio. The NTGR includes several factors that create differences between gross and net savings, such as free-ridership and spillover. In prior years, Xcel Energy relied on a NTGR value of 0.92 for envelope improvement and appliance rebates.

TRC estimated a retrospective NTGR based on data reported by builders and HERS raters. We then recommended prospective NTGRs based on potential changes to the product's design and market conditions. Note that a NTGR of 1.0 may not be achievable in all cases, as eliminating all free-ridership may not be feasible for a program operating at significant scale. In addition, a variety of factors affect the achievable level of free-ridership, including the maturity of the product, the maturity of the technologies it promotes, product intervention strategies, and cross-product coordination strategies. We have taken care to present our NTGR results with this context in mind.

This chapter presents:

- **Key Impact Findings –** The key findings section presents the recommended NTGR based on the evaluation team's synthesis of findings from market actors.
- **Net-to-Gross Approach –** The approach section presents an overview of the evaluation team's methods of calculating the recommended NTGR.
- **Retrospective Net-to-Gross Ratio Inputs –** This section presents qualitative and quantitative data that support the NTGR calculations.
- **Prospective Net-to-Gross Considerations –** This section presents findings the evaluation team considered when recommending its prospective NTGR.
- **Peer Utility Net-to-Gross Comparisons –** This section presents NTGR ratios across peer utilities included in this evaluation.

2.1 Key Impact Findings

This section presents a summary of the key findings from the impact evaluation for the CO ENERGY STAR New Homes Product, including retrospective and prospective NTGR recommendations. TRC has provided its estimated retrospective NTGRs based on the quantitative and qualitative results of builder and HERS rater research. We have recommended a prospective NTGR based on potential changes to the residential new construction market and product design.

2.1.1 Retrospective Net-to-Gross Ratio

TRC estimated a retrospective NTGR of 0.63 for the ENERGY STAR New Homes Product, based on participating builder, non-participating builder, and HERS rater responses. To estimate this NTGR, the evaluation team took the following steps:

- We first estimated an overall free-ridership ratio of 0.49 (unweighted average), based on participating builder surveys and follow-up interviews with builders to determine whether data obtained through the initial survey required adjustment. The high free-ridership ratio was driven by almost all participating builders (12 of 14) reporting it was somewhat or extremely likely that they would have built the new homes to the exact same efficiency level above code without the product.
- The evaluation team weighted these results to be representative of the population and adjusted to 0.42.
- As neither participating nor non-participating builders reported spillover, we estimated a 0.00 spillover adjustment factor.
- The evaluation team included a 0.05 adder for market effects, as HERS rater interviews indicated that the product has impacted HERS rater business practices, and has been incorporated into their marketing activities. HERS raters also underscored the influence of rebates on large-volume builders.
- To calculate the overall NTGR, the evaluation team subtracted the free-ridership ratio from 1.00, then added 0.05 for market effects. No spillover adjustment was included. This brings the NTGR to 0.63. Detailed methodology for the NTGR calculation can be found in Section 2.2.

2.1.2 Prospective Net-to-Gross Ratio

TRC recommends Xcel Energy adopt a prospective NTGR of 0.73, providing that Xcel Energy implements the recommendations in this report and no other significant changes to the product are made. These recommendations include:

- **Targeting non-participating builders.** The evaluation indicates that while ENERGY STAR certification influences participating builders' building practices, it is more likely to be a non-product factor. However, the market share for ENERGY STAR-certified homes in Colorado (11% in 2020)[3] and the estimated product penetration (approximately 20%) suggests that there is a significant portion of the market that the product is missing, for whom ENERGY STAR certification may not be a primary driver. Targeting non-participating builders to increase participation may reduce overall free-ridership.
- **Targeting large-volume builders.** HERS raters reported that the product was more influential among large-volume or production builders than small-volume or custom builders. Tailoring outreach and training toward this group, and incentivizing HERS raters by scaling their incentive with savings, may encourage participation among production builders at higher savings tiers and reduce free-ridership.

[3] https://www.energystar.gov/newhomes/energy_star_certified_new_homes_market_share

2.2 Net-to-Gross Approach

The evaluation team developed the NTGR for the Colorado ENERGY STAR New Homes Product using a self-report approach, based on participating builder survey results in combination with additional research data inputs. TRC built the methodology used in this evaluation from the Residential New Construction Protocol in the 2021 Illinois Statewide Technical Reference Manual for Energy Efficiency Version 9.0, in Attachment A of Volume 4: Residential and Low Income Sector Protocols (hereafter referred to as the "Illinois TRM").

The data inputs to the NTGR analysis included:

- **Participating builder surveys –** focused on builder-level effects, including free-ridership and participating builder spillover
- **Follow-up interviews with participating builders –** sought to clarify any conflicting information in the participating builder surveys
- **HERS rater interviews –** focused on determining overall market effects and whether HERS raters were influenced by Xcel Energy
- **Non-participating builder interviews –** focused on non-participating builder spillover and determined overall market effects
- **Known product changes in upcoming years –** implications for planned changes in product design, including a focus on code compliance improvement and adoption support

TRC contacted all 88 builders who participated in the ENERGY STAR New Homes Product between January 2018 and December 2020. Fourteen of these builders responded to the survey, a response rate of 16%, which enabled us to reach a 90% level of confidence with +/- 20% relative precision. The evaluation team also attempted to survey participating builders based on builder characteristics. We contacted both small-volume builders, defined as those who completed fewer than 20 homes per year through the ENERGY STAR New Homes product, and large-volume builders, those who completed 20 or more homes in any year. The number of surveys completed by builder size is shown in Table 2-1.

Table 2-1. Number of ENERGY STAR New Homes Participating Builder Survey Respondents by Size

Builder Size	Number of Completes
Small Volume	10
Large Volume	4
Total	14

The evaluation team used self-reported data from participating builders to develop an initial NTGR. We then used data from the additional sources listed above to construct a logical narrative of product attribution and finalize the prospective NTGR for the product.

The NTGR relies on three key components, a free-ridership score, a spillover score, and a market effects score. The following sections define each of these key components and then present how they are combined to estimate the NTGR.

2.2.1 Free-Ridership

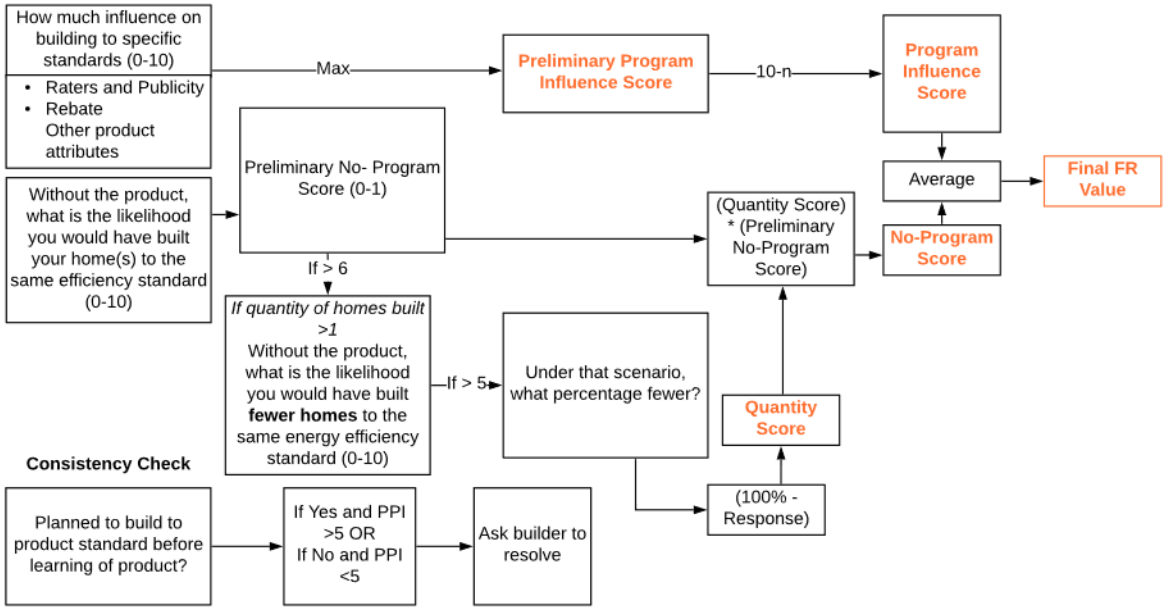
Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Free-ridership is assessed on a scale from 0 to 1, where 1 indicates that the product had 100% free-ridership and all product savings would have occurred without any of the product's rebates or assistance and 0 indicates that the product had 0% free-ridership and no product savings would have occurred without any of the product's rebates or assistance.

To determine free-ridership, the evaluation team started with the Residential New Construction Protocol from the Illinois TRM, and wrote specific questions to assess four free-ridership components:

- **A Program Components Score**, based on the participating builder's perception of the importance of various product components in their decision to build the energy-efficient home
- **A No-Program Score**, based on the participating builder's intention to build the home to the exact same energy-efficient standards, and in the exact same quantities, without the product funds
- **A Quantity Adjustment**, accounts for builders who built more efficient homes than they would have without the influence of the product

When scored, these components assess the likelihood of free-ridership on a scale of 0 to 10, with the two scores averaged and the quantity adjustment applied to create a final free-ridership score (Figure 2-1).

Figure 2-1. Free-Ridership Calculation Methodology



2.2.2 Spillover

Spillover is a measure of the amount of energy savings that occur due to the product that are not captured in the product's claimed energy savings. For the purposes of this evaluation, TRC estimated both participating and non-participating builder spillover.

To capture participating builder spillover, we asked participating builders for information about any additional efficient new homes built outside of the product (for which they did not receive a rebate). The surveys also probed for information on the importance of the ENERGY STAR New Homes Product when participants made installation decisions for non-rebated homes, specifically the likelihood that energy-efficient measures would have been installed in non-rebated homes if they had not participated in the product. The evaluation team computed savings estimates for all identified spillover homes and the product's participant spillover ratio was calculated by dividing the total spillover savings by the product's total energy savings.

To capture non-participating builder spillover, the evaluation team asked non-participating builders if the product, including participating builders' improved practices, influenced their own building practices and in what ways, specifically identifying building practices above that jurisdictions' energy code. Interviews also probed for the influence of Xcel Energy through trade group events or other interactions. The evaluation team computed savings estimates for all identified spillover homes and the product's non-participating builder spillover rating was calculated by dividing the total spillover savings by the product's total energy savings.

2.2.3 Market Effects

The final component to the NTGR was a market effects adder. The market effects adder estimated additional savings that could be attributed to the ENERGY STAR New Homes

Product due to prolonged changes in the market from the product's influence. To understand market effects, TRC asked HERS raters about the product's impact on the overall residential new construction market in the Colorado Xcel Energy territory.

2.2.4 Determination of Net-to-Gross Ratio

The evaluation team estimated the Colorado ENERGY STAR New Homes Product's initial NTGR using the formula in Equation 2-1 below:

Equation 2-1. Net-to-Gross Calculation Methodology

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

Finally, we utilized all the information collected about the product (through builder surveys and follow-up interviews, HERS rater interviews, 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, we recommended a final summative NTGR consistent with this narrative.

2.3 Retrospective Net-to-Gross Ratio Inputs

As described in the approach section, the recommended retrospective NTGR is based on three primary data inputs: free-ridership, spillover, and market effects. This section explores the results from each of these inputs in more detail, including qualitative data that support the results.

2.3.1 Free-Ridership Results

Free-ridership is a measure of the proportion of the product's claimed energy efficiency savings that would have occurred in the absence of the product. This section presents results related to the three metrics used to estimate the final free-ridership value of 0.42: the program components score, the no-program score, and the quantity adjustment.

Program Component Score

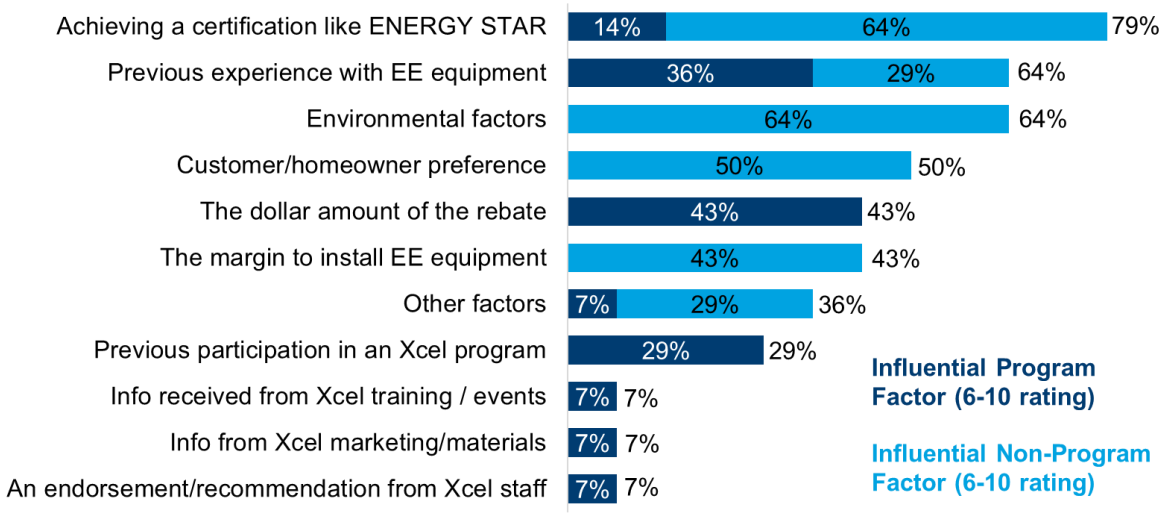
TRC estimated the unweighted Program Components Score for the ENERGY STAR New Homes product to be 0.31. To determine the Program Components Score, the evaluation team asked each participating builder to rate the influence of a variety of factors upon their decision to build the energy-efficient home. These factors each fall into one of three categories: automatic program factors, non-program factors, or non-automatic program factors.

- **Automatic program factors:** These are factors that can be attributed to Xcel Energy and/or the product's activities in all cases, including (1) previous participation in an Xcel Energy program, (2) the dollar amount of the rebate, (3) information from Xcel Energy marketing or information materials, (4) information received from any training or events conducted by Xcel Energy, and (5) an endorsement or recommendation by Xcel Energy staff.

- **Automatic non-program factors:** These are factors that may influence a builder's decision to build an energy-efficient home, but that are not related to the product. The evaluation team asked participating builders to rate the following non-program factors: (1) environmental factors like reduced carbon emissions, (2) customer preference or request, and (3) the margin to install energy-efficient equipment or materials.
- **Non-automatic program factors:** These are factors that, depending on the specific situation, may be classified either as a program factor or as a non-program factor. Follow-up questions during the survey determined whether these factors were program factors or non-program factors. If survey respondents reported Xcel Energy played a role in these non-automatic program factors, the factor was included as a program factor for that participating builder. If Xcel Energy did not play a role in these factors, the factor was included as a non-program factor. Non-automatic program factors included (1) achieving an energy efficiency certification like ENERGY STAR and (2) previous experience with energy-efficient equipment or materials.

Each factor is shown in Figure 2-2 with program factors shown in blue and non-program factors shown in orange. Non-automatic program factors shown in two colors, where each color denotes the percentage of respondents attributing a given factor to either the product or not to the product. As shown in Figure 2-2, participating builder respondents rated the following factors as being most important to their decision to build the energy-efficient home: achieving a certification like ENERGY STAR, previous experience with energy-efficient equipment or materials, environmental factors, and customer preference or request.

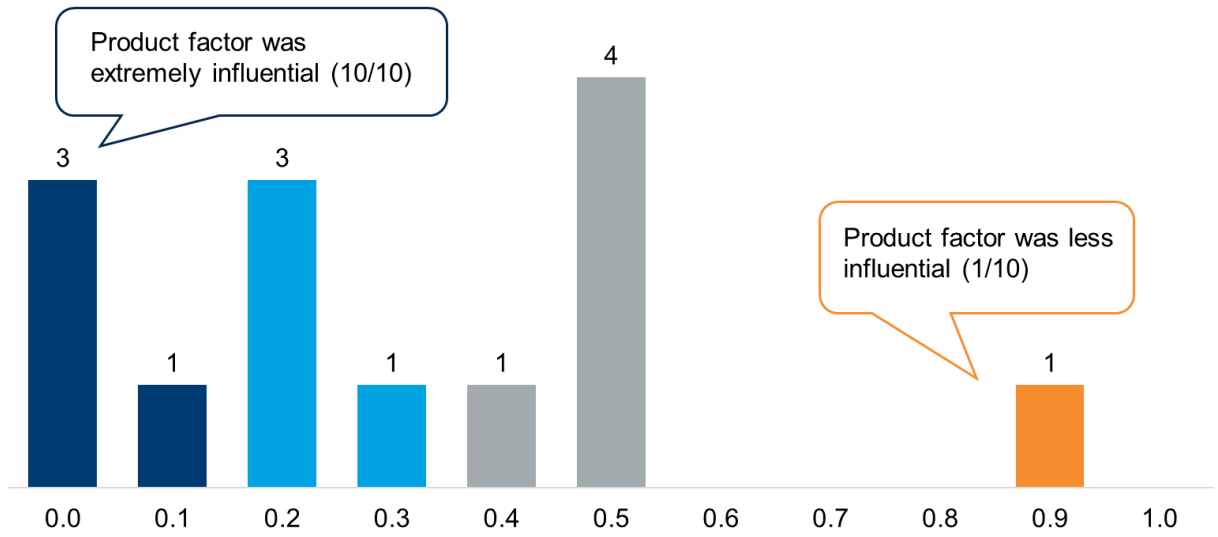
Figure 2-2. Factors to Build the Energy-Efficient Home Rated as Highly Influential by Participating Builders



To determine the Program Components Score, the evaluation team took the top-rated program factor, shown above in Figure 2-2, and reversed the scale, so a "10" was now a "0," and adjusted the score to fall between "0" and "1." We did this in order to have matching scales with the Non-Program Score, so we could calculate Free-Ridership. A Program Components Score closer to 0 would indicate a high level of product influence. Distribution details for this score can

be seen below in Figure 2-3, where the number of participating builders (y-axis) are categorized by their Program Components Score rounded to the nearest tenth (x-axis). Only one builder, shown on the right in Figure 2-3, was considered a free-rider based on the Program Components Score. Three builders were considered “0%” free-riders.

Figure 2-3. Program Components Score Distribution



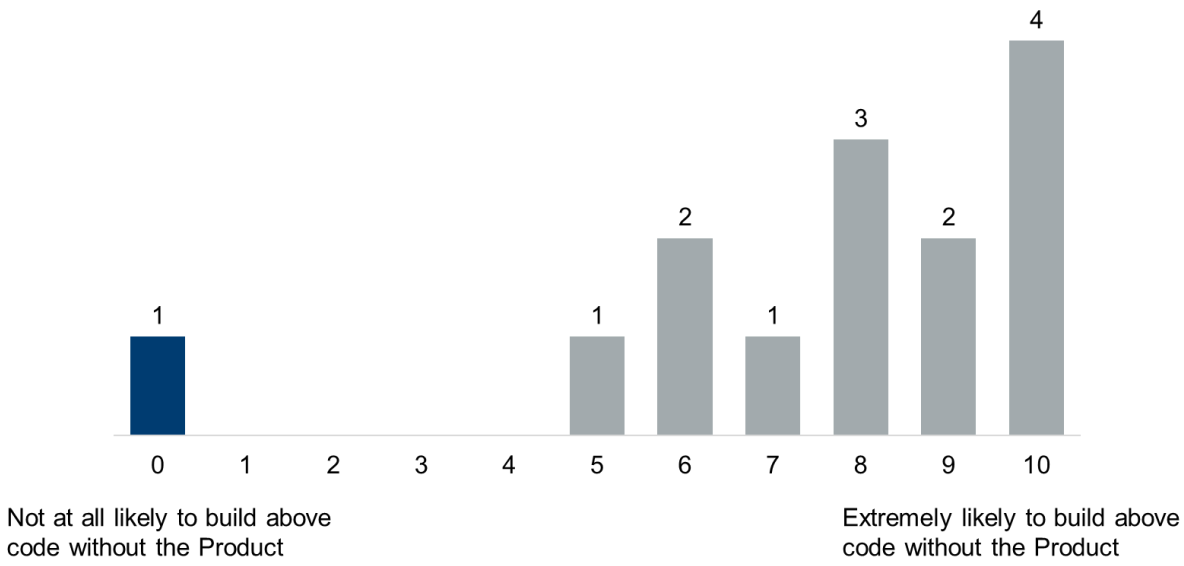
The evaluation team averaged all of the Program Component Scores to create an overall unweighted 2020 ENERGY STAR New Homes Program Score of 0.31. Since the Program Component Score does not take into account what would have happened in the absence of the product, it typically underestimates free-ridership and is balanced by the No-Program Score. The evaluation team averaged the Program Score and the No-Program Score together to estimate an initial Free-Ridership Score for each participating builder respondent. The No-Program Score is described in the next section.

No-Program Score

The No-Program Score is a measure of the participating builder’s intention to build the home to the same energy-efficient standards, and in the same quantities, without product funds. In contrast to the Program Components Score, which asks how influential the product was on a builder’s decision to build the energy-efficient home, the No-Program Score asks whether that decision would have been different absent the product.

When asked what the likelihood was that they would have built the new home to the exact same efficiency level above code without the incentive, information, and support from the Xcel Energy ENERGY STAR New Homes Product, most builders reported they would have built the new home to the same standard without the product. Figure 2-4 below shows the distribution of these scores on a scale of 0 to 10, where 0 is not at all likely and 10 is extremely likely.

Figure 2-4. No-Program Score Distribution



The average No-Program Score was 7.6 out of 10. This finding somewhat contradicts the Program Components Score, where only one participating builder was considered a free-rider. However, taken together, these two components suggest that, while the product (and its rebates) influences builder decision-making, it is one of many influencing factors in the complex decision-making process of designing and building a new home. The No-Program Score suggests that without the product, builders would still be influenced to build to a standard above code to some extent by non-product factors. Builders cited several motivating factors to building to a standard above code, noting that municipal or developer requirements, or performance-based codes that require the use of a HERS rater often drive their building practices (n=3). Builders also cited the non-energy benefits of an energy-efficient home for their customers (n=6) and the marketing advantage of ENERGY STAR (n=3) as factors motivating energy-efficient design practices.

These findings agree with findings from the HERS rater interviews. The majority of interviewed HERS raters (5 of 7) think rebates motivate builders to participate in the product. However, HERS raters also reported rebates are often secondary to other factors including ENERGY STAR brand recognition (4 of 7), code requirements (2 of 7), and homeowner comfort (2 of 7). These competing motivations are exemplified in the two quotes below.

> *"[The product] has an influence; the rebates are important, but again [the influence is] most of the time bare minimum code and what's the least I can get by and trying to get them to the next tier…[the rebate] gives you a little bit more bang for your buck when you're recommending stuff."*

> *"I won't say that it [the rebate] wasn't important, but it was secondary."*

Additionally, qualitative evidence suggests that ENERGY STAR certification is an influential factor in participating builders' decisions to build energy-efficient homes. HERS raters discussed using ENERGY STAR as a marketing tool (4 of 7) and rating ENERGY STAR-certified homes without product participation (2 of 7), as shown in the following two quotes.

> *"ENERGY STAR design is great, and it's wonderful to have. Builders learn about how to build an ENERGY STAR home and get that certification and get that branding out there and get more people excited about energy-efficient homes, but we're sort of already doing that, on our own."*

> *"The marketing heft that EPA DOE has put into ENERGY STAR… it does well, [ENERGY STAR has] 78% market recognition."*

Quantity Adjustments

The quantity adjustment accounts for builders who built a larger number of efficient homes than they would have without the influence of the product. However, no builders reported that they would have built fewer efficient homes without the influence of the product. Therefore, the evaluation team did not make any quantity adjustments to the free-ridership score.

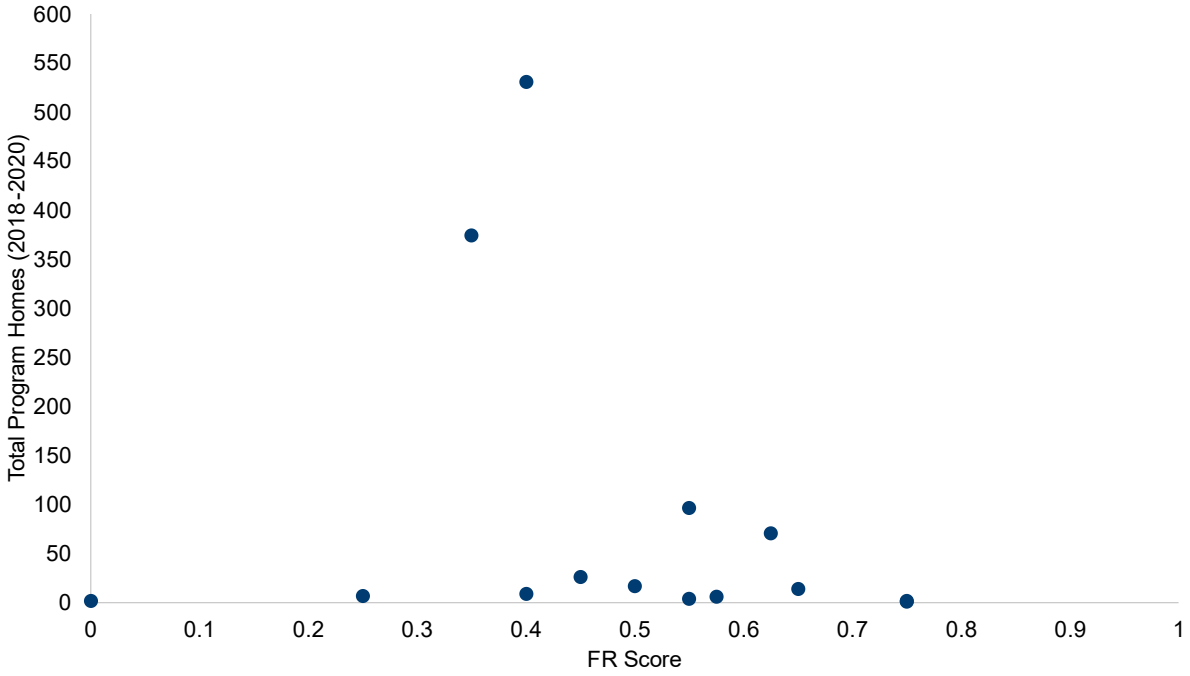
Free-Ridership Adjustments Due to Consistency Checks

Prior to finalizing the free-ridership score, the evaluation team reviewed respondents' open-ended responses to various survey questions to confirm that their free-ridership scores matched the experiences included in the open-ended responses. The evaluation team conducted follow-up interviews or reviewed telephone survey recordings for five builders because their open-ended responses did not correlate with their given free-ridership scores. This resulted in three adjustments to free-ridership scores; one score was adjusted from 0.80 to 0.45, one from 0.65 to 0.58, and one from 0.75 to 0.63. Overall, these adjustments had minimal effect on the final NTGR.

Final Free-Ridership Score

Finally, TRC averaged the Program Components Score and the adjusted No-Program Score and applied sampling weights to estimate free-ridership. We weighted each score by the total number of homes completed during the participation period (2018 – 2020) so that the score is more representative of population-level savings (i.e., builders who built more homes are weighted more heavily, as they have more influence on the total product savings). The final adjusted and weighted free-ridership score is 0.42. As discussed previously, major drivers of free-ridership include customer preference or request, environmental factors, and jurisdictional or code requirements. Figure 2-5 below shows final free-ridership scores and the total homes completed for each respondent.

Figure 2-5. Final Participating Builder Free-Ridership Scores



2.3.2 Spillover Results

Spillover is a measure of the amount of energy savings that occur due to the product that are not captured in the product's claimed energy savings. Two spillover metrics were estimated for this evaluation: participating builder spillover and non-participating builder spillover.

To be eligible for participating builder spillover, builders must have:

1. Built additional efficient new homes after participating in the product;
2. Not received rebates for these homes (and may not be in the process of applying for rebates); and
3. Been influenced to install this equipment by the ENERGY STAR New Homes Product.

To be eligible for non-participating builder spillover, builders must have been influenced to improve building practices by other participating builders or by Xcel Energy; to be eligible for non-participating builder spillover, builders must identify building practices above the local energy codes in the jurisdictions in which they operate.

The evaluation team found no evidence of participating or non-participating builder spillover. No participating builder respondents built additional efficient new homes after participating in the product without receiving a rebate. No non-participating builder interviewees referenced improved building practices due to the influence of participating builders or Xcel Energy activities.

2.3.3 Market Effects

In addition to free-ridership and spillover, the evaluation team applied a 0.05 adder for market effects, due to the influence of the Xcel Energy ENERGY STAR New Homes Product on the Colorado market. While this adder is not always relevant in impact evaluations, it is appropriate in cases where the product has had significant impact on the marketplace.

The two most active HERS raters, who collectively rate approximately 5,500 homes per year in Colorado, have participated in the ENERGY STAR New Homes product since product inception. These two HERS raters noted that the product has influenced their business practices, that they are more likely to recommend energy efficiency measures due to product participation, and they incorporate the product into their regular kick-off and marketing activities. Additionally, these HERS raters underscored the influence of product rebates on the production builders that they primarily work with. These reflections are highlighted in the following two quotes.

> *"Had there not been the Xcel Energy program and the rebate money standing behind [our] suggestions, I think builders would have been less likely to make impactful changes to the construction of the home."*

> *"You know, we recommend [energy efficiency measures] at all times, just because we're in the program I would say."*

HERS raters also described how newer, performance-based codes drive builder interest in, and need for, a HERS rating. Given this, it is plausible that the product is enabling greater increases in energy code performance due to increased familiarity with higher performance building practices that are encouraged through the product. The potential increases in energy code performance enabled by the above code portion of this product could help to reinforce the work that Xcel Energy began in 2021, proactively encouraging and supporting jurisdictions in adopting newer building energy codes, further enabling increases in energy code performance. The below two quotes describe how newer codes drive builder interest in HERS rating.

> *"[Since] this mandated code came out people are just coming to us, purely because we're HERS raters that are located in the county."*

> *"[Builders] usually seek us out when they have to…someone says to them from a building department, you know you need a HERS rating or you need a blower door test and that's when they seek us out."*

These findings suggest that the product has had a significant impact on the Colorado market; therefore, the evaluation team included a 0.05 adder for market effects. The 0.05 adder accounts for the influence product rebates have had on the market, as referenced by HERS raters, that may not have been reflected in the free-ridership and spillover portions of this analysis, as well as the plausible increases in energy code performance enabled by product activities.

2.3.4 Retrospective Net-to-Gross Ratio

Overall, TRC found that the product moderately impacted participating builder decisions; while the product was influential, non-product factors played a significant role in participating builder decision making as well. Using the net-to-gross formula, we determined a NTGR of 0.63. The generalized formula we used to determine the NTGR is shown in Equation 2-2 below.

Equation 2-2. Generalized Net-to-Gross Ratio

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

Using this formula, the NTGR is shown in Equation 2-3. The free-ridership ratio of 0.42 indicates that the product is influencing some of the decisions to build energy-efficient homes but not all. Most builders reported they would have built new homes to the same standard without the product, but they also found product factors to be influential. Only one builder was considered a free-rider based on the program components score alone. These findings suggest that the product is one of many complex and interdependent factors builders consider when designing and building a new home, though is often secondary. The evaluation team found no evidence of participant or nonparticipant spillover. The evaluation team also added a 0.05 adder for market effects to account for the impact the product has had on the residential new construction market over time.

Equation 2-3. ENERGY STAR New Homes Net-to-Gross Ratio

$$NTGR = 1 - 0.42 + 0.00 + 0.05 = 0.63$$

2.4 Prospective Net-to-Gross Considerations

TRC also examined market conditions and expected product changes to recommend a prospective NTGR. Our findings indicate there are key areas where product changes could decrease free-ridership and increase the NTGR. Accordingly, we recommend an estimated NTGR of 0.73, providing that Xcel Energy implements the recommendations in this report. If more significant changes are made to the product, this prospective NTGR may not be appropriate.

To explore prospective NTGR considerations, the evaluation team looked at the following factors: ENERGY STAR market share, construction starts in Xcel Energy service territory, and code compliance and adoption support. This section presents findings related to each of these factors, followed by a comparison of NTGR of peer utility programs.

2.4.1 ENERGY STAR Market Share

Although participating builders and HERS raters highlighted the importance of ENERGY STAR certification, the market share for ENERGY STAR certified homes is just 11% in Colorado, representing just 2,828 homes in 2020.[4] Additionally, the product team estimates that roughly

[4] https://www.energystar.gov/newhomes/energy_star_certified_new_homes_market_share

20% of new homes within Xcel Energy territory go through the ENERGY STAR New Homes Product. These findings suggest that there are a large number of non-participating builders for whom ENERGY STAR certification may not be an important decision-making factor. If the product were to engage these builders, Xcel Energy may exert more influence on these builders through the knowledge about energy-efficient building practices the product can provide and assistance in achieving and marketing ENERGY STAR certification.[5] This increased influence would result in lower free-ridership scores.

2.4.2 Construction Starts in Xcel Energy Colorado Service Territory

TRC looked at construction volume and code levels to understand where Xcel Energy could influence the Colorado construction market. In 2019, the majority of new construction in the Xcel Energy Colorado service territory occurred in either the metro Denver or metro Fort Collins areas; these regions contain nine of the ten counties in Xcel Energy territory with the largest construction volume. All of the counties in those two areas are either on or considering moving to a newer energy code as shown in Table 2-2 below.

Table 2-2. Construction Volume in Xcel Energy Colorado Service Territory[a]

County	Current Energy Code	Single-Family Construction Starts (2019)	Percent of Total Single-Family Construction Starts	Region
Broomfield County	2018 IECC	545	3%	Metro Denver
Mesa County	2009 IECC	651	4%	Western CO
Boulder County	2018 IECC	667	4%	Metro Denver
Jefferson County	2018 IECC	776	4%	Metro Denver
Arapahoe County	2009 IECC[b]	1,176	7%	Metro Denver
Larimer County	2018 IECC	1,279	7%	Northern CO
Adams County	2018 IECC	2,257	13%	Metro Denver
Denver County	2018 IECC	2,299	13%	Metro Denver
Douglas County	2018 IECC	2,709	15%	Metro Denver
Weld County	2018 IECC	3,194	18%	Northern CO
Total	**-**	**15,553**	**87%**	**-**

[a] Xcel Energy Codes Research Phase 2 – Final Results. EMI Consulting, September 15th, 2020.

[5] Additional research may be needed with nonparticipating builders to confirm this potential product influence, understand nonparticipating builder needs, and how Xcel Energy could best service this group.

[b] Arapahoe County is currently considering moving to 2018 IECC

However, 4% of single-family construction volume in 2019 occurred in Mesa County, which includes Grand Junction. Mesa County is the only county in the top ten for construction volume that is still on an energy code prior to 2015 IECC. As mentioned previously, participating builders and HERS raters cited updated energy codes as a factor that motivates above code performance. Further, HERS raters who primarily work in Western CO discussed recruiting builders as a key challenge to participating in the product, as shown in the below quote.

> *"Finding new builders in this area [Grand Junction], specifically, is difficult because they don't care...so you know you're asking how do we get new builders, well, we really don't honestly, for the most part."*

The evaluation team recognizes that Mesa County makes up a relatively small percentage of the total construction volume in Xcel Energy territory; however, given the energy code and HERS rater difficulty identifying interested builders, we expect that Xcel Energy could have a greater influence on these builders if some outreach and training efforts were focused on this area.[6] Additionally, the large number of construction starts in front range urban corridor communities (14,902 single family homes in 2019) compared to total product participation (2,397 electric and 4,398 gas participants in 2020) suggests that there is an opportunity to increase product participation within front range communities as well.

2.4.3 Code Compliance & Adoption Support

As discussed previously, the product unveiled a new enhancement in 2021 focused on encouraging and supporting jurisdictions in adopting updated energy codes, which includes helping jurisdictions to improve code compliance. This work includes code compliance and adoption support activities such as a comprehensive training program and Circuit Rider[7] positions. Both activities could be used to increase participation from non-participating builders and current participating builders at higher savings tiers in a synergistic way. For example, Circuit Riders could identify code compliant builders who are ready for engagement from the above code portion of the product. Additionally, the training program could include above code trainings, such as trainings on specific above code technologies, in addition to trainings intended to improve code compliance.

These trainings could help to recruit non-participating builders while improving their building practices, which would help to dilute free-ridership. These activities could help decrease free-ridership among current participating builders as well. The current product design relies in part on educational trainings to market the product and improve builder performance. However, Xcel

[6] Additional research focused on these nonparticipating builders could help to identify barriers specific to these builders, and identify strategies Xcel Energy could use to help these builders build to a standard about local energy code.
[7] A circuit rider is a technical consultant that provides guidance and support to jurisdictions, design professionals, and building associations

Energy provided just one joint-training session in 2020 for the Colorado and Minnesota participating builders on Indoor airPLUS, put on by the vendor for Minnesota. This suggests that there is ample opportunity to improve the education of participating builders and increase product influence among this group.

2.4.4 Recommended Prospective Net-to-Gross Ratio

TRC recommends an estimated NTGR of 0.73, providing that Xcel Energy implements the recommendations in this report and no other significant changes to the product are made. The reduction in free-ridership needed to achieve this NTGR could be achieved through increasing participation among current nonparticipating builders, focusing on builders who are non-ENERGY STAR builders, outside of the front range in jurisdictions with newer energy codes, or both. The evaluation team believes these builders would have a lower free-ridership score given the drivers of free-ridership identified through this evaluation. Evaluation findings suggest that Xcel Energy influence has the potential to be higher among these groups. In order to dilute free-ridership through adding non-participating builders alone, the product would need to add approximately 3,400 new homes with an average free-ridership score of 0.10. Though this increase in participation is ambitious, this estimation is intended to demonstrate that a reduction in free-ridership due to dilution is reasonable, as peer utilities see participation at these levels, as shown in **Error! Reference source not found.** below. The estimation assumes that product changes would have no effect on the free-ridership scores of currently participating builders. However, we believe that the recommendations in this report *would* also reduce free-ridership among currently participating builders and encourage participation at higher savings tiers. The combination of increased participation among non-participating builders with lower free-ridership and the reduction in free-ridership among participating builders would, together, ensure the prospective NTGR is attainable.

The evaluation team has also included recommendations that represent more substantial changes to product design. These recommendations are discussed further in Section 4. However, we have not developed a prospective NTGR associated with implementing these recommendations, given that the fundamental changes to product design that these recommendations represent. If Xcel Energy pursues these more fundamental changes, we recommend conducting follow-up NTGR research to understand the influence of the new product design on the market.

2.5 Peer Utility Net-to-Gross Comparisons

The evaluation team found that both the recommended retrospective and prospective NTGR were lower than the NTGR used by peer utilities. It should be noted, however, that the states in which three of these utilities operate have adopted a newer energy code since their programs were last evaluated, as shown in Table 2-3. This evaluation found that meeting performance-based energy codes drove up free-ridership. Because of this, NTGR for these utilities may decrease following future evaluations. For example, Utility C has proposed a significantly lower NTGR for their current residential new construction offering for 2022, as shown in **Error! Reference source not found.**. Additionally, as **Error! Reference source not found.** shows, many reviewed utilities have a slightly different program design compared to the Xcel Energy

Colorado ENERGY STAR New Homes Product. Five of seven peer utilities offer a prescriptive only component to their residential new construction programs. Additionally, all four interviewed peer utilities offer one-on-one training and guidance to either all builders or at least their most active builders.

Table 2-3. Peer Utility Net-to-Gross Ratios

Peer Utilities	A[c]	B	C[b]	D[c]	E	F	G
Program Overall	1.05	1.00[A]	.96 *.38 (electric), .48 (gas) proposed for 2022*	1.00[A]	.91	.80	.90 (electric)
Year updated	2018	N/A	2018	N/A	2018	2019	Unknown (2020 planned)
Current Energy Code	2015 IECC	Home rule state	2018 IECC as of 2020	2018 IECC as of 2021	2018 IECC as of 2021	2018 IECC as of 2021	Home rule state
Program Design	Performance, based on stretch code	Performance or prescriptive	Performance	Performance, all-electric & heat pump required	Performance or prescriptive (HVAC only)	Performance or prescriptive	Performance or prescriptive
ENERGY STAR Certification Incentive		X			X		
Participation	6,453	8,500	8,185	248	5,211	850	17 (electric)
Training / Outreach	• Quarterly 1:1 with top 25 builders • Initial plan review meeting	• Building science training, realtor training • Site visits, builder 1:1	• Hands on desktop, and ad hoc trainings		• Builder 1:1 • Training at HBA events • Active HBA participation		

[a] Stipulated NTGR for all DSM programs and measures
[b] Developing an offering that incorporates Passive House and electrification elements
[c] Moved away from ENERGY STAR certification in recent years

Utility A and Utility C have either made or are considering changes to their program designs to align with stretch codes or high-performance building certification. Utility A found that their previous, percentage above code, tiered approach wasn't significantly influencing builders or HERS raters. This peer utility interviewee noted that once builders achieved the highest tier, they felt there was no point in pursuing additional above code energy savings. Since aligning with the stretch code, which they had a hand in creating, this utility has seen higher above code performance from participating builders. Utility A uses the statewide energy code as the baseline for savings estimation; the stretch code is approximately 15-20% above the statewide energy code. Utility C has received feedback from builders that their current pay for savings structure is opaque and that additional assistance is needed on electrification. This utility has found that a Passive House offering has helped to overcome these barriers for high-rise multifamily builders. They are currently in the process of developing a similar offering for single-family and low-rise multifamily new construction that would include components of Passive House, require some level of electrification, include specific air infiltration requirements, and include HERS score requirements.

3 Process Findings

TRC conducted a process evaluation to determine how Xcel Energy can optimize the design and delivery of the Colorado ENERGY STAR New Homes Product to builders and homeowners. Specific research objectives of the process evaluation are listed in the bullets below:

- Assess builder and HERS rater experiences to understand what is working well, what the most important or valuable aspects of the product are, and identify what they would like to see included in the product.
- Assess product awareness and identify builder barriers to participation in the product.
- Identify opportunities to support smart connected homes and support jurisdictional energy-related goals, such as electrification.
- Understand the impacts of jurisdictional goals (e.g., electrification) and updated energy codes on the product. This includes understanding the relationship with and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify motivations and barriers of homeowners/end-users to purchasing an energy-efficient home.

To accomplish these objectives, the evaluation team elicited feedback from product staff, participating builders, lapsed small volume builders, non-participating builders, homeowners, HERS raters in the Xcel Energy Colorado territory, and peer utilities. 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 evaluation objective. Within the sub-section for each objective, the evaluation team included data from all relevant data collection efforts. The synthesis of findings places an emphasis on helping Xcel Energy to interpret research findings and identify actionable opportunities for improving product operations. These findings, along with findings from the impact evaluation, inform the conclusions and recommendations presented in the final chapter.

3.1 Key Findings

TRC found that, overall, market actors were satisfied with current product operations. Participating builders and HERS raters both noted that the product was easy to participate in and that they were happy with their experiences. Additional key findings from the process evaluation research included:

- **Product Experience:** Participating builders and HERS raters were largely satisfied with the product; no current participating builders or HERS raters were dissatisfied with the product. About one-third of participating builders provided suggestions for product improvement that fell into three categories: communication, rebates, and timeliness.
- **Awareness & Barriers to Participation:** Participating builders primarily learned about the product through interactions with HERS raters. Non-participating builders were largely aware of the product. Participating builders primarily cited cost-related barriers to

participation, which were identified by HERS raters as well. Non-participating builders cited cost concerns as a barrier as well, though they framed the concern as a lack of *homeowner* interest due to budgetary constraints.

- **Electrification & High-Performance Building Certifications:** Overall, builders have a neutral opinion of electrification, while HERS raters have a more positive view. However, both groups discussed concerns with technological limitations and electrification in cold climates. HERS raters also had positive perceptions of high-performance building certifications.
- **Homeowner Experience:** Non-energy benefits including comfort and indoor air quality were the most important factors to homeowners in their decision to purchase an energy-efficient home. Additionally, homeowners were satisfied with these non-energy benefits on average, as well as with the energy efficiency of their home.

In Section 3.2, we describe the overall approach used for the process evaluation research activities and, beginning in Section 3.3, we provide detailed results from all of these activities.

3.2 Approach

To accomplish the objectives for the ENERGY STAR New Homes Product evaluation, TRC completed a suite of intersecting and complementary research activities in 2021. Detailed information on the sampling approach used for the research can be accessed in the evaluation plan, found in Appendix A. The following sections highlights the research topics contributed by each research activity: staff interviews, participating builder surveys, lapsed small-volume builder surveys, non-participating builder interviews, HERS rater interviews, homeowner surveys, and peer utility interviews.

3.2.1 Staff Interviews

The evaluation team conducted four telephone interviews with three Xcel Energy staff members and one implementer staff member managing and implementing the Colorado ENERGY STAR New Homes Product, including:

- The Xcel Energy Product Lead
- One Energy Efficiency Engineering Team member, selected by the Xcel Energy Product Manager
- The Strategic Segment Team Lead
- The Vice President of Program Management for the implementation team

The staff interviews covered the following topics:

- Description of the product's process and goals
- Staff perceptions of the product's challenges and successes
- Product staff evaluation priorities

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

3.2.2 Participating Builder Surveys

The evaluation team conducted telephone surveys with participating builders using builder contact information obtained from the product implementer. The evaluation plan used for this project can be found in Appendix A. We surveyed 14 respondents, which provided a 90% level of confidence with a minimum of +/- 20% relative precision for questions where all those surveyed provided a response.

For the purposes of this evaluation, we defined a participating builder as any builder that closed a Colorado ENERGY STAR New Homes project between January 2018 and December 2020. The evaluation team designed the participating builder survey to address the following topics:

- **Product Awareness & Perceptions of Electrification:** We assessed how builders became aware of the ENERGY STAR New Homes Product to better understand how participating builders learned about the product. The survey asked builders about their familiarity with and opinion of electrification to better understand opportunities and barriers to supporting jurisdictions' electrification goals.
- **Product Experience & Satisfaction:** We discussed participating builders' experiences satisfaction with various aspects of the product and interactions with their HERS raters. Additionally, we asked builders if there were other electrification technologies and practices, smart connected technologies, or prescriptive opportunities that were of interest to builders.
- **Motivations & Barriers:** We asked participating builder respondents about the challenges of building to a standard above their local energy code. We also asked about when in the design and construction process they make decisions about energy efficiency and what motivates them to include energy efficiency in their designs.
- **Participating Builder Firmographics:** To better understand which housing markets the product serves, we also asked participating builders about the homes their organizations typically build, including typical selling price and housing markets served.

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

3.2.3 Lapsed Small-Volume Builder Surveys

The evaluation team also conducted six telephone surveys with lapsed small-volume builders using builder contact information obtained from the product implementer. We contacted the entire population of 57 lapsed small-volume builders, with a response rate of 11%. The evaluation plan used for this project can be found in Appendix A.

For the purposes of this evaluation, we defined a lapsed small-volume builder as any builder that closed fewer than 20 Colorado ENERGY STAR New Homes projects each year since 2013 but did not participate between January 2018 and December 2020 (i.e., lapsed participants); small-volume builders who participated between January 2018 and December 2020 were included in the participating builder sample. The evaluation team designed the lapsed small-volume builder survey to address the same process objectives addressed by the participating builder survey (outlined above). Because lapsed small-volume builders were not asked impact

evaluation questions, we were able to address additional process topics with these respondents. The lapsed small-volume builder survey addressed two additional topics:

- **Homeowner Interactions:** We asked lapsed small-volume builders how they interact with homeowners, including what trainings are provided to homeowners, and what opportunities they see to improve interactions that would increase energy savings.
- **High-Performance Building Certifications:** We asked lapsed small-volume builders whether their organizations have pursued any high-performance building certifications. For those whose organizations have pursued these certifications, we asked what motivated them to do so and what challenges they encountered.

Appendix B.3 contains the survey instrument used for the lapse small-volume builder survey, and Appendix C.3 provides results related specifically to this research activity.

3.2.4 Non-Participating Builder Interviews

The evaluation team conducted eight in-depth interviews with non-participating builders. We identified non-participating builders through contact information obtained from the product implementer (a total of 193 builders) and secondary research, including Colorado Home Builder Association directories. The evaluation plan used for this project can be found in Appendix A.

For the purposes of this evaluation, the evaluation team defined a non-participating builder as either those who have not participated in the product since 2013 (i.e., true non-participating builders) or those who have closed more than 20 Colorado ENERGY STAR New Homes projects in any year since 2013 but did not participate between January 2018 and December 2020 (i.e., lapsed participating large-volume builders). The evaluation team designed the non-participating builder interviews to address the following topics:

- **Product Awareness & Barriers to Participation:** To better understand awareness of the product among non-participating builders, we assessed how familiar builders were with the ENERGY STAR New Homes Product, including the performance and prescriptive rebates offered through the product. We also asked builders about their familiarity with local energy code requirements and organizational above code targets to gauge potential builder readiness for product participation.
- **Motivations & Barriers to Energy-Efficient Home Construction:** The evaluation team asked non-participating builders what drives their decision-making related to energy efficiency, including what energy-efficient and smart home technologies are typically included in homes their organization builds. We also asked builders what challenges impact their ability to pursue energy-efficient designs and what could help them overcome those barriers.
- **Perceptions of Electrification & High-Performance Building Certifications:** The evaluation team asked builders about their familiarity with and opinion of electrification and high-performance building certifications to better understand opportunities and barriers to supporting jurisdictions' goals.

Appendix B.4 contains the interview guide used for the non-participating builder interviews, and Appendix C.4 provides results related specifically to this research activity.

3.2.5 HERS Rater Interviews

In addition to the builder data collection efforts, TRC conducted seven in-depth interviews with HERS raters. As just 15 HERS raters have participated in the product in recent years, the completed interviews represent a response rate of 47%. The HERS rater research addressed the following process topics:

- **Awareness/Motivations:** We asked HERS raters how they became aware of the product and what their motivations were to recommend projects to the ENERGY STAR New Homes Product. We also asked HERS raters how they identify prospective builders and how early in the design and construction processes they engage builders.
- **Builder Decision-Making & Barriers:** We assessed HERS rater feedback on builder awareness, motivations, and barriers to product participation. Our assessment provides insight into broader market experiences to help supplement findings from the participating builder surveys, lapsed small-volume builder surveys, and non-participating builder interviews.
- **Product Experience/Satisfaction:** We discussed HERS raters' product experiences and their satisfaction with the product, including their interactions with product staff (whether it be with Xcel Energy and/or the implementer), recruiting builders, and completing and submitting product documentation.

Appendix B.5 presents the interview guide used for the HERS rater research, and Appendix C.5 provides results related specifically to this research activity.

3.2.6 Participating Homeowner Surveys

TRC also conducted 85 web surveys with participating homeowners. For the purposes of this evaluation, we defined a participating homeowner as any customer who owns a home that qualifies for the Colorado ENERGY STAR New Homes Product and for which the builder was rebated between January 2019 and March 2021. The homeowner research addressed the following topics:

- **Product Awareness & Purchasing Decisions:** The evaluation team asked homeowners about the importance of various factors in their decision to purchase their energy-efficient home, including the importance of the ENERGY STAR New Homes Product.
- **Builder Interactions:** The evaluation team asked homeowners about the type of interactions that they had with their home builder, including what trainings about energy-efficient equipment were offered, if any. We also asked homeowners about the energy efficiency education they would have liked to receive if they didn't receive any.
- **Experience & Satisfaction:** We assessed homeowners' experiences with purchasing and living in their energy-efficient home, as well as how satisfied they were with their ENERGY STAR New Home product experience. This included asking about home energy costs, comfort, and the quality of construction. We also assessed homeowner fuel type preferences for space and water heating, and homeowner familiarity with smart home technologies.

Appendix B.6 presents the survey instrument used for the homeowner survey research, and Appendix C.6 provides results related specifically to this research activity.

3.2.7 Peer Utility Benchmarking Interviews

Last, the evaluation team interviewed peer utilities. The objective of the peer utility benchmarking task was to understand how peer utilities approached key issues related to implementing residential new construction programs. We collaborated with the Xcel Energy product manager to identify seven peer utilities to include in our sample; of these, we spoke to four. We considered the following criteria when selecting peer utilities: similar program designs, programs known to have best practices or tools Xcel Energy is interested in pursuing, utilities that operate in similar territories (including the geography, the number of customers, and/or the annual new construction starts in its territory).

The evaluation team recruited staff in key management roles related to residential new construction programs at peer utilities. Interviews with these staff focused on the same discussion topics explored in the interviews with builders and HERS raters, but emphasized the following research objectives specific to peer benchmarking interviews:

- **Energy code advancement:** How do peer utilities account for energy code updates and rising baselines within their program design?
- **Housing markets:** How do peer utilities assist builders in constructing affordable energy-efficient homes for moderate- and low-income customers in their service territories?
- **Electrification & integrated homes:** How do peer utility programs support jurisdictional goals related to electrification and integrated homes?

Appendix B.7 presents the interview guide used for the peer utility research, and Appendix C.7 provides results related specifically to this research activity. The evaluation team also included the peer utilities reviewed for the 2019 Minnesota Efficient New Home Construction Product in this analysis; these findings have been incorporated in the results for this research activity.

3.3 Product Experience

TRC asked both participating builders and HERS raters about their experience with the product, including their satisfaction with individual product elements and the product as a whole. Results suggest that both participating builders and HERS raters are satisfied with the product; no current participating builder or HERS rater said they were dissatisfied with the product overall. About one-third of participating builders provided suggestions for product improvements that fell into three categories: communication, rebates, and timeliness.

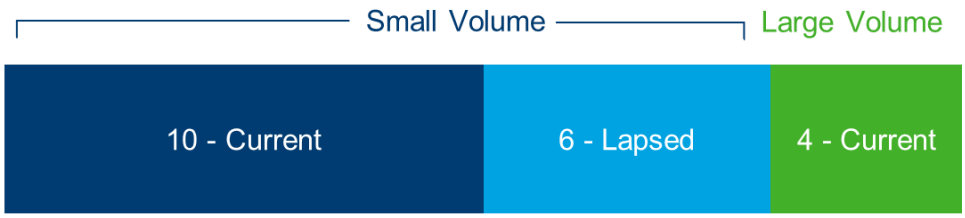
The remainder of this section provides an overview of participating builder and HERS rater characteristics, and provides detailed results related to product experience.

3.3.1 Participating & Non-Participating Builder Characteristics

Participating builders were mostly small volume (n=16) with an average home selling price between $700,000 and $850,000 (n=7). We have provided the breakdown of participating

builders, both current and lapsed small-volume builders, in more detail in Figure 3-1 below. All four large-volume builders surveyed were production builders[8]; 29% of respondents were large-volume builders compared to 35% in the overall population.

Figure 3-1. Participating Builder Respondents Participation Type



Conversely, non-participating builders were primarily single-family, custom home builders (80%, n=6) with average home prices above $1,000,000 (80%, n=68). Given this, responses from non-participating builders may not be representative of the balance of the residential new construction market in Colorado; Table 3-1 outlines typical home selling price for non-participating builders compared to other respondents and Colorado generally. This selling price is not only higher than the average selling price for participating builders, but also higher than the typical purchase price for surveyed homeowners (i.e., homeowners who purchased a product home); Homeowners primarily purchased homes under $700,000 (80%, n=68). Both are slightly higher than the average selling price of $542,756 for single-family homes in Colorado in 2020,[9], and the average selling price of $525,185 for single-family homes in the Denver Metro area in 2020.[10]

Table 3-1. Typical / Average Home Selling Price

Group	Typical / Average Home Selling Price (2020)
Non-participating builder respondents	Above $1,000,000
Participating builder respondents	Between $700,000 and $850,000
Surveyed homeowners	Under $700,000
Colorado Statewide	$542,756 (average)
Denver Metro Area	$525,185 (average)

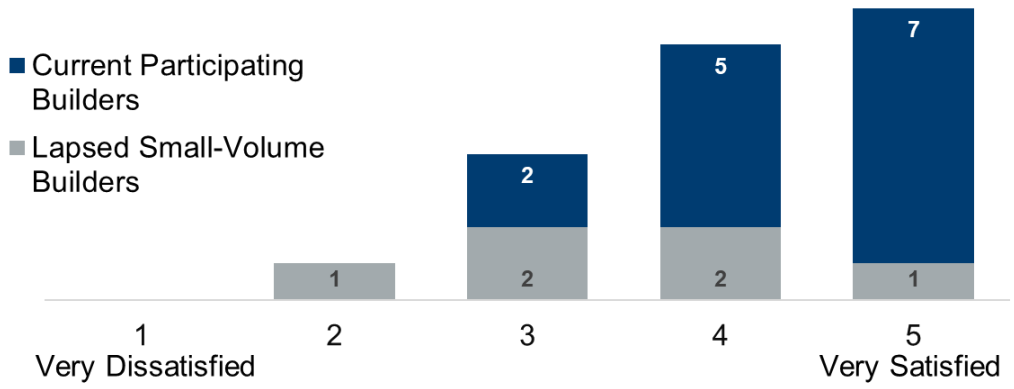
[8] A production builder is a home builder that builds communities. Production builders typically offer model home plans for homeowners to choose from, with some opportunities for customization.
[9] https://car-co.stats.showingtime.com/docs/mmi/x/Statewide?src=map
[10] https://www.dmarealtors.com/sites/default/files/content/dmars_year_end_report_2020.pdf

3.3.2 Builder Product Experience & Satisfaction

The evaluation team asked builders about their experiences and satisfaction with the ENERGY STAR New Homes Product as a whole, as well as with various product components. We asked these experience and satisfaction questions to both builders who participated between 2018 and 2020 (current participating builders) and small-volume builders who participated between 2013 and 2017, but have not participated since (lapsed small-volume builders).

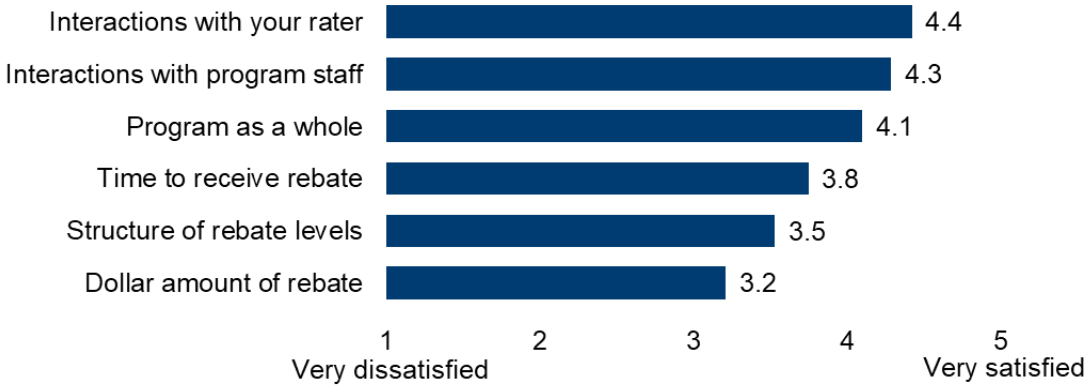
Participating builder respondents, both current and lapsed, were satisfied with the product overall, with an average satisfaction rating of 4.1 out of 5.0. Current participating builder respondents had a slightly higher average overall satisfaction than lapsed small-volume builders, with an average score of 4.4, compared to 3.5 for lapsed small-volume builders. Eight builders said that they were very satisfied with the product overall, however seven of these were current builders and just one was lapsed, as shown in Figure 3-2 below. Notably, no current participating builder respondent said they were dissatisfied with the product.

Figure 3-2. Participating Builder Overall Product Satisfaction



Participating builder respondents also indicated satisfaction with multiple product elements. Their satisfaction was highest with their interactions with HERS raters and product staff, and lowest with the structure and dollar amount of the rebate, as shown in Figure 3-3 below.

Figure 3-3. Participating Builder Satisfaction with Product Elements



Two participating builder respondents discussed more general concerns with the amount or structure of the rebate, while one discussed difficulties with achieving higher savings tiers as energy codes improve:

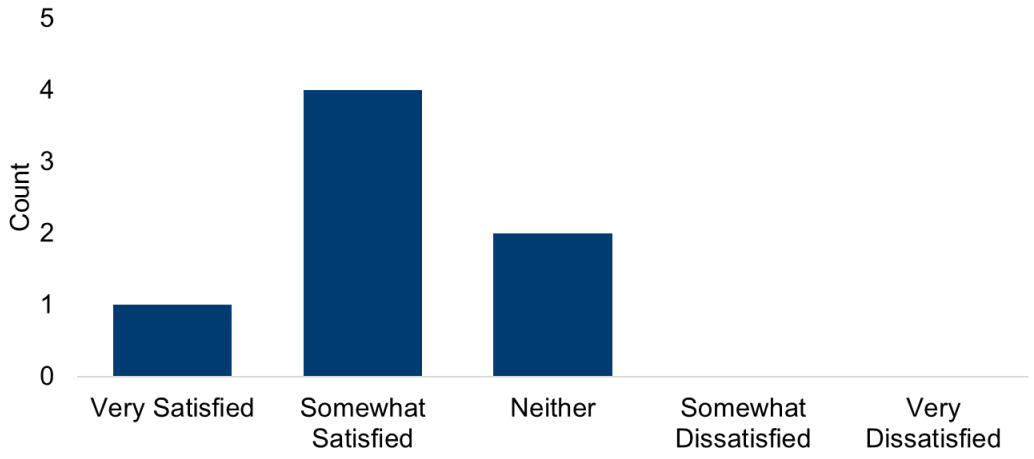
> *"It's very expensive to build up to that higher level, and the rebate amount does not offset much of it."*
>
> *"The [rebate] level was low and declined over time."*
>
> *"The municipalities and jurisdictions in my area are on the 2018 IECC code. It is the most advanced code and it makes it hard to differentiate between code and those higher tiers. The codes are getting better, [it's] harder to get to the 15-19% tier now as the codes are catching up."*

3.3.3 HERS Rater Product Experience & Satisfaction

TRC also asked HERS raters about their experiences and satisfaction with the Colorado ENERGY STAR New Homes Product overall, as well as with various elements of the product. Given HERS raters are a primary point of contact with builders and a major driver of product participation, understanding HERS raters experiences and satisfaction provides insight into both builders experiences/satisfaction and the functioning of the product as a whole.

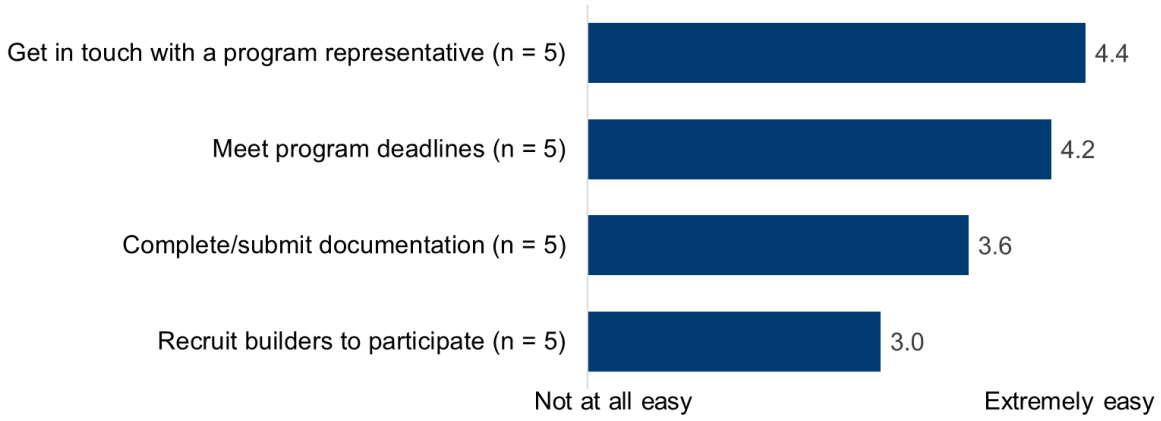
HERS raters were satisfied with their product experience overall, with an average rating of 3.9 out of 5.0. As shown in Figure 3-4 below, no HERS rater express dissatisfaction with their product experience.

Figure 3-4. HERS Rater Satisfaction with ENERGY STAR New Homes Product



The evaluation team also asked HERS raters how easy or difficult it was to complete various tasks associated with product participation. HERS raters found that it was easiest to get in touch with a product representative, with an average rating of 4.4 out of 5.0, as shown in Figure 3-5 below.

Figure 3-5. HERS Rater Ease of Task Completion



Additionally, five HERS raters described their interactions with Xcel Energy staff and the product implementer as a strength of the product:

> *"With [implementer] employees and Xcel Energy employees…they were very helpful. That's probably been the most beneficial thing… talking to a human being and getting information."*

> *"I have found over the years [the implementer] to be very communicative, very easy to kind of troubleshoot their software with…I know there's been a little bit of a shift with the*

representatives for Xcel, but they have all been very engaging and interested and very much trying to find working solutions that also worked for rating companies."

HERS raters found completing and submitting documentation through HouseRater (average rating of 3.6) and recruiting builders to participate in the product (average rating of 3.0) more difficult, as shown in Figure 3-5. Four HERS raters described data and administrative requirements that made it difficult to participate in the product. Three of these four raters described similar data entry frustrations, including minor, time-consuming edits. These specific frustrations are described in the two quotes below.

"We are the recipient of emails on a daily basis of corrections… A decimal point in between, or at the end of a serial number and that doesn't match exactly what's in the picture, it can be a minor spacing issue and they flag that as being incorrect."

"Oftentimes they'll have minor complaints like you know these numbers were off by a point one, and I'll have to go back and spend half an hour redoing a report so that they match up, and it's frustrating because I could spend my time in better ways than that. So, in my experience, it's not been ideal."

Two HERS raters discussed lack of builder interest as a barrier to participation, including specific concerns with recruiting builders in Western CO as described in Section 0. This suggests that HERS raters might need assistance in marketing the product, particularly in areas on older energy codes.

3.3.4 Product Suggestions

About one-third of participating builder respondents (30%, n=6) provided suggestions for product improvements. This included both current participating and lapsed small-volume builders. These suggestions fell into three categories: communications (n=2), rebates (n=3), and timeliness (n=1).

- **Communication:** Participating builders asked for more frequent communication about the product, including help with navigating the participation process. One builder noted that more personal communication is better and highlighted tools like Zoom when in-person contact is not possible.
- **Rebates:** Two participating builders recommended raising the rebate amount, with one recommending increasing rebates for higher savings tiers, noting that they don't believe the scale should be linear. A third builder recommended rebates for specific upgrades or improvements instead of tying rebates to achieving a specific percentage above code. These findings are in line with the lower satisfaction scores for the structure of rebate levels and dollar amount of the rebate (3.5 and 3.2 respectively). One HERS rater echoed this recommendation, suggesting that prescriptive rebates might increase participation:

"Way bigger rebates… if they did, rebates for prescriptive path like if you did... a continuous insulation, you get a $500 rebate on top of your therm saving your total energy savings, I think something like that is going to help drive change... The more creative they

can get with incentives, maybe smaller tiers for higher rebates, or something like that to really drive that change and the big difference.

- **Timeliness:** One participating builder suggested that it would be helpful if the ENERGY STAR certificates came more quickly, noting that certificates often arrive long after the homes close and owners are done with the home buying process.

3.4 Product Awareness & Barriers to Participation

TRC asked participating builders and non-participating builders about product awareness and barriers to participation in order to better understand both what efforts have successfully led to participation and what barriers exist to increased participation. We also asked HERS raters about their own barriers to participation, and perceived barriers for the builders they work with, in order to gain a more nuanced understanding of barriers to product participation. Our results indicate that participating builders most often heard about the product through HERS raters. Cost concerns were a barrier for participating builders to achieving above code savings. Most non-participating builders were aware of the product, and cited lack of client interest, including client costs concerns, as a primary barrier to participation. The remainder of this section provides additional detail on these findings.

3.4.1 Participating & Non-Participating Builder Awareness

TRC asked both participating and non-participating builders about how they first became aware of the Colorado ENERGY STAR New Homes product. Understanding product awareness helped us to understand which Xcel Energy efforts led to initial encounters with participating builders. This section first reviews participating builder product awareness, and then outlines product awareness among non-participating builders.

Participating builder respondents, including both current participating builders and lapsed small-volume builders, primarily heard about the product through interactions with HERS raters, as shown in Figure 3-6 below. Notably, outreach strategies involving interpersonal interactions were most successful. Only two participating builders heard about the product through a sponsored development or marketing materials; all others heard about the product through another business or word-of-mouth, Xcel Energy product staff, or their HERS rater. The evaluation team also asked non-participating builders about their product awareness to help understand barriers to participation. Overall, non-participating builder interviewees were aware of the product (6 of 8).

Figure 3-6. Participating Builder Product Awareness

3.4.2 Decision-Making & Barriers

TRC asked participating builders, non-participating builders, and HERS raters about barriers to participation. We also asked HERS raters about their own barriers to participation and what they perceive to be barriers to participation for builders. Understanding barriers and drivers to participation for all three groups helped us to gain a nuanced understanding of product barriers and provide suggestions for improvement.

Participating Builders & HERS Raters

Participating builder respondents pointed to cost as the primary limiting factor when asked about challenges to building to a standard greater than their average standard above code. Participating builder respondents also referenced energy codes as a factor that exacerbates these cost concerns, suggesting that energy codes are a barrier to participation for some participating builders. The impact of energy codes is complex. However, as both participating builder respondents and HERS raters noted, updated energy codes and performance-based energy codes can be a driver of energy-efficient building practices, as described in Section 2.3. The two quotes below provide additional detail on challenges to participation reported by participating builders.

> *"My area is on the 2018 IECC code. It is the most advanced code, and that makes it hard to differentiate between code and meeting those higher tiers. The codes are getting better, so it is harder to get to the 15-19% tier now."*

> *"There are budgetary concerns coming from the client. If a client wanted a better standard, we would do that."*

HERS raters echoed builder costs concerns. They believe cost-related barriers, including upfront costs (2 of 7), appraisals that don't fully recognize the value of energy efficiency (2 of 7), and small rebates (2 of 7) are the biggest barriers for builders to pursuing energy-efficient designs and participating in the product. The four quotes below highlight these cost concerns.

> *"[It's] a mild incentive. For our clients, it's always a little extra icing on the cake when we try to encourage energy efficiency. I don't think it's a huge motivator, because the [rebate] amounts are fairly small."*

> *"Usually [for builders], it's just whatever's cheapest and whatever is ... the least amount of work."*

> *"The problem is, I don't think it really does what it's supposed to do … people who want to do good get a little bonus; people who don't care aren't motivated by the little bit of extra money because… it's less than they would save by not doing the good thing... the financial motivations are not sufficient to get people who aren't interested."*

> *"We've had builders actually fall off from doing ENERGY STAR [in Grand Junction] because they're paying for a product, essentially, and… it's not increasing the rate at which they're selling their houses. They are selling houses no matter what.*

Two lapsed small-volume builders echoed HERS rater appraisal concerns, noting that buyers do not often recognize the value of HERS rating:

> *"The rating itself is too expensive, and it does not always make sense. But building to ENERGY STAR was not hard."*

> *"The buyers had little regard for the rating."*

Though participating builder respondents and HERS raters noted that low rebate amounts can be a barrier to participation, the evaluation team found that the product's rebate levels were in line with that of peer utilities. An analysis of peer utility rebates can be found in Appendix C.7.

Non-Participating Builders

For non-participating builder interviewees, the main drivers to purchase energy-efficient equipment in homes included client interest and energy codes. However, as noted previously, most non-participating builder interviewees were custom home builders, where clients are more directly involved in design decisions. Non-participating builder interviewees noted that the combination of newer energy codes and cold climates lead them to prioritize energy efficiency. The below two quotes describe non-participating builder interviewee motivations:

> *"We really have no other choice other than to use the highest efficiency equipment that we can get for all the systems, because of the energy code and our severe climate zone makes it even more important."*

> *"Lots of times it [motivation for EE] is cost, and a lot of times it's the decision made by the homeowner since we do a lot of custom things."*

Non-participating builders also discussed barriers to participating in the product and to including energy-efficient equipment and systems generally. Four of the six non-participating builders who were aware of the product mentioned a desire for higher rebate amounts and faster rebate timelines. One non-participating builder expressed some interest in the product, but currently only builds code-compliant homes. This sentiment is outlined in the below quote.

> *"When the program came out, I definitely read through the checklist. But now I'm only doing what's required by the city or county."*

Three non-participating builders discussed the need to balance materials pricing with client budget considerations. One non-participating builder noted that energy efficiency upgrades are often the first to be cut when costs increase unexpectedly, citing COVID-19-related impacts to the lumber market. The quote below describes these drivers.

> *"Increased lumber cost impacted a few things. You can't decide not to have wood in your house, so you would cut other things like energy efficiency upgrades."*

Taken together, these findings suggest that cost concerns, though nuanced and varied, are a primary barrier to building above code in the Xcel Energy Colorado service territory.

3.5 Electrification & High-Performance Building Certifications

Xcel Energy is interested in where builders and HERS raters are in their energy transformation journey, and in how Xcel Energy can support jurisdictions in meeting their electrification goals. To explore this, TRC asked participating builders, non-participating builders, and HERS raters about their understanding and perceptions of electrification. We also asked HERS raters about their perceptions of high-performance building certifications[11] to gain a high-level understanding of market interest in these standards.

Overall, builders have a neutral opinion of electrification, while HERS raters have a more positive view. However, both groups discussed concerns with electrification in cold climates and technological limitations. HERS raters also had positive perceptions of high-performance building certifications. The remainder of this section provides additional detail on these results.

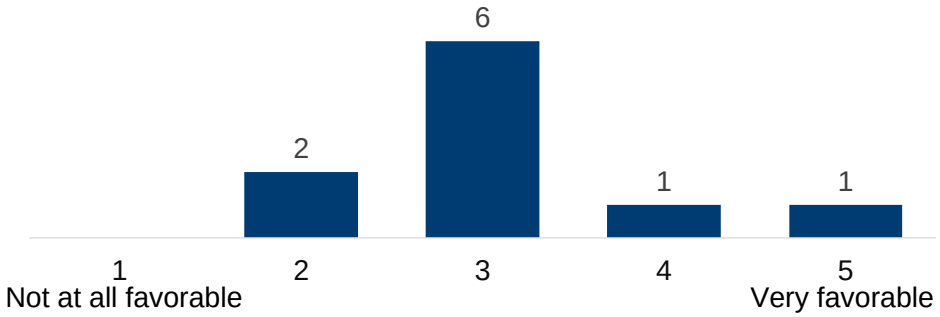
3.5.1 Participating & Non-Participating Builder Electrification Perceptions

Participating Builders

Half of the participating builder respondents (n=10) were familiar with the term electrification. When asked about their perceptions of electrification, respondents who were familiar with the concept expressed largely neutral attitudes, as shown in Figure 3-7 below.

[11] High-performance building certifications are optional standards that require the inclusion of energy-efficient equipment and systems.

Figure 3-7. Participating Builder Perceptions of Electrification



When asked to expand upon and explain their perceptions, respondents highlighted (1) technological concerns in cold climate zones (40%, n=4), including specific concerns related to heat pumps, and (2) cost concerns (30%, n=3), as shown in the three quotes below.

> *"We're in an extreme climate zone, and we don't think the technology currently exists to provide the adequate comfort level to eliminate gas fuel appliances."*
>
> *"It's [electrification's] time is coming. The technology just has to catch up a bit more to reach the price point that will be comparable to natural gas."*
>
> *"In the northern climate zone 5, the technology for heat pump systems has not advanced enough and customized enough to become practical. Cost has to become affordable."*

Non-Participating Builders

Non-participating builder interviewees were largely aware of electrification as well (75%, n=6) and expressed similar concerns to participating builders around the cost of electrification and technological limitations Interviewees also acknowledged a generational divide among their customers related to electrification. These builders found that younger generations are more open to electrification. The hesitancy expressed by interviewees can be captured in the two quotes below.

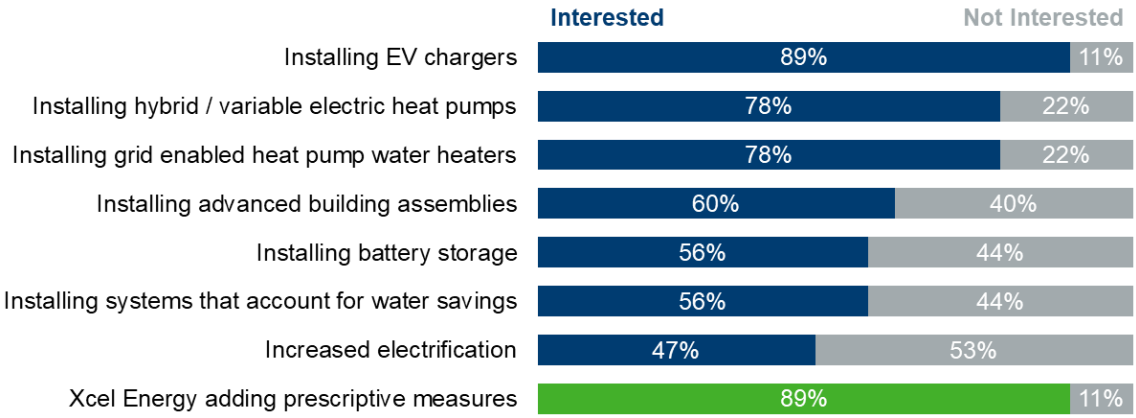
> *"People are asking for it [electrification], like younger people that are more eco-conscious. I think it's probably the wave of the future, but older people will always be stuck on gas, because that's what they're used to."*
>
> *"If there was an electric heating system that could compare [to gas boilers], I think a lot of folks would shift that direction, but it's just not there."*

Electrification & Smart Connected Technologies

TRC also asked participating builders about their interest in electrification technologies and practices, as well as smart connected technologies and additional prescriptive opportunities through the product. Respondents expressed interest in most technologies, as shown in Figure

3-8 below. Increased electrification was the only element that participating builders were not interested in on average, a finding that reflects the electrification hesitancy discussed previously. Respondents were most interested in installing EV chargers (89% interested) and in Xcel Energy adding additional prescriptive measures (89% interested). The evaluation team asked about interest in prescriptive measures generally, but not specific measures. However, this finding agrees with the participating builder and HERS rater respondent suggestions to offer rebates for specific upgrades or improvements (Section 3.3.2).

Figure 3-8. Participating Builder Interest in Additional Technologies & Xcel Energy Rebates



3.5.2 HERS Rater Electrification & High-Performance Building Certification Perceptions

HERS raters were unanimous in their positive opinion of electrification, however they expressed similar concerns to participating and non-participating builders. Three HERS raters described concerns with promoting electrification in cold climate zones, which comprises the majority of the Xcel Energy Colorado service territory. HERS raters also discussed builder distrust of electrification (3 of 7) and builder cost concerns (1 of 7). HERS rater perceptions of electrification are described in the two quotes below.

> *"I think it's a great idea in most cases, I think the little harder and more expensive to implement in Summit County… There are heat pumps that now work in those very cold climates, but there's a lot of distrust from the building community on them, even if they claim to be able to work below zero."*

> *"Yeah, so I think in the mountains it doesn't make sense, and I'm just going to flat out say that...so you know for this climate down here on the front range yeah absolutely makes sense, but up there, my builders [would] be like yeah no."*

The evaluation team also asked HERS raters about their perceptions of high-performance building certifications. Generally, HERS raters have a positive opinion of high-performance building certifications. However, two HERS raters discussed a preference for Passive House certification over Zero Energy Ready Homes certification, including a belief that Zero Energy

Ready Homes certification doesn't significantly improve home performance, as shown in the two quotes below.

> *"The reason I don't like the ZNE program is it tacks on top of ENERGY STAR; it makes you do a lot of things on a checklist that don't really improve the overall energy efficiency of the home.*
>
> *"Zero [Energy Ready] is great, but zero, you know, you can get away with this basically running conduit for solar and coming in with a HERS50 and you're done."*

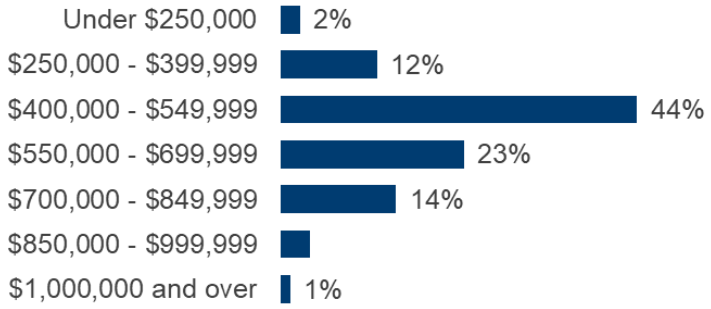
3.6 Homeowner Experiences

Xcel Energy is interested in understanding the experience and motivations of homeowners to understand the impact of the product on the end-user. TRC found that non-energy benefits, including comfort and indoor air quality, were the most important factors to homeowners in their decision to purchase an energy-efficient home. Homeowners were satisfied with these non-energy benefits on average, as well as with the energy efficiency of their home. We also asked homeowners about their fuel preferences to better understand electrification opportunities and barriers. Results suggest that homeowners prefer gas for both space and water heating. However, this preference is stronger for space heating. The remainder of this section provides more detailed results.

3.6.1 Homeowner Characteristics

The evaluation team asked homeowners about features of their home, including purchase price and the efficiency of their home, to understand both who the product is serving and how homeowners perceive product participation. Homeowners primarily purchased homes under $700,000 (80%, n=68) and almost half of homeowners purchased a home between $400,000 and $549,999 (44%) as shown in Figure 3-9 below. As mentioned previously, this is in line with both the average home price in Colorado and the typical selling price for participating builders.

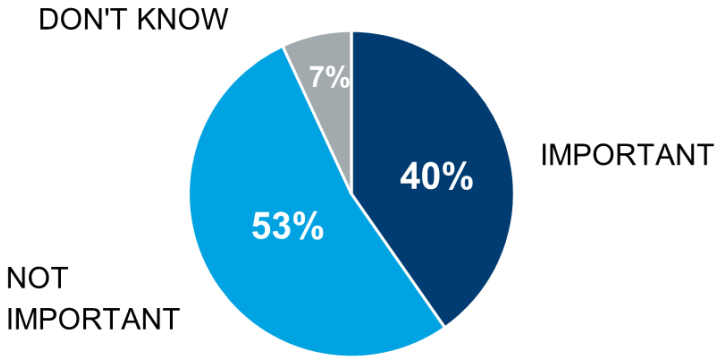
Figure 3-9. Purchase Price of the Home



Most homeowners (85%, n=72) described their home as energy-efficient; the remaining homeowners either didn't know if their home was energy-efficient (9%) or did not believe their home was energy-efficient (6%). However, a majority of homeowners (53%, n=38) indicated that there was no energy efficiency upgrade important to their home-buying decision, as shown

in Figure 3-10 below. Those homeowners who *did* indicate that particular energy-efficient upgrades were important in their decision to purchase their new home mentioned efficient heating and cooling (n=7), insulation and other envelope improvements (n=4), efficient appliances (n=3), and solar or EV charging (n=3).

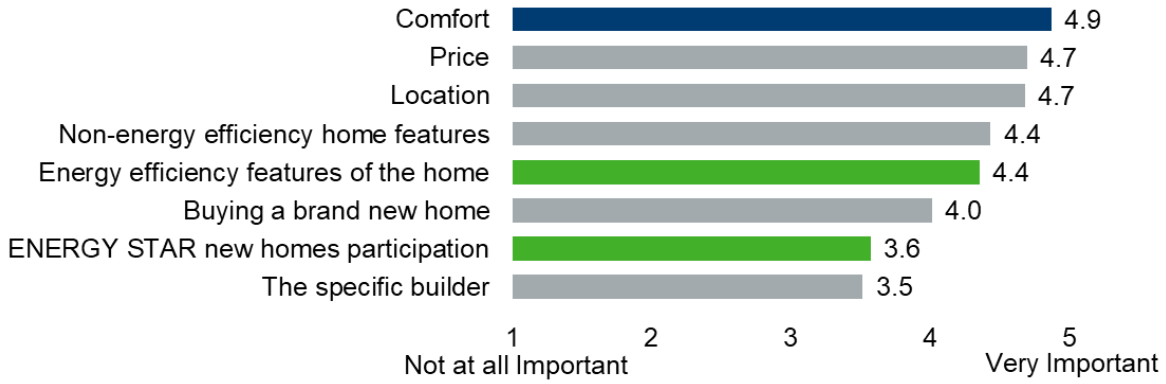
Figure 3-10. Importance of Energy-Efficient Upgrades on New Home Purchase



3.6.2 Home Purchasing Decisions

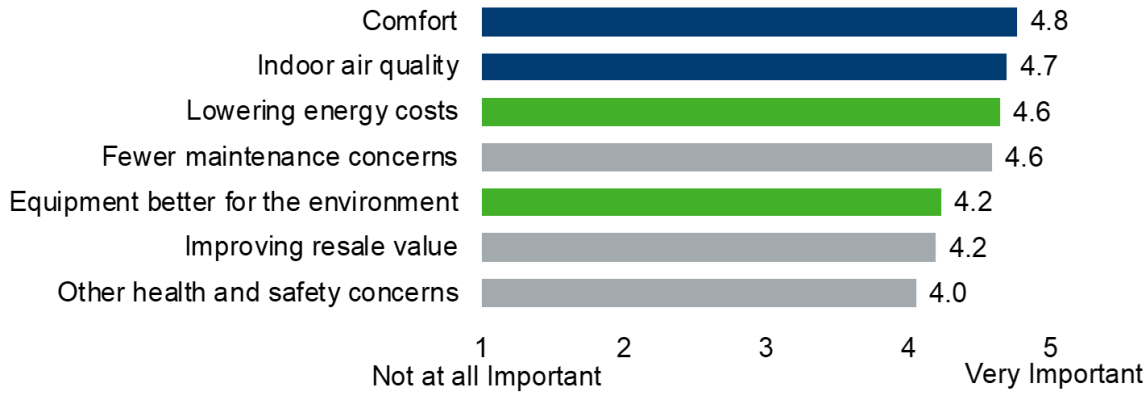
TRC asked homeowners (1) what factors were important in their decision to purchase their home, and (2) what factors were important when deciding to purchase a home with energy-efficient equipment and/or materials. Both questions were asked to better understand homeowner purchasing decisions, including general considerations and those specific to energy efficiency. When asked about factors that impacted their decision to purchase their new home, homeowners rated all factors as somewhat to very important on average, as shown in Figure 3-11 below. Homeowners rated comfort the most important factor when purchasing a new home, with an average score of 4.9 out of 5. Notably, comfort was more important to homeowners than the price of their home on average. This finding contradicts the participating builder respondent finding that cost is the primary barrier to building to a standard above code. Comfort was also rated as more important than both the energy-efficient features of the home and the home's participation in the Xcel Energy ENERGY STAR New Homes program. This finding suggests that highlighting the increased homeowner comfort associated with an energy-efficient home might increase homeowner interest in the product.

Figure 3-11. Important Factors on Homeowner Decision to Purchase New Home



The evaluation team also asked homeowners to rate the importance of factors on their decision to purchase a home with energy-efficient equipment and/or materials. Homeowners also rated comfort the most important factor here, with an average score of 4.8 out of 5 as shown in Figure 3-12 below. Homeowners also rated indoor air quality (4.7 out of 5) and lowering energy costs (4.6 out of 5) as important factors. This suggests that homeowners highly value the non-energy benefits of an energy-efficient home and associate these benefits with energy efficiency.

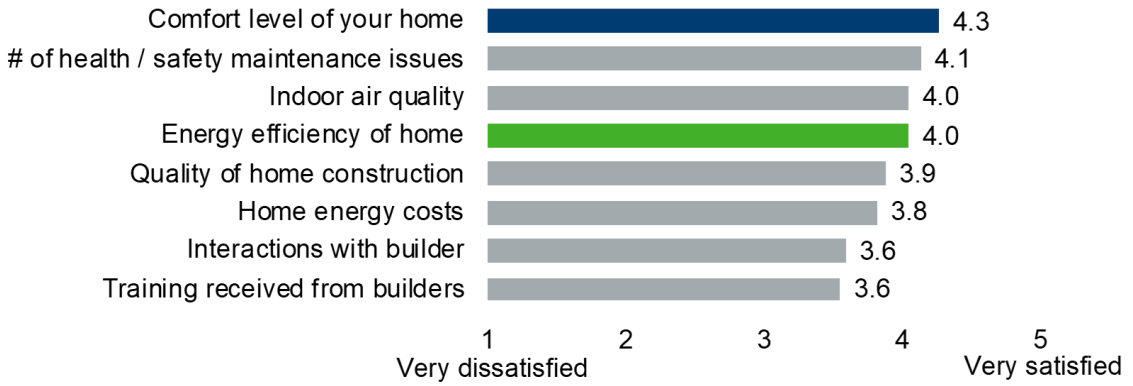
Figure 3-12. Important Factors on Homeowner Decision to Purchase Home with Energy-Efficient Features



3.6.3 Product Experience & Satisfaction

TRC asked homeowners about their satisfaction with their home's energy efficiency measures and their experience with the energy efficiency of their home to better understand the end-user product experience. Homeowners were largely satisfied with the comfort of their homes, as well as with the overall energy efficiency of the home, as shown in Figure 3-13 below.

Figure 3-13. Homeowner Satisfaction



On average, homeowners were somewhat to very satisfied with all factors. However, homeowners were least satisfied with their interactions with their builder (3.6 out of 5.0) and the training they received from builders on energy-efficient equipment and/or materials (3.6 out of 5.0). Homeowners mentioned a lack of communication or responsiveness from builders and difficulty resolving warranty issues, as shown in the following two responses.

> *"Builders were very difficult to get a response from. They didn't want to help me get my warranty claims resolved."*

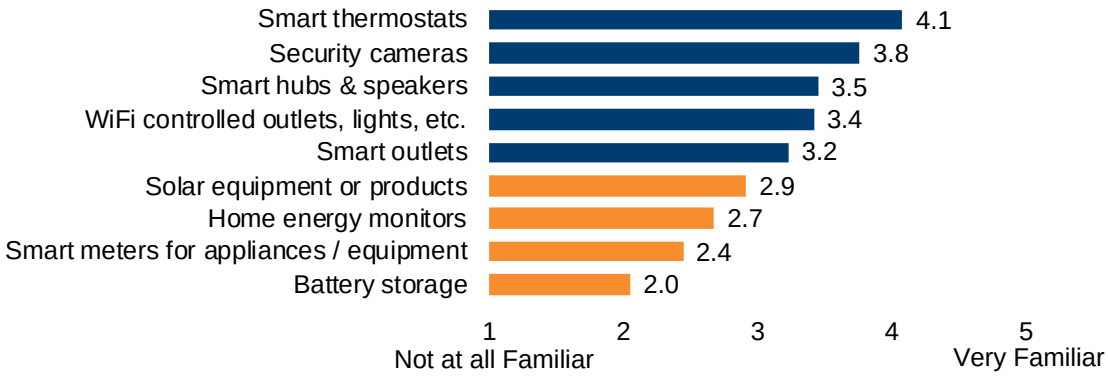
> *"Mediocre follow-through with post-construction issues."*

Twenty-seven homeowners (36%) received training on energy-efficient equipment and/or materials from their builder. This training included information on how energy-efficient equipment and/or materials lower energy costs (n=20), how to properly maintain energy-efficient equipment (n=17), and how to properly use energy-efficient equipment to maximize energy savings (n=15). Homeowners who were unsatisfied with this training discussed the limited scope of trainings and feeling as though builders were not knowledgeable enough about energy efficiency.

3.6.4 Smart Home Technologies

TRC asked homeowners about their familiarity with various smart home technologies. Homeowners only reported high familiarity with smart thermostats and security cameras, as shown in Figure 3-14 below. Homeowners were most familiar with smart thermostats on average (4.1 out of 5.0). Homeowners were not familiar on average with solar equipment or products (2.9 out of 5.0), home energy monitors (2.7 out of 5.0), smart meters for appliances and/or equipment (2.4 out of 5.0) or battery storage (2.0 out of 5.0).

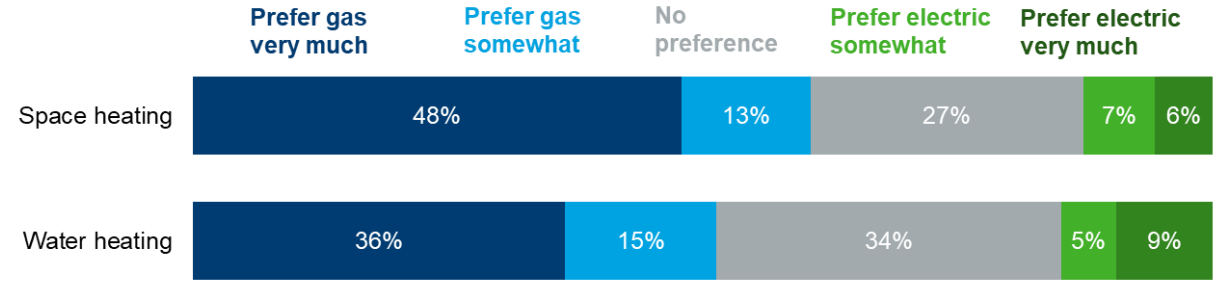
Figure 3-14. Homeowner Familiarity with Smart Home Technologies



3.6.5 Fuel Type Preferences

To better understand electrification opportunities and barriers, the evaluation team asked homeowners whether they prefer gas or electricity when heating the water in their home and when heating their home. More homeowners prefer gas for both space and water heating than prefer electric, as shown in Figure 3-15 below. Homeowner preference for gas is stronger for space heating than for water heating, with 48% of homeowners preferring gas very much and 13% preferring gas somewhat to heat their homes, a total of 61% of homeowners with a preference for gas. For water heating, roughly equivalent proportions of homeowners had a strong gas preference (36%) as had no preference (34%).

Figure 3-15. Homeowner Fuel Type Preferences



When asked why they preferred gas for water heating, homeowners noted that they believe gas costs less (n=7), is more energy-efficient (n=6), is more effective, meaning it heats faster (n=5), and that it is cleaner than electricity as the grid may rely on coal power (n=3). Homeowners provided similar responses for space heating, but in some cases compared gas to an oil alternative and cited cost constraints for heat pumps. All homeowners who preferred electric cited renewable energy or a decreased carbon footprint as the driver.

4 Conclusions & Recommendations

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

Overall, the evaluation team found that the ENERGY STAR New Homes Product operated smoothly, and both participating builders and HERS raters were satisfied with their experience with the product. The evaluation team identified a number of recommendations to improve product influence and improve satisfaction among participating builders, HERS raters, and homeowners. The remainder of this chapter presents our key findings and recommendations.

- **Key Finding 1: The ENERGY STAR New Homes Product showed some influence in the market, with a retrospective NTGR of 0.63.** Rebates and previous experience with energy-efficient equipment through an Xcel Energy product were key drivers of product influence. The evaluation team found supporting qualitative evidence that rebates are a helpful influence, particularly among large-volume builders. Major drivers of free-ridership include meeting updated energy codes, achieving an ENERGY STAR certification, and customer preference. We found that newer, performance-based energy codes motivate energy-efficient building practices and influence participating builders to go the extra step and install above code technologies. Additionally, qualitative evidence suggests that participating builders are motivated to achieve ENERGY STAR certification on their own due to the marketing advantage it provides. Although participating builders and HERS raters highlighted the importance of ENERGY STAR certification, the market share for ENERGY STAR certified homes is only 11% in Colorado, representing just 2,828 homes in 2020.[12] This suggests that there is ample opportunity to engage code compliant-builders in Colorado and influence their building practices.
  - **The evaluation team recommends using a prospective NTGR of 0.73 if the product team incorporates evaluation recommendations 1a, 1b, and 2a.** To increase Xcel Energy's influence in the market, we recommend:
    - **Recommendation 1a: Provide targeted trainings and outreach to large-volume builders.** These trainings could include information on general building science principles, specific above code technologies, and information specific to electrification technologies and practices to help support jurisdictions in their electrification goals.
    - **Recommendation 1b: Dilute free-ridership by targeting non-participating builders, including non-ENERGY STAR builders and builders outside of front range communities.** This should include improving communication between product representatives and builders, including training and marketing activities targeted toward these groups.
- **Key Finding 2: HERS raters struggled with product administrative requirements.** Several HERS raters cited similar data entry frustrations, including minor, time-

consuming edits. One HERS rater mentioned that the rater incentive was insufficient to cover administrative tasks, while another described a desire for the incentive to scale with the project.

- **Recommendation 2a: Scale HERS rater incentives with savings to encourage participation from higher savings projects.** HERS raters are currently a major driver of product participation. Scaling HERS rater incentives with savings could account for the additional administrative burden associated with submitting complex projects and encourage HERS raters to promote additional energy efficiency upgrades.
- **Recommendation 2b: Collaborate with the product implementer to explore pain points in administrative requirements, including clarifying HouseRater documentation as applicable.** Assessing the usability of HouseRater could uncover improvements to mitigate HERS rater difficulties with administrative requirements and help to avoid commonly requested edits. Further, clarifying processes and requirements could improve HERS rater product experience.

- **Key Finding 3: Comfort is the most important factor to homeowners when purchasing their home, higher than both the price and location of the home.** Homeowners also rated comfort the most important factor on their decision to purchase a home with energy-efficient equipment and/or materials; indoor air quality received the second highest rating. This indicates that participating homeowners connect the link between energy efficiency and non-energy benefits, including comfort and indoor air quality. Xcel Energy can improve product marketing to underscore this link to increase product awareness and the perceived value of an energy-efficient home. Additionally, when asked about satisfaction with their product experience, homeowners were least satisfied with the training they received from builders, indicating a need for improved homeowner engagement on their energy-efficient home.
  - **Recommendation 3: Develop targeted marketing materials for homeowners.** Homeowners value the non-energy benefits of their energy-efficient home over financial considerations such as lowering energy costs. Developing collateral that highlights the non-energy benefits of product homes may increase demand for energy efficiency among potential home buyers. Marketing collateral should also include builder leave-behinds that describe features of the energy-efficient home to help ensure that homeowners receive sufficient information about the energy-efficient features of their new home.

The recommendations we have identified to address the remaining key findings, if implemented, would result in more substantial product changes. These changes could result in changes to the prospective NTGR, however, we have not estimated a prospective NTGR associated with these changes. If these recommendations are implemented, Xcel Energy should conduct additional research to determine the impact on the NTGR.

- **Key Finding 4: Achieving an ENERGY STAR certification was a key motivator for participating builders to build above code, more so than the Xcel Energy product.** The evaluation team found supporting qualitative evidence from both participating builders and HERS raters that the marketing advantage of an ENERGY STAR certified home was a significant influence outside of the product. Two peer utilities have either made or are considering changes to program design to align with stretch codes or high-

performance building certifications. One utility found this alignment with stretch codes helpful in encouraging participating builders to further improve the energy efficiency of new home design and construction. This indicates that if Xcel Energy wanted to increase influence on the market, including among current participating builders, it could consider product offerings that go above and beyond current ENERGY STAR certification.

- **Recommendation 4: Consider creating an alternative offering based on high-performance building certifications to improve product influence among participating builders.** This credential could be based on a single high-performance building certification such as Zero Energy Homes or Passive House, or could combine components of several certifications to create a credential tailored to Xcel Energy's Colorado service territory. Xcel Energy could consider future versions of ENERGY STAR if changes represent sufficient energy efficiency improvements.

- **Key Finding 5: Participating builders and HERS raters indicated that costs remain a barrier to energy-efficient building practices, specifically to including electrification technologies in the new home. Both participating builders and HERS raters recommended including more prescriptive measures.** Neither group had strong recommendations about specific measures, but generally felt that targeted incentives would help to drive change. Additionally, many peer utilities offer both a prescriptive and performance-based participation option. Suggesting that prescriptive measures can help to drive change among participating builders.

  - **Recommendation 5: Consider expanding prescriptive new construction rebate offerings, including incentivizing technologies and practices for all-electric homes to support jurisdictions in achieving their electrification goals.** The evaluation team recommends that these incentives be offered as a "bonus," so that participating builders are still required to achieve a minimum level of above code performance. Providing specific incentives for electrification technologies may help to overcome the cost concerns cited by builders and homeowners and provide an opportunity to clarify misconceptions around the readiness of electrification technologies, particularly in cold climate zones.

January 28, 2022

Xcel Energy

Colorado ENERGY STAR New Homes
Product Impact & Process Evaluation: Appendices

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Appendix A:Evaluation Plan

A.1 Introduction

To support the 2021 process and impact evaluation of Xcel Energy efficiency products, the TRC evaluation team will be conducting a process and impact evaluation of the Xcel Energy Colorado ENERGY STAR New Homes product. This memo provides a plan for the 2021 Colorado ENERGY STAR New Homes product evaluation based on staff feedback during the evaluation kick-off meeting, staff interview findings, and review of product documentation. This evaluation plan includes the following sections:

- Product Overview
- Evaluation Overview
- Data Collection Activities and Sampling Plans
- Net-to-Gross Approach

A.2 Product Overview

The Colorado ENERGY STAR New Homes product provides incentives, and well as educational trainings, to encourage home builders to exceed local building codes and common construction practices. Additionally, Home Energy Rating System (HERS) Raters consult with participating builders during construction on energy efficient equipment to help builders incorporate these measures into their home design and ensure proper installation. Builders of single-family and small multifamily homes (duplexes, triplexes, fourplexes, and townhomes) may participate. Homes that achieve total energy savings of at least 10% better than code in their respective jurisdiction are eligible for rebates. Product savings for the evaluation year are shown in **Error! Reference source not found.**. In 2020, the product's three main offerings included:

Builder envelope improvement rebate. Gas/electric combination, electric-only homes, or natural gas-only homes that achieved energy savings of at least 10% above their jurisdiction's energy code could receive rebates. Rebates are offered to encourage builders to build energy-efficient new homes by lowering the upfront premium costs associated with the building and testing of these homes.

Add-on builder rebates.

ENERGY STAR certified rebate. Gas/electric combination homes that achieved 10% above energy code could receive an additional $100 certification rebate if 1) the HERS Rater confirmed all certification requirements were met and 2) an ENERGY STAR label was posted on the home's electrical breaker box.

Appliance rebates. ENERGY STAR rated clothes washers and heat pump water heaters were eligible for rebates in homes successfully participating in the product. Homes that receive natural gas-only service from Xcel Energy were not eligible for the lighting rebates.

HERS Rater incentive. HERS Raters received an incentive for each eligible home they submitted to the product.

Table 1. Colorado ENERGY STAR New Homes Savings, January – December 2020

	kW	kWh	Electric Participants	Budget/ Spend	Dth	Gas Participants	Budget/ Spend
2019 Goals	924	2,767,019	2,790	$1,038,889	83,456	4,000	$1,956,038
2020 Goals	808	2,626,700	2,521	$956,678	71,150	4,000	$1,823,925
2020 Actuals	728	4,350,331	2,397	$935,434	81,892	4,398	$2,193,149

Note: This is the population of participating builders receiving rebates between January 2020 and December 2020. These numbers are based on aggregated data provided to TRC in March 2021.

In 2020, the Colorado ENERGY STAR New Homes product included builder envelope improvement rebates in two categories, in addition to the ENERGY STAR certified and appliance rebates, depending on the local jurisdiction's adopted code:

- 2009 IECC or Lower (ranging from $200 to $1,400 depending on total energy savings achieved better than code), and;
- 2012 IECC or Higher (ranging from $250 to $2,550 depending on total energy savings achieved better than code).

The appliance rebate was $30 for ENERGY STAR rated washers and $450 for heat pump water heaters. In addition to builders, the Colorado ENERGY STAR New Homes product relies on HERS Rater. Each participating builder subcontracts with a HERS Rater of its choice. In 2020, Xcel Energy provided a $75 rebate per home per HERS Rater.

Xcel Energy has made changes to the Colorado ENERGY STAR New Homes rebate and product structure for 2021. In 2021, Xcel Energy will proactively encourage and support jurisdictions in adopting more stringent building energy codes. Additionally, envelope improvement rebates will be included in five categories, in addition to the ENERGY STAR certification and appliance rebates, depending on the local jurisdiction's adopted code[1], but also based on the service a customer receives from Xcel Energy (i.e., whether a home is gas-only, electric-only, or combination):

- Gas-Only Homes – 2009 IECC or Lower;
- Gas/Electric Combination Homes – 2009 or Lower;
- Gas-Only Homes – 2012 IECC or Higher;
- Gas/Electric Combination Homes – 2012 IECC or Higher, and;
- Electric-Only Homes – 2012 or Higher.[2]

Incentives are highest for electric only homes in jurisdictions that have adopted 2012 IECC or higher, with envelope improvement rebates starting at $500 and reaching up to $5,100, and

[1] Although rebates are determined based on whether a local jurisdiction's code is 2009 IECC or lower, or 2012 IECC or higher, the baseline for calculating savings is the local energy code.
[2] Electric-only homes in jurisdictions that have adopted 2009 IECC or lower will still be eligible to participate, but will be baselined to a higher energy code (i.e., 2012 IECC or higher).

lowest for gas-only homes in jurisdictions that have adopted 2009 IECC or lower, starting at $100 and reaching up to $700.

A.3 Evaluation Overview

The 2021 evaluation will consist of a process evaluation and an impact evaluation. The process evaluation will focus on customer and market actor experiences with the product, while the impact evaluation will focus on estimating a net-to-gross (NTG) ratio. This section presents the objectives of the two components of the evaluation. It is followed by a more detailed description of the evaluation activities.

Process Evaluation

The evaluation team discussed process evaluation priorities during the kickoff meeting[3] and staff interviews.[4] During those conversations, several process-related themes emerged.

- **Connections with end users:** This first topic relates to the product team's interest in establishing more direct relationships with builders and home buyers, to increase customer and builder understanding of the latest and future energy-saving technologies and improve product reach. These relationships could include more direct marketing and outreach, as well as customer education. The evaluation team will focus on understanding the extent to which the product meets end users' needs in addition to identifying how it might cater to further needs.
- **Opportunities to incorporate new technology or practices:** This second topic echoes a key product staff goal to support electrification and integrated homes. The evaluation team will investigate opportunities to support builders in meeting jurisdictional goals and how other Xcel Energy products and departments can play an increasing role in product improvement. Product staff are also interested in leveraging integrated homes in the future in a way that supports Xcel Energy's overall corporate goals.
- **Potential for product expansion and improvement:** This third topic reflects positive feedback in previous years while acknowledging the potential for process improvement. According to product implementation staff, the product currently reaches an estimated 20% of eligible homes in Xcel Energy's Colorado service territory, which highlights an opportunity to expand the product's market reach beyond those currently served by the product. The evaluation team will explore this opportunity to expand product reach, particularly in moderate- and low-income communities. This portion of the evaluation will focus primarily on developing and maintaining builder relationships that further encourage above code savings across jurisdictions, while ensuring that processes are efficient for builders, home buyers, implementers, and Xcel Energy staff.
- **Impact of increasingly stringent codes:** The adoption of more stringent energy codes and increasing baselines presents a challenge for builders to complete product participation. This has also transformed HERS Rater assistance into a pass/fail score for code compliance rather than a continuous improvement tool, according to implementation staff. Therefore, this portion of the evaluation will investigate how to equip product staff with the tools and knowledge to continue to drive change among Colorado builders.

[3] The kickoff meeting was held in February 2021.
[4] Staff interviews took place in February 2021.

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

- Understand the impacts of jurisdictional goals (e.g., electrification) and increasingly stringent energy codes and rising baselines on the product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the product. In doing so, the evaluation team will explore the following:
  - Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.
  - Identify barriers for participating and non-participating builders serving medium- and low-income customers.
- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform product improvements.
  - Tracking realized customer energy usage within product homes 1-10 years after construction could aid in improving the product's building science consulting and forcasted energy savings. Additionally, this connects to Xcel Energy's long-term goals of continuous improvement, grid flexibility, and integration with other Xcel Energy productss in Colorado.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the product work. Research questions include:
  - How exactly do builders and home buyers interact?
  - Do builders, builders' contractors, and home buyers know to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?

Impact Evaluation

The objective of the impact evaluation of the Colorado ENERGY STAR New Homes product is to develop a net-to-gross (NTG) ratio documenting the extent to which product activities influenced builder decision-making. The evaluation team proposes to use participant self-report surveys from participating builders as well as trade partner interviews with HERS Raters to estimate the Colorado ENERGY STAR New Homes product NTG ratio (both retrospective and prospective). Accordingly, the **objectives of the impact evaluation** include:

- Determine NTG ratio for energy-efficient home rebates.
- Identify major drivers of free ridership.
- Assess participant and nonparticipant spillover.

- Assess market effects of the Colorado ENERGY STAR New Homes product.

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

A.4 Data Collection Activities and Sampling Plans

To meet the above objectives, we will collect direct feedback from product stakeholders via a variety of data collection activities. These are listed in Table 2 and explored more in this section. The evaluation team has already conducted interviews with Xcel Energy staff members (Table 2, Task Reference 1) to help understand specific needs for this evaluation.

For participant research, the evaluation team will conduct phone surveys with active participating builders, defined as builders who have participated in the product in the past 3 years (Table 2, Task Reference 2). These surveys will inform prospective and retrospective NTG ratio estimates, as well as builder-related process questions. Additional surveys will be conducted with small volume participating builders to satisfy builder-related process objectives, particularly those related to opportunities for smart connected homes and jurisdictional energy-related goals, such as electrification. The evaluation team also recommends completing follow-up in-depth interviews with up to 10 participating builders; the interviews will follow up with participating builders who provide conflicting information during the survey research (Table 2, Task Reference 2b).

The evaluation team also plans to conduct interviews with non-participating builders, defined as an organization or individual that builds single-family and/or small multifamily homes, but have not previously participated in the product, as well as those who participated in the product in the past, but have not participated in the past 3 years (Table 2, Task Reference 3). Additionally, the evaluation team will complete web surveys with homeowners (Table 2, Task Reference 4) to obtain customer feedback on barriers to participation.

For trade partner research, the evaluation team recommends conducting phone interviews with HERS Raters (Table 2, Task Reference 5) to understand their experiences with completing HERS ratings for product homes, and to gain their insight on the impact of the product on the market.

Finally, peer utility benchmarking interviews (Table 2, Task Reference 6) will help Xcel Energy understand how other organizations are supporting residential new construction programs.

Table 2. Colorado Energy Star New Homes Product Research Summary

Task Ref.	Research Task	Included in Original Scope?	Sample Size	Research Objectives
1	Staff Interviews	✓	4	Inform evaluation plan
2	Participating Builder Surveys (phone)	✓	40	Perceptions/awareness, builder decision making & barriers, product experience/satisfaction, NTG
2a	Participating Builder Surveys (phone) – Small Volume Builders	✓	30	Perceptions/awareness, builder decision making & barriers, product experience/satisfaction, NTG

2b	Participating Builder Interviews	✓	10	Perceptions/awareness, builder decision making & barriers, product experience/satisfaction, NTG
3	Non-Participating Builder Interviews	✓	20	Perceptions/awareness, builder decision making & barriers, NTG
4	Homeowner Surveys (web)		70	Perceptions/awareness, homeowner decision making & barriers
5	Recommended: Trade Partner (HERS Rater) Interviews	✓	20	Product experiences, barriers to participation, market growth
6	Peer Utility Benchmarking Interviews	✓	4-6 utilities	Energy code advancement, housing markets, electrification & integrated homes, NTG

Staff Interviews

In February 2021, the evaluation team conducted four interviews with Xcel Energy staff to inform this evaluation plan, discuss product goals, and review product processes, challenges, and successes. Those interviewed included the product manager, a team lead, a member of the engineering team, and the Vice President of Program Management for the implementation contractor. These interviews were conducted over the telephone and took between 30 minutes and one hour to complete. These meetings, combined with the kickoff meeting, allowed the evaluation team to create a focused evaluation plan with defined data collection activities.

Participating Builder Surveys

The evaluation team will utilize participant telephone surveys to meet both process and impact objectives. These surveys will focus on the following four topics:

- **Perceptions/Awareness:** The evaluation team will assess builder perceptions and awareness of energy efficient technologies to better understand how this may hinder greater product participation. In addition, the evaluation team will gauge builder interest in various marketing strategies, including training opportunities as an avenue to increase awareness of the product and of the efficient technologies available to improve home performance.
- **Builder Decision-Making and Barriers to Participation:** The evaluation team will discuss motivations behind building energy efficient homes as well as barriers to pursuing efficient designs.
- **Product Experience/Satisfaction:** The evaluation team will discuss builders' experience and satisfaction with the product.
- **Retrospective NTG Impacts:** The team will ask questions on product attribution, or the impact the product had on builders' decision to build high-efficiency homes.

For the participating builder survey, the evaluation team will survey builders who participated in the Colorado ENERGY STAR New Homes product in the past three years (i.e., builders who have participated between January 2018 and December 2020).

Participating Builder Surveys – Small Volume Builders

The evaluation team will conduct additional telephone surveys with participating builders who have participated in the Colorado ENERGY STAR New Homes product in the past and are small volume builders[5]; the requirement that participating builders are "active" participants will not apply for small volume builders. These surveys will cover the same four topics outlined for participating builder surveys above.

Participating Builder Interviews

The evaluation team recommends selecting up to 10 builder from the participating builder surveys and conducting in-depth interviews with these builders. These interviews will be reserved for survey respondents who had conflicting responses on NTG questions so that the evaluation team can dive deeper into their decision-making processes and clarify their free-ridership and/or spillover.

Non-Participating Builder Interviews

The evaluation team recommends conducting 20 non-participant telephone interviews to meet process objectives. For the purposes of this research, non-participating builders are defined as builders who have not completed participation in the product recently, which includes both those who have not participated in the past (non-participants) and those who have participated in the program in the past, but did not participate between January 2018 and December 2020 (lapsed participants). These interviews will be conducted over the phone and will focus on the following three topics:

- **Perceptions/Awareness:** The evaluation team will assess non-participating builder perceptions and awareness of the product.
  - Additionally, the team will investigate non-participating builder awareness of efficient technologies to better understand builder priorities within the Colorado market.
- **Barriers to Participation:** The evaluation team will investigate barriers to product participation and to pursuing efficient designs in general. The team will also identify specific barriers builders face when building homes for moderate- and low-income market segments.
- **Retrospective NTG Impacts:** The evaluation team will ask non-participating builders if they installed energy efficient technologies or equipment due to any influence from Xcel Energy outside of the product. This information will support potential spillover results among non-participating builders.

For the non-participating builder survey, the evaluation team will attempt to interview 20 non-participating builders.

Homeowner Surveys

The evaluation team will use homeowner web surveys to meet process objectives. Homeowners are defined as the end-users living in the energy efficient new home. These surveys will be conducted over the phone and will focus on the following topics: perceptions/awareness, decision-making, and barriers.

[5] Small volume builders are generally defined as those builders who construct fewer than 20 homes per year, however this threshold may be updated based on product data analysis.

- **Perceptions/Awareness:** The evaluation team will assess homeowner perceptions and awareness of the product, as well as energy efficient building practices to better understand how this may hinder greater product participation.
- **Homeowner Decision-Making and Barriers to Participation:** The evaluation team will discuss homeowners' motivation behind, as well as barriers to, purchasing an energy efficient home.

For the homeowner survey, the evaluation team will attempt to survey a representative mix of income-qualified customers, using participation in the Low Income Home Energy Assistance Program (LIHEAP) and other products within Xcel Energy's Colorado Low Income Segment as a proxy for this income tier.

Trade Partner Interviews

The evaluation team will use trade partner interviews to meet process objectives and the market effects impact objective. We expect to conduct 20 interviews with HERS Raters. These interviews are integral for exploring the following topics.

- **Barriers to Participation:** The evaluation team will discuss builders' motivation behind and barriers to building energy efficient homes from the perspective of HERS Raters.
- **Product Experience/Satisfaction:** The evaluation team will discuss HERS Raters' experience with and satisfaction with the product, including experience with marketing the product.
- **Market Growth:** The evaluation team will further investigate the proportion of the builder market that Xcel Energy is capturing through the product. Further, the team will focus on if and how builders are constructing efficient buildings in lieu of product participation.

The evaluation team will attempt to conduct these interviews after the participating builder surveys so that we can follow-up with trade partners that builders identified as being particularly influential to their decision-making processes.

Peer Utility Benchmarking Interviews

The objective of the peer utility benchmarking task is to understand how peer utilities are approaching key issues related to implementing residential new construction programs. The evaluation team will collaborate with the product manager to identify 4 peer utilities to interview. It can consider the following criteria when selecting peer utilities: similar program designs, programs known to have best practices or tools Xcel Energy is interested in pursuing, utilities that operate in similar territories (including the geography, the number of customers, and/or the number of annual new construction starts in its territory). In addition to these peer utility interviews, the evaluation team will incorporate findings from the peer utility benchmarking interviews conducted for the 2018 Minnesota Energy Efficient New Homes evaluation into this task.

The evaluation team will work to recruit staff in key management roles related to Colorado ENERGY STAR New Homes programs at peer utilities with a target sample size of four to six interviews. These interviews will generally focus on the same discussion topics being explored in the surveys and interviews with builders and trade partners, with a focus on objectives not fully addressed through the 2018 Minnesota Energy Efficient New Homes evaluation peer utility

benchmarking interview. The following research objectives specific to peer benchmarking interviews will be emphasized:

- **Energy Code Advancement:** There is interest among product staff and the evaluation team in understanding how other utilities account for increasingly stringent code adoption and rising baselines within their residential new construction programs, such as specific programmatic changes that equip utilities to effectively support builders.
- **Housing Markets:** The evaluation team and product staff want to investigate if and how other utilities assist builders in constructing affordable energy efficient homes for moderate- and low-income customers in their service territories.
- **Electrification and Integrated Homes:** The evaluation team and product staff want to investigate if and how other utilities are supporing electrification and integrated homes, and how these programs support broader utility goals related to these topics, if at all.
- **Construction Growth:** As the greater Denver area and other Colorado regions experience increased construction growth due to urbanization, the evaluation team will seek feedback from utilities whose service territories have experienced similar periods of growth.

The evaluation team identified the following peer utilities to include in the peer utility sample in collaboration with the product manager. The evaluation team will review these utilities and identify additional peer utilities with Xcel Energy for consideration prior to conducting the interviews:

- Duke Energy
- Arizona Public Service
- Eversource Massachusetts
- Idaho Power
- Rocky Mountain Power

The evaluation team will develop a peer utility interview guide that is customized to the desired benchmarking components, to be provided to Xcel Energy for approval prior to beginning any data collection. Finally, the evaluation team will summarize the results of the benchmarking analysis in a summary within the final evaluation report. The summary will include a description of the comparability of each utility, based on the factors identified during the planning task.

A.5 Net-To-Gross Approach

The NTG assessment aims to estimate the percent of savings achieved that can be attributed to product actions, or a NTG ratio. The NTG value includes multiple metrics, which are described in the sections below. To do so, the evaluation team will primarily use self-report participating builder surveys and nonparticipating builder interviews to assess product attribution, including free ridership, spillover, and market effects metrics. The team will base its methodology on the most recent Illinois Technical Reference Manual (TRM)[6] as this type of approach is used

[6] Illinois Energy Efficiency Stakeholder Advisory Group. Illinois Statewide Technical Reference Manual, Version 9.0, Volume 1, Attachment A: Illinois Statewide Net-to-Gross Methodologies, Volume 1.

extensively in other jurisdictions both by our team and outside industry experts, and it has been the basis for our evaluations conducted for Xcel Energy since 2017.

The evaluation team will estimate a retrospective and prospective NTG value. Using multiple sources of information, including surveys and interviews with builders, we will synthesize available data to develop the final NTG ratios to ensure that we provide the most accurate and reliable estimate of NTG. The remainder of this section presents the evaluation team's method to estimating the retrospective and prospective NTG ratios.

Retrospective NTG

The evaluation team will estimate a retrospective NTG by examining free ridership, spillover, and market effects. The evaluation team will rely on data collected from builders, and will then synthesize these results to estimate a NTG ratio for the product. The evaluation team will not estimate NTG for builder add-on rebates including the ENERGY STAR certification and appliance rebates. This section describes how the evaluation team will estimate these components of the retrospective NTG ratios.

Free ridership. Free-ridership is a measure of the amount of a product's claimed savings that would have occurred in the absence of the product. Free-ridership is assessed on a scale from 0 to 1, where 1 indicates that the product had 100% free-ridership and all product savings would have occurred without any of the product's rebates or assistance.

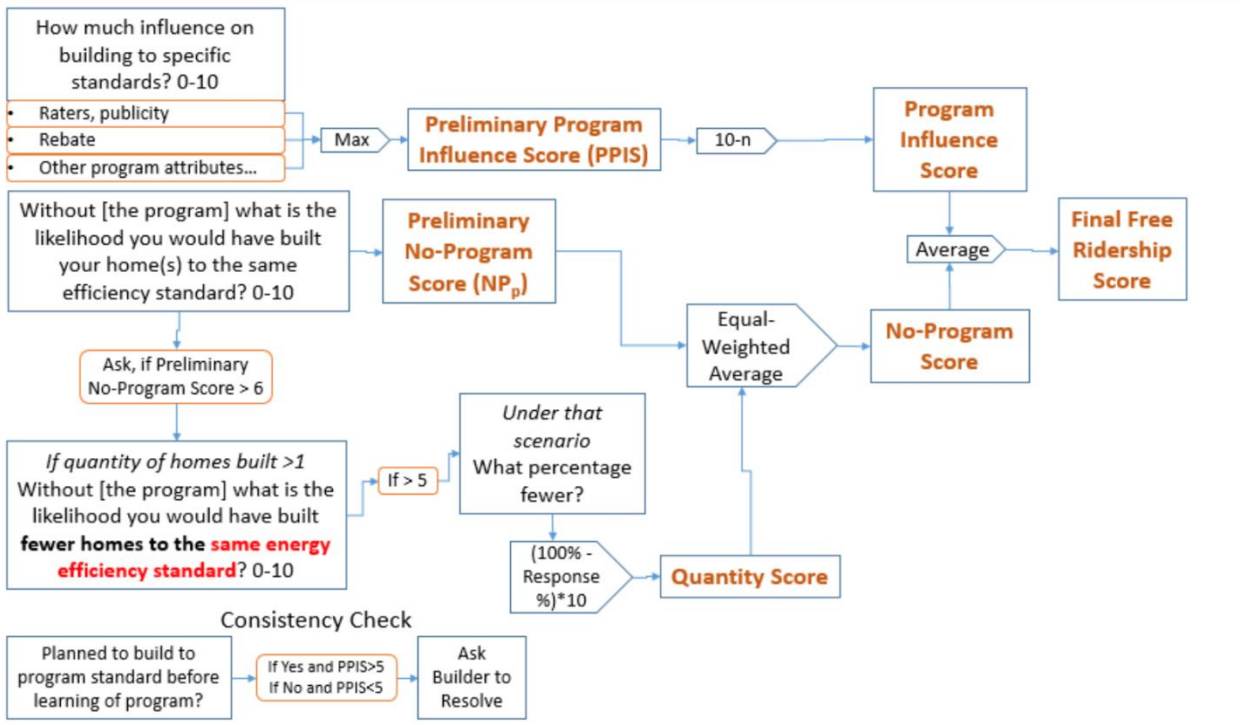
To determine free-ridership, the evaluation team will apply the Residential New Construction Protocol from the Illinois TRM, and write specific questions to assess two free-ridership components:

- **A Program Influence Score**, based on the participating builder's perception of the importance of various product components in their decision to build the energy-efficient home; and
- **A No-Program Score**, based on the participating builder's intention to build the home to the same energy-efficient standards, and in the same quantities, without product funds.

When scored, these components assess the likelihood of free-ridership on a scale of 0 to 10. These two scores are averaged together to produce the final free-ridership score. **Error! Reference source not found.** describes the logic used for calculating free ridership.

September 25, 2020. https://www.icc.illinois.gov/downloads/public/2021%20IL-TRM%20Version%209.0%20dated%20September%2025,%202020%20Final%20(Volumes%201-4%20Compiled).pdf

Figure 1. Residential New Construction Free Ridership Calculation Methodology[7]



Participant Builder Spillover. The spillover metric represents additional savings achieved as a result of product activities, outside of rebated measure savings, by participating builders. For this evaluation, participant spillover represents exceeding local building codes and changes to common construction practices. The evaluation team will incorporate two practice attribution scores; the first incorporates the influence the product had on builders modifying their building practices (practice attribution score #1), and the second incorporates likely actions taken in absence of product participation (practice attribution score #2). The spillover score, as calculated below,[8] must be greater than five in order for the additional building practice to qualify for spillover. When this criterion is met, the savings are added to product attributable savings.

$$Spillover\ Score = \frac{Practice\ Attribution\ Score_1 + (10 - Practice\ Attribution\ Score_2)}{2} > 0.5$$

Nonparticipant Builder Spillover. The evaluation team will also estimate a nonparticipant spillover metric; nonparticipant spillover is potentially created through builders who are exposed to the product, but do not participate. In this evaluation, nonparticipants include non-participating builders, defined as builders who have not completed participation in the product, which includes both those who have not participated in the past (non-participants) and those who participated in the past, but did not participate between January 2018 and December 2020 (lapsed participants).

[7] As depicted in the IL TRM Version 9, Volume 4, Figure 4-12, page 88.

The interviews will ask nonparticipating builders if other participating builders' improved practices influenced their own building practices and in what ways, specifically identifying building practices above that jurisdictions' energy code.

To calculate the nonparticipant builder spillover percentage for each qualifying builder the evaluation team will follow these steps[9]:

- Calculate the difference between the total reported energy-efficiency upgrades sold and the total that would have been sold had the product not existed, which is the net number of upgrades by type for a builder.
- Multiply this net number of upgrades by the average gross unit savings for each type of upgrade.
- Total this for each builder and weight by the ratio of the population of non-active builders to the sample of builders, which is the total nonparticipant spillover energy for the program period.
- Lastly, divide the spillover energy savings by program gross savings.

Market Effects. The participating builder surveys and interviews will offer important insights into market effects of the product. Our surveys and interviews with builders will ask about what portion of customers purchase highly-efficient homes that do not receive an Xcel Energy rebate. These additional energy-efficient home purchases may be considered as product impacts through the market effects assessment. These additional energy-efficient home purchases will be considered on a case by case basis to ensure that market effects are not double counted. Market effects that capture additional product impacts beyond nonparticipant spillover will be included.

The prospective NTG (described below) may also provide valuable insights into the remaining savings potential of the residential new construction market.

Estimating NTG Ratio. By design, our final NTG estimate recommendation includes data from mixed methods research – both quantitative data and qualitative data. The initial NTG estimates will be calculated separately and estimated using self-reported participating builder responses and nonparticipating builder survey responses. The formula to calculate the retrospective NTG ratio is as follows:

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

After the initial NTG estimates are calculated, we will then use the quantitative and qualitative data to construct a logical, internally consistent, and coherent narrative of product attribution that attempts to identify all possible pathways of Xcel Energy influence. We will rely on the following data sources to construct the NTG ratio:

- Participating builder surveys
- Participanting builder interviews
- Non-participating builder interviews

Based on these results, we then may adjust the NTG to create a final recommended NTG ratio that is consistent with this narrative and is informed by the overall purpose and design of the

[9] 2021 IL TRM v9.0 Vol. 4_September 25, 2020_FINAL p. 93 of 148

product. The final NTG recommendation is based on the professional judgment of our team after considering all available quantitative and qualitative data.

Prospective NTG

The team will recommend a prospective NTG ratio that will be forward-looking and reflect upcoming changes to the market and known changes to the product. The NTG ratio will reflect any recommended adjustments to the retrospective NTG ratio based on evidence from the evaluation findings, including results from participating builders, non-participating builders, trade partners, staff interviews, and peer utilities. In developing our final recommended NTG ratio, the evaluation team will follow the Illinois TRM protocol which recommends that the evaluation team assess each data collection activity based on considerations of the likely bias, accuracy, and representativeness of the findings. Additionally, we will use input from the staff interviews to inform potential future changes to the product and incorporate those into the final NTG estimate. We may also incorporate results from the benchmarking research into prospective NTG values used in other states to inform the estimate.

Appendix B: Data Collection Documents

B.1 Staff Interview Guide

Introduction

This guide is to be used to interview staff associated with Xcel Energy's DSM products as part of the TRC Companies 2021 evaluation of the Xcel Energy DSM products. The interviews will be semi-structured, with these questions serving as a basic guide for experienced TRC Companies staff during one-on-one phone interviews.[10] As a guide for semi-structured interviews, these questions will not necessarily be asked verbatim, but will serve as a roadmap during the conversation.

Staff Interview Research Questions or Objectives

List the research questions that this research task is designed to address.

- Assess the extent to which the product design supports product objectives and customer service/satisfaction objectives
- Understand Xcel Energy's current CO ENERGY STAR New Homes offerings
- Assess the degree to which product resources are sufficient to conduct product activities with fidelity to the implementation plan
- Collect staff feedback on implementation successes and challenges
- Identify themes and issues for possible revisions to the standard evaluation plan

Interview

Section A: Introduction

[If staff did not attend the kick-off meeting:] First we would like to give you some background about who we are and why we want to talk with you today. TRC Companies is an independent consulting firm that works with electric and gas utilities to review and improve product operations and delivery. Xcel Energy contracted with us to perform an evaluation of their portfolio of energy efficiency products, and we're currently in the process of conducting interviews with product managers and key staff involved in designing and delivering the CO ENERGY STAR New Homes to improve our understanding of Xcel Energy's DSM products and their influence on customers. We also want to understand how our research can be useful for you as Xcel Energy product staff and incorporate your priorities into our study so that the results are as useful as possible.

[ALL] Thank you for taking the time to speak with us today. My objective for this meeting today is to gain a deeper understanding of the CO ENERGY STAR New Homes, what Xcel Energy hopes to achieve through implementing this product, how it operates, and a bit about your experiences with the CO ENERGY STAR New Homes. We are interested in asking you some questions about the CO ENERGY STAR New Homes so we can benefit from your knowledge and experience to improve our understanding. I have a set of questions that should take

[10] Some interviews may be conducted jointly if someone's role recently changed or if more than one person performs the role.

approximately 45 minutes. We will combine the information you provide with information gathered from other interviews before reporting summarized information back to Xcel Energy.

Before I begin, is it alright if I record the conversation for note taking purposes? [RECORD IF ALLOWED AND CONFIRM YOU ARE RECORDING ONCE RECORDING BEGINS]. Thanks, we are recording now.

A1. First, can you take a moment and explain your role and scope of responsibilities with respect to the CO ENERGY STAR New Homes? [IF ALREADY KNOWN, REWORD TO CONFIRM]

Probes:

- Approximately how long have you held this position?
- What previous positions did you hold?
- Whom do you report to in the overall org structure?

Section B: Product Goals

I'd like to be sure I understand the goals of the CO ENERGY STAR New Homes, both overall and specific.

B1. Can you take me through the key goals for the CO ENERGY STAR New Homes?

[For staff outside of the Customer Solutions team] Can you take me through the key goals for the CO ENERGY STAR New Homes, as it relates to your role?

B1a. Can you describe the product's savings goals? Do you have specific goals for individual components of the product (e.g., upstream vs. downstream, by measure type)?

B1b. Any other, non-energy goals?

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

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

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

B2a. What was the rationale for changing them?

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

B2c. Where these changes a result of internal factors (to Xcel Energy), external factors, or a combination of both?

B3. Have any of these goals changed in 2020?

B3a. What was the rationale for changing them? Probe: COVID-related changes?

B3b. In your opinion, how have these changes affected the product's operations or its outcomes?

B4. What are "indicators of success" for the CO ENERGY STAR New Homes?

B4a. What are interim indicators that the CO ENERGY STAR New Homes is or is not meetings its objectives or goals?

B5. What influences, if any, do you think the CO ENERGY STAR New Homes has had on the market?

Section C: Product Activities

I would like to make sure I have a solid understanding of how this product operates and talk through the different components of the product. If there are any formal documentation and/or websites that you can refer me to as we walk through these next questions, I'd appreciate getting that information.

C1. Can you describe the incentives and/or tools the product uses to achieve its goals, with incentives including both monetary incentives as well as services provided directly by someone on behalf of Xcel Energy

C2. Have any of these incentives changed in the last few years?

C2a. If yes - What was the rationale for changing them?

C2b. If no- Do you anticipate any changes in the near fut?ure?

C3. What activities do product and implementer staff engage in to achieve product goals?

- Marketing?
- Financial Assistance?
- Applications?
- Technical Assistance?
- Education?
- Contractor/Trade Partner Support?
- Drop Ship/Direct Install?

C3a. What tools are used to reach out to customers and/or market partners?

C3b. Are these product activities modeled on another product or set of products?

C4. Have any of these activities changed in the last few years?

C4a. What was the rationale for changing them?

C4b. In your opinion, how have these changes affected the product's operations or its outcomes?

C4c. Have you measured how these changes impacted savings or participation?

C5. What are the participation steps from a customer perspective?

Section D: Strengths and Challenges

Next, I'd like to get your feedback on how the product is running.

D1. In your opinion, what are the strengths of the CO ENERGY STAR New Homes as it is currently being run?

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

D2. What are the most significant challenges for this product at this point?

D3. What feedback, if any, do you receive from customers on the product? (PROBE FOR CUSTOMER ENGAGEMENT/ CUSTOMER SATISFACTION)

D4. What do you believe are the biggest barriers to getting customers to participate in this product?

D5. Are there any specific opportunities for improvement in the design or implementation of the product? Please describe.

D6. What would you like to see changed in how the product is designed or run, if anything?

D6a. Do you think there are any roadblocks preventing these changes from happening?

Section E: Resources

E1. What resources do you rely on to implement the product?

E1a. Product, implementer, sales staff?

E1b. Management and product direction?

E1c. IT tools and data tracking tools?

D1d. Other resources?

E2. Are these resources sufficient to implement the product as designed?

E2a. [IF NO] How could the product design/implementation change to be more efficient?

E2b. [IF NO] What additional resources, if any, would help you implement the product as designed?

E3. Have any of these product resources changed in the last few years?

E3a. What was the rationale for changing them? Any COVID related changes?

E3b. In your opinion, how have these changes affected the product's operations or its outcomes?

Section F: Product Tracking and Reporting

I understand that you are using Salesforce as your primary product tracking tool. I'd like to understand how product activities are tracked to understand what data might be available to us in our evaluation.

[TAILOR BASED ON WHAT IS ALREADY KNOWN]

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

F2. What kinds of data are collected for the CO ENERGY STAR New Homes?

F3. Are there any data that you would like to collect for the CO ENERGY STAR New Homes but haven't been able to?

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

F5. As part of our evaluation, we may want to speak to "near-participants," customers/distributors that were eligible to participate in the product, showed some interested in product participation, but didn't participate for whatever reason. Would these customers/distributors all be tracked in Salesforce?

F6. [For Engineering Staff] What kind of baseline does the product use to estimate energy savings? [PROBE FOR CODE VS. COMMON PRACTICE]

Section G: Closing

G1. Based on the kickoff meeting, we are planning to prioritize the prospective NTG and any necessary changes to program design given increasingly stringent energy codes, as well as barriers to participation for non-participating customers Does this align with your understanding?

G1a. Do you have anything you would like to add to these priorities, remove from this set of priorities, or change about these priorities?

G2. Do you have particular questions that you would like to see answered by the evaluation? Why are these questions important?

G3. Do you have any other comments, concerns or suggestions about the product that we didn't discuss that you would like to make sure I know about?

G4. Are there any particular product staff members you would like to make sure we talk with?

G5. Do you have any peer utilities that you'd like us to include in the peer utility benchmarking interviews? Peer utilities could either include utilities that have been identified by internal or external parties as exemplary or utilities with a similar climate, customer mix, etc. to understand their practices.

G5a. What criteria is most important to you when selecting a peer utility (e.g., similar climate, similar time in market, etc.)?

G5b. What performance indicators are you interested in the evaluation benchmarking?

Thank you very much for taking the time in assisting us with this evaluation. If I come up with any additional questions that come from this interview, do you mind if I send you an email or give you a quick call?

B.2 Participating Builder Survey Instrument

Introduction

To support the process and impact evaluation of the 2020 Xcel Energy energy efficiency products, the TRC evaluation team will conduct telephone surveys with participants. For the purposes of this survey, the evaluation team defined a participating customer as any customer that closed a Colorado ENERGY STAR New Homes project between January 2018 and December 2020. For small volume builders, the evaluation team may include builders who

participated in the Product prior to January 2018 if additional sample is needed. The research will be conducted to assess key process and impact evaluation objectives, including builders' perceptions and awareness, decision-making and barriers, Product experience and satisfaction, and NTG impacts, such as free-ridership and spillover.

The remainder of the introduction provides the research questions which the participating builder survey is designed to address, a description of the sample population and the target number of completes, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The process objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the Product. In doing so, the evaluation team will explore the following:
  - Barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.
  - Barriers for participating and non-participating builders serving medium- and low-income customers.
- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform Product improvements.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.

The impact objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Determine NTG ratio for energy-efficient home rebates.
- Identify major drivers of free-ridership.
- Assess participant and nonparticipant spillover.
- Assess market effects of the Colorado ENERGY STAR New Homes Product.

The participating builder survey does not address every evaluation objective, including both process and impact objectives. For reference, Table 3 provides the evaluation efforts used for each objective.

Table 3. Evaluation Objectives by Research Activity

Evaluation Objective	Impact or Process Objective	Research Activity	Participating Builder Survey Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, trade partner interviews, benchmarking interviews	✓
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, trade partner interviews	✓
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	Process	Participating builder survey, nonparticipating builder survey, trade partner interviews	✓
Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Benchmarking interviews, trade partner interviews	
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work	Process	Participating builder surveys, homeowner surveys	✓
Determine NTG ratio for energy-efficient home rebates.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓
Identify major drivers of freeridership.	Impact	Participating builder survey	✓

Assess participant and nonparticipant spillover.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓
Assess market effects of the Colorado ENERGY STAR New Homes Product.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓

This participating builder survey is designed to address the following research questions:

- What are builders' perceptions of electrification initiatives?
- What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?
- What are builders' perceptions of grid interactive technologies?
- How well are the product's processes working for builders?
- What aspects of the product are easy / challenging for builders?
- What prevents builders from achieving higher-tier energy code savings?
- How do builders and homeowners interact? How do builders and Xcel Energy interact?
- How many builders have participated in other energy efficiency products?
- How many builders serve moderate- or low-income communities? What is easy / challenging about serving these communities?
- Does the product influence additional energy savings outside of what is captured through the product (i.e. spillover)?
- Would program participants install identical measures without the product availability (i.e., free-ridership)?
- What other opportunities do builders see that would help increase energy efficiency of new homes?
- Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?

Table 4 presents the link between each evaluation objective, research question, and survey question.

Table 4. Evaluation Objective, Research Question, and Survey Question Crosswalk

Evaluation Objective	Research Question	Survey Question Number(s)
Determine NTG ratio for energy-efficient home rebates.		Section C

Identify major drivers of free ridership.	• Would program participants install identical measures without the product availability (i.e. free-ridership)?	Section C
Assess market effects of the Colorado ENERGY STAR New Homes Product	• Does the product influence the underlying structure and functioning of the market?	Section C
Assess participating and non-participating builder spillover.	• Does the program influence additional energy savings outside of what is captured through the product (i.e. spillover)?	Section D
Investigate the barriers preventing participating builders from achieving higher tier energy code savings	• What prevents builders from achieving higher-tier energy code savings? • How well are the product's processes working for builders? • What aspects of the product are easy / challenging for builders?	E1 – E2, Section F, Section G
Connect the link between customers and the utilities, two parties which do not *have* to communicate to make the Product work.	• How do builders and homeowners interact? How do builders and Xcel Energy interact? • Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?	B4 – B6, E1
Understand the impacts of jurisdictional goals (e.g., electrification) and increasingly stringent energy codes and rising baselines on the product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	• What are builders' perceptions of electrification initiatives? • What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)? • What are builders' perceptions of grid interactive technologies? • How many builders have participated in other energy efficiency programs?	A3, B2 – B3, G4 – G6
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	• What other opportunities do builders see that would help increase energy efficiency of new homes?	G4 – G6
Identify where and how there is potential future coordination with other Xcel Energy products.	• How many builders have participated in other energy efficiency programs?	A3

Identify barriers for participating and non-participating builders serving medium- and low-income customers.	• How many builders serve moderate- or low-income communities? • What is easy / challenging about serving these communities?	A5, A6, E1

Sample Population and Target Completes

Table 5 provides the sample population based on data provided to the evaluation team in May 2021. The population includes all builders who completed at least one home through the Product between January 2018 and December 2020.

Table 5. Sample Population and Target Completes

	Population	Target Completes	Response Rate for Statistically Significant Results
Participating Builders	88	40	45%

Sample Variables

Table 6 include the sample variables that will be used to conduct this survey, as well as descriptions of these variables and potential codes.

Table 6. Sample Variables

Sample Variable	Variable Description	Potential Codes
Interviewer Name	Name of interviewer from Ewald and Wasserman	e.g. Emma Weaver
Organization	Organization name	e.g. TRC
Contact	Contact at organization	e.g. Allie Hotzfeld
Year	Most recent year builder completed projects through program	e.g. 2020
Program	Program name	"Colorado ENERGY STAR New Homes"
Participation	Number of customer new homes built in 2018-2020 for which the builder received a rebate	Numeric
Phone	Phone number for contact at organization	e.g. 555-555-5555
Average_Envelope_Tier	Average % energy savings above baseline for homes rebated through the program	e.g. "17%"
Average_Dollar_Amount	Average amount of rebate received through the program based on average envelope tier	Numeric

Fielding Instructions

- Attempt each record six times on different days of the week and at different times.

- Leave messages on the first and fourth attempt.
- Experienced interviewers should attempt to convert "soft" refusals (e.g., "I'm not interested", immediate hang-ups) at least once.
- The survey is considered complete when CLOSE1 is answered.
- After the survey fielding subcontractor (Ewald and Wasserman) completes 5 interviews, hold calling and output a preliminary SPSS dataset (i.e. file ending in .sav) and recordings of the pretest interviews. Resume calling after TRC 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 9 AM to 5 PM MDT.

Survey Sections

- **Intro.** Introduction and Screening
- **A.** Firmographics, Operations, Participation
- **B.** Awareness and Homeowner Interactions
- **C.** Free-ridership
- **D.** Spillover
- **E:** Program Implementation and Processes
- **F:** Satisfaction
- **CLOSE:** Closing

Survey

Section Intro: Introduction and Screening

Intro1. Hello, this is **<INTERVIEWER NAME>** calling from Ewald and Wasserman, a national research firm working with Xcel Energy. I'm hoping to speak to someone at your organization who would be familiar with your company's participation in the Xcel Energy **<PROGRAM>** in **<YEAR>.** Our records show that your company, **<ORGANIZATION>**, received at least one rebate from this program for building a new home that was at least 10% better than code. May I speak with **<CONTACT>?**

1. Yes, that would be me.

2. Yes, let me transfer you to the correct person **[IF NAME GIVEN, ENTER AS <CONTACT>; REPEAT QUESTION INTRO1 WITH NEW RESPONDENT]**

3. No, they are not available right now.-SET Callback

4. No, they are no longer employed by this organization.

5. No, other reason (SPECIFY).

DK **[TERMINATE]**

REF **[TERMINATE]**

[ASK IF INTRO1=1, 4, OR 5]

Intro2. Are you the person at **<ORGANIZATION>** who is most familiar with your company's participation in the Xcel Energy **<PROGRAM>** program, or at least as familiar as anyone else there?

1. Yes.

2. No, they are not available right now. **(Skip to Intro4)**

3. No, that's someone else. **(Skip to Intro4)**

4. No, that person no longer works here. **(Skip to Intro3)**

5. Not applicable – this organization did not participate in any such program. **[TERMINATE]**

DK **[TERMINATE]**

REF **[TERMINATE]**

[Ask IF Intro2 = 1]

Intro2_1. Is there anyone else at your organization who is involved in the decision making about the energy efficiency of the homes that your organization builds?

1. Yes, **[SPECIFY] (Skip to Intro6)**

2. No **(Skip to Intro6)**

DK **(Skip to Intro6)**

REF **(Skip to Intro6)**

[ASK IF INTRO2=4]

Intro3. Is there someone else that is knowledgeable about your participation in the **<PROGRAM>** program?

1. Yes.

2. No **[TERMINATE]**

DK **[TERMINATE]**

REF **[TERMINATE]**

[ASK IF INTRO2=2-3 OR INTRO3=1]

Intro4. What is this person's name?

1. **[RECORD CORRECT PERSON' S NAME AS <CONTACT>]**

DK **[TERMINATE]**

REF **[TERMINATE]**

[ASK IF INTRO4=1]

Intro5. Would I reach that person by dialing the same number I used to connect with you: **<PHONE>**?

1. Yes

2. No, use a different number **(RECORD HERE AS <PHONE>) [THANK AND TERMINATE; REDIAL NEW SAMPLE CASE]**

DK **[TERMINATE]**

REF **[TERMINATE]**

PROGRAMMER NOTE: Only those for whom Intro1=1 or Intro2=1 should get to this screen; the rest would end at Intro5 as they will need to be made into new sample cases and called back at a later time.

[ASK IF INTRO1=1 OR INTRO2=1]

Intro6. Great! (IF NEEDED: Again, we're Ewald and Wasserman, a national research firm calling on behalf of Xcel Energy). I would like to invite you to participate in a short survey that will help Xcel Energy improve the **<PROGRAM>** program to best suit the needs of businesses like yours. The survey takes about 20 minutes on average, and as a small token of appreciation, we are offering a $25 gift card that you will receive after completing the survey. Your responses will remain confidential, meaning that your name and company name will not be attributed to your answers.

Is now a good time or should we call you back?

1. No objection – fine to continue

2. Objection **[RESOLVE AND RESCREEN AS NECESSARY]**

REF **[TERMINATE]**

Section A: Firmographics, Operations, Participation

First, I'd like to gather some information about your organization's involvement with the Xcel Energy **<PROGRAM>** program, your organization, and your role at your organization.

A1. What is your occupational title within your company?

1. (**Ask Open-Ended**)

99. Prefer not to answer

DK

A2. Were you the primary contact between your organization and the Xcel Energy **<PROGRAM>** program staff?

1. Yes **(Skip to A3)**

2. No

DK **(Skip to A3)**

REF **(Skip to A3)**

[If A2 = 2]

A2a. Who was the primary contact?

1. Someone else at my firm **(Ask name and title)** _____
2. Other _____

DK

REF

[ASK ALL]

A3. Has your organization previously participated in any other Xcel Energy energy efficiency program?

1. Yes, **[SPECIFY]**
2. No, never participated in an Xcel Energy program

DK

REF

[ASK ALL]

A5. What is the typical selling price of the homes your organization builds?

1. Under $250,000
2. $250,000 to $399,999
3. $400,000 to $549,999
4. $550,000 to $699,999
5. $700,000 to $849,999
6. $850,000 to $999,000
7. $1,000,000 and over

DK

REF

A6. Which housing markets do you typically serve?

[Read answering options. Can select multiple.]

1. Affordable
2. Entry-Level
3. Move-Up
4. Luxury/Custom
5. Vacation/Second
6. Other _____

DK

REF

Section B: Awareness, Electrification and Homeowner Interactions

[ASK ALL]

B1. Next, I'd like to understand a little more about how you first became aware of Xcel Energy rebates for **<PROGRAM>**. Was it from:

[Read answering options. Select one.]

1. Xcel Energy program staff
2. Home Energy Rating System (HERS) rater
3. Xcel Energy educational training
4. Xcel Energy sponsored development
5. Xcel Energy website, media promotions (TV, mass media ads) or other marketing materials
6. Xcel Energy event, expo, or demonstration
7. Xcel Energy staff at a trade show or other industry event
8. Another business or other word of mouth
9. Other **[SPECIFY]**

DK

REF

[ASK ALL]

B2. Are you familiar with the term "electrification"?

1. Yes, **very** familiar

2. Yes, **somewhat** familiar

3. No, **not at all** familiar

DK

REF

[If B2 = 1 or 2]

B2a. What does the term "electrification" mean to you?

1. [OPEN END, RECORD VERBATIM]

DK

REF

[IF B2=3 AND ASKED FOR DEFINITION] Electrification refers to the shift from any non-electric source of energy to electricity at the point where the energy is consumed (i.e., in the home).[11]

[If B2 = 1 or 2]

[11] https://www.nrel.gov/docs/fy18osti/71500.pdf

B3. How would you describe your overall opinion of electrification, on a scale from 1 to 5, where 1 is "not at all favorable" and 5 is "very favorable"?

1. **[NUMERIC OPEN END, 1 - 5]**

77. Not applicable

DK

REF

[If B3 = 1]

B3a. Why did you rate your overall opinion of electrification a **<numeric response to B3>**?

1. [OPEN-END]

DK

REF

Section C: Free-ridership

Included as background only, NOT to be read during the survey: Free-ridership is a measure of the amount of a Product's claimed savings that would have occurred in the absence of the program. 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.

To determine free-ridership, the evaluation team will apply the Residential New Construction Protocol from the Illinois TRM, and write specific questions to assess two free-ridership components:

- A **Product Components Score**, based on the participating builder's perception of the importance of various Product components in their decision to build the energy-efficient home; and
- A **No-Product Score**, based on the participating builder's intention to build the home to the same energy-efficient standards, and in the same quantities, without product funds.

When scored, these components assess the likelihood of free-ridership on a scale of 0 to 10, with the two scores averaged and the timing adjustment applied to create a final free-ridership score.

[ASK ALL]

C0. In your own words, how would you describe the influence that the Xcel Energy <PROGRAM> had on your decision to build new home(s) better than code?

1. [RECORD VERBATIM]

DK

REF

C0_1. (INTERVIEWER: PLEASE READ THE FOLLOWING SLOWLY AND CAREFULLY)

Making decisions can sometimes be relatively simple, involving one major factor, like price. Or, they can be relatively complex involving multiple factors, such as cost, information provided by your utility, and meeting customer preferences.

[SELECT HALF OF PARTICIPANTS TO RANDOMLY SHOW C0_2 BEFORE C0_3; FOR THE OTHER HALF, SHOW C0_3 BEFORE C0_2]

C0_2. **[SHOW IF C0_2 SHOWN SECOND:** There might be other things that influenced your decision such as…] For example, for each eligible new home, you received:

- An incentive of [INSERT <AVERAGE_DOLLAR_AMOUNT>]
- Information through marketing or informational and educational materials about the benefits of installing energy efficient equipment
- Technical assistance provided by Xcel Energy, by a third party that was funded through Xcel Energy, or support from prior participation in an Xcel Energy program.

C0_3. **[SHOW IF C0_3 SHOWN SECOND:** There might be other things, not related to the program that might also **[SHOW IF C0_3 SHOWN FIRST:** For example, many factors may**]** have influenced your decision to build new home(s) to an average **<AVERAGE_ENVELOPE_TIER>** above code. For example, these factors may have included

- Customer preference,
- Company policies,
- Your own experiences with energy efficient equipment and/or materials, or
- Your own research on energy efficiency equipment and/materials.

C1. There are of course many other possible reasons.

Next, I'm going to ask a few questions about your decision to build new homes at an average energy savings of **<AVERAGE_ENVELOPE_TIER>** above the code**.** Please rate the importance of each of the following factors on your decision using a scale from 0 to 10, where 0 means "not at all important" and 10 means "extremely important". The bigger the number, the greater the influence. If you don't know, just say "I don't know". If a factor is not applicable, say "Not applicable". Now, how important was…

(RANDOMIZE C1a-C1j, REPEAT SCALE AS NECESSARY)

1. [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

DK

REF

C1a. The dollar amount of the rebate [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1b. An endorsement or recommendation by Xcel Energy staff [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1c. Information from Xcel Energy marketing or informational materials [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1d. Previous experience with energy efficient equipment or materials installed in the new home [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF**]**

[ASK IF C1d>5 and C1d<77]

C1d_1. Was this experience through an Xcel Energy program?

1. Yes
2. No

DK

REF

C1e. Customer preference or request [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1f. Margin to install energy efficient equipment / materials [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1g. Your previous participation in an Xcel Energy program [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1h. Information received from any training or events conducted by Xcel Energy [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1i. Achieving a certification like ENERGY STAR [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

[ASK IF C1i>5 and C1i<77]

C1i_1. Did you learn about this certification through the Xcel Energy <PROGRAM> program?

1. Yes
2. No

DK

REF

C1j. Environmental factors like reduced carbon emissions [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

C1o. Were there any other factors that were important to your decision to participate in the program? **(ASK OPEN END)**

1. Yes (SPECIFY, RECORD OPEN END)
2. No additional factors

DK

REF

[ASK IF C1o=1]

C1o_1. On the same scale from 0 to 10, how would you rate the importance of that factor? [NUMERIC OPEN END, 0 – 10, 77=NA 88=DK, 99=REF]

1. [NUMERIC OPEN END, 0 - 10]

DK

REF

[CREATE INTERNAL VARIABLE: Max_ProgramFactor.

IF C1d_1=1 AND C1i_1=1, SET Value = max(C1a, C1b, C1c, C1d, C1g, C1h, C1i).

IF C1d_1=1 AND C1i_1=2, DK, OR REF, SET Value = max(C1a, C1b, C1c, C1d, C1g, C1h).

IF C1i_1=1 AND C1d_1=2, DK, OR REF, SET Value = max(C1a, C1b, C1c, C1d, C1g, C1i).

ELSE, SET Value= max(C1a, C1b, C1c, C1g, C1h).]

C5a. If the incentive, information, and other support from the Xcel Energy **<PROGRAM>** was not available, would you have built the new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code**? If you are not sure, please let me know.

1. Yes
2. Maybe / not sure
3. No (Skip to D1)

77. Would not have built homes above code at all (Skip to D1)

REF

[IF NEEDED] Building to the exact same efficiency level or standard could mean using building practices, installing equipment (e.g., lighting, heating, cooling or water heating equipment) and/or installing appliances that would as a whole consume the same amount of energy.

[ASK IF C5a=1,2,REF, ELSE SKIP TO D1]

C5b. Using a scale from 0 to 10, where 0 means “not at all likely” and 10 means “extremely likely”, please rate the likelihood that you would have built the new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** if the Xcel Energy **<PROGRAM>** was not available.

1. [NUMERIC OPEN END, 0 - 10]

DK

REF

PROGRAMMING NOTE:

if (ans = 0) skp C5e

if (ans = 1) skp C5e

if (ans = 2) skp C5e

if (ans = 3) skp C6

if (ans = 4) skp C6

if (ans = 5) skp C6

if (ans = 6) skp C6

if (ans = 7) skp C5d

if (ans = 8) skp C5d

if (ans = 9) skp C5d

if (ans > 76) skp C6

[ASK IF C5b=10]

C5c. To clarify, you just told me that it is extremely likely that you would have built new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** if you did not have any support, information, or rebates from the Xcel Energy **<PROGRAM>** program.

Is that correct, or do you want to change the likelihood that you would have built the new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** without support from Xcel?

1. Yes, rating is correct [Skip to C6]

2. No, rating is incorrect, want to change likelihood **[LOOP BACK TO C5b]**

DK [Skip to C6]

REF [Skip to C6]

[ASK IF C5b > 6]

C5c_1. We are trying to gain a deeper understanding of why builders use energy efficient building practices and would love to have additional feedback. You just told me that it is likely that you would have built new homes to the exact same efficiency level of **<AVERAGE_ENVELOPE_TIER> above code** if you did not have any support, information, or rebates from the Xcel Energy **<PROGRAM>** program. Can you elaborate on why?

1. [OPEN END, RECORD VERBATIM]

DK

REF

[ASK IF C5b = 7-9 and Max_ProgramFactor > 7]

C5d. You just rated your likelihood to have built new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** without any support or incentives from the **<PROGRAM>** as a(n) **<RESTORE RESPONSE FROM C5b>** out of 10, suggesting that the program was not very important. Earlier, when I asked you to rate the importance of each factor associated with the **<PROGRAM>** program on your decision, the highest rating you gave was a **<Max_ProgramFactor>** out of 10, suggesting that the program was very important. Is this correct or should I go back and change one of your answers?

1. Correct – leave answers as is [Skip to C6]

2. Change the likelihood of building new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above baseline** without the program **[RETURN TO C5b]**

3. Change the influence of the program factors **[C5FactorUpdate]**

DK [Skip to C6]

REF [Skip to C6]

[ASK IF C5b = <3 and Max_ProgramFactor < 3]

C5e. You just rated your likelihood to have built new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** without any support or incentives from the **<PROGRAM>** as a(n) **<RESTORE RESPONSE FROM C5b>** out of 10, suggesting that the program was very important. Earlier, when I asked you to rate the importance of each factors associated with the <PROGRAM> program on your decision, the highest rating you gave was a **<Max_ProgramFactor>** out of 10, suggesting that the program was not very important. Is this correct or should I go back and change one of your answers?

1. Correct – Leave answers as is [Skip to C6]

2. Change the likelihood of building new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above baseline** without the program **[RETURN TO C5b]**

3. Change the influence of the program factors

DK [Skip to C6]

REF [Skip to C6]

[ASK IF C5d = 3 OR C5e = 3]

C5FactorUpdate. You said you would like to change the influence of program factors. Which factor(s) would you like to change and what would you like to change them to? (Lower # = Lower importance, Higher # = Higher importance)

1. The dollar amount of the rebate (you said %C1a%/10):
2. An endorsement or recommendation by Xcel Energy staff (you said %C1b%/10):

3. Information from Xcel Energy marketing or informational materials (you said %C1c%/10):

4. Your previous participation in an Xcel Energy program (you said %C1g%/10)

5. Information received from any training or events conducted by Xcel Energy (you said %C1h%/10)

IF C1d_1=1

6. Previous experience with energy efficient equipment or materials installed in the new home (you said %C1d%/10):

[ASK IF C5b > 6 and <PARTICIPATION> > 1], Else skip to C8

C6. In absence of the Xcel Energy program, what is the likelihood you would have built fewer homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** you built through the **<PROGRAM>**? Please use a scale from 0 to 10, where 0 means "not at all likely" and 10 means "extremely likely".

1. [NUMERIC OPEN END, 0 - 10]

DK

REF

[ASK IF C6 > 5 and NOT DK or REF], Else Skip to C8

C7. Under that scenario, what percentage fewer homes?

1. [NUMERIC % OPEN END, 0 - 100]

DK

REF

C8. Before learning of the **<PROGRAM>** program, did you plan to build new homes to the same efficiency standard as you did as a participant in the program, **<AVERAGE_ENVELOPE_TIER> above code**?

1. Yes
2. No

DK

REF

[ASK IF C8 = 1 AND WERE NOT ASKED C5c_1]

C8_1. We are trying to gain a deeper understanding of why builders use energy efficient building practices and would love to have additional feedback. You just told me that you plan to build new homes to the same efficiency standard as you did as a participant in the program. Can you elaborate on why?

1. [OPEN END, RECORD VERBATIM]

DK

REF

[ASK IF C8=1 and <Max_ProgramFactor> > 5]

C8a. To clarify, you planned to build new homes to the *same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** before learning of the **<PROGRAM>** program. Earlier, when I asked you to rate the importance of each program factor on your decision, the highest rating you gave was a **<Max_ProgramFactor>** out of 10, suggesting that the program was very important in your decision-making. Is this correct or should I go back and change one of your answers?

1. Correct – Leave answers as is

2. Change the plan of building new homes to the *same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** before learning of the program **[RETURN TO C11]**

3. Change the influence of the program factors **[SKIP TO C11FactorUpdate]**

DK

REF

[ASK IF C8=2 and <Max_ProgramFactor> < 5]

C8b. To clarify, you did not plan to build new homes to the *same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** before learning of the **<PROGRAM>** program. Earlier, when I asked you to rate the importance of each program factor on your decision, the highest rating you gave was a **<Max_ProgramFactor>** out of 10, suggesting that the program was not very important in your decision-making. Is this correct or should I go back and change one of your answers?

1. Correct – Leave answers as is

2. Change the plan of building new homes to the *same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** before learning of the program **[RETURN TO C11]**

3. Change the influence of the program factors **[SKIP TO C8FactorUpdate]**

DK

REF

C8FactorUpdate. You said you would like to change the influence of program factors. Which factor(s) would you like to change and what would you like to change them to? (Lower # = Lower importance, Higher # = Higher importance)

1. The dollar amount of the rebate (you said %C1a%/10):
2. An endorsement or recommendation by Xcel Energy staff (you said %C1b%/10):

3. Information from Xcel Energy marketing or informational materials (you said %C1c%/10):

4. Your previous participation in an Xcel Energy program (you said %C1g%/10)

5. Information received from any training or events conducted by Xcel Energy (you said %C1h%/10)

IF C1d_1=16. Previous experience with energy efficient equipment or materials installed in the new home (you said %C1d%/10):

7. Achieving a certification like ENERGY STAR (you said %C1i%/10):

8. Environmental factors like reduced carbon emissions (you said %C1j%/10):

Section D: Spillover

[ASK ALL]

D1. Since your participation in the **<PROGRAM>** program in **<YEAR>,** has your company built any efficient new homes without applying for a rebate from Xcel Energy? When I say "efficient new homes", I mean new homes that were built in Xcel Energy service territory and would've been eligible for an Xcel Energy **<PROGRAM>** rebate.

1. Yes
2. No (Skip to E1)

DK (Skip to E1)

REF (Skip to E1)

[ASK IF D1=1, ELSE SKIP TO SECTION E]

D1a. For these efficient new homes in Xcel Energy territory that you did not receive a rebate for, why did you not apply an Xcel Energy rebate?

1. [OPEN END]

DK

REF

[ASK IF D1=1, ELSE SKIP TO SECTION E]

D2. For these new homes in Xcel Energy territory that you did not receive a rebate for, did your experience with the efficient equipment and/or materials you installed through the Xcel Energy **<PROGRAM>** influence your decision to install some or all of the additional efficient equipment?

1. Yes
2. No (Skip to E1)

DK (Skip to E1)

REF (Skip to E1)

[ASK IF D2=1, ELSE SKIP TO SECTION E]

D3. What type of efficient equipment did you install?

1. [OPEN END, RECORD VERBATIM]

DK

REF

D4. Approximately, what percent better than code were these homes you built that were not rebated by the Xcel Energy **<PROGRAM> program**? (Select one)

1.. < 10% better than local energy code

2.. 10% - 19% better than local energy code

3. 20%-29% better than local energy code

4. > 30% better than local energy code

DK

REF

[ASK IF D3=1-6, ELSE SKIP TO SECTION E]

D5. How important was your experience in the **<PROGRAM>**, including the equipment and/or materials you installed through the program, in your decision to install the additional equipment and/or materials in other new homes not rebated by the **<PROGRAM>**,? Please use a scale from 0 to 10, where 0 is "not at all important" and 10 is "extremely important".

1. [NUMERIC OPEN END (0-10)]

DK

REF

[ASK IF D3=1-6 ELSE SKIP TO SECTION E]

D6. If you had not participated in the **<PROGRAM>**, how likely is it that your organization would have installed these additional efficient equipment and/or materials, using a scale from 0 to 10, where 0 means you definitely WOULD NOT have installed and 10 means you definitely WOULD have installed them?

1. [NUMERIC OPEN END (0-10)]

DK

REF

D7. Are you familiar with Xcel Energy influencing the residential new homes construction market through talking with trade groups, state legistation, or other actions?

1. Yes [SPECIFY]

2. No

DK

REF

Section E: Barriers

E1. What, if anything, prevents your organization from building to a standard greater than an average **<AVERAGE_ENVELOPE_TIER>** above the local energy code?

[RECORD VERBATIM]

DK

REF

E2. Are there any challenges to building to a standard greater than an average **<AVERAGE_ENVELOPE_TIER>** above the local energy that are specific to affordable or entry-level housing?

1. Yes (SPECIFY)
2. No

NA

DK

REF

E3. At what point in the design and construction process are you making decisions about energy efficiency building materials, equipment and/or appliances?

1. Prior to applying for construction permits

2. After construction permits are acquired

3. Other (specify)

DK

REF

[ASK IF E3 = 1]

E4. How far in advance of applying for construction permits are you making decisions about nergy efficiency building materials, equipment and/or appliances?

1. **[OPEN END]**

DK

REF

Section G: Satisfaction (Programs and Components)

[ASK ALL]

G1. Thank you for your patience; we have only a few questions left.

I'm going to ask you to rate your satisfaction with various aspects of the program. For each, please rate your satisfaction on a scale from 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied", or let me know if it is not applicable to your project. How would you rate your satisfaction with: **[RANDOMIZE, PAUSE AFTER EACH FOR RATING, REPEAT SCALE IF NECESSARY]**

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

DK

REF

(RANDOMIZE)

G1a. The amount of time it took to receive your rebate

G1b. The dollar amount of the rebate

G1c. Your interactions with program staff

G1d. Your interactions with your rater

G1e. The structure of the rebate levels varying by percent better than code

[For any G1 < 3]

G2a – G2e. Why weren't you satisfied with **<RESTORE QUESTION WORDING FROM G1A – G1E>**

[ASK ALL]

G3. Thinking about your experience from start to finish, how would you rate your satisfaction with the **<PROGRAM>** as a whole? (IF NEEDED: Please use the same scale from 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied")

1. [NUMERIC OPEN END, 1 – 5]

77. Not applicable

DK

REF

If (ans = 3, 4) skip to G3b

If (ans = 5, 77, DK or REF) skip to G4

[ASK IF G3 <3]

G3a. Why weren't you satisfied with your experience with the **<PROGRAM>?**

1. [OPEN END]

DK

REF

[ASK IF G3 = 3-4]

G3b. What else could Xcel Energy do to improve your satisfaction with the **<PROGRAM>?**

1. [OPEN END]

DK

REF

[ASK ALL]

G4. Do you have an interest in installing any of the following electrification technologies and practices?

[Read G4a - G4d one at a time, receiving answers before moving on to the next one]

1. Yes
2. No

DK

REF

A. Electric Vehicle chargers
B. Hybrid and/or variable capacity electric heat pump technology
C. Grid-enabled heat pump water heaters
D. Advanced building assemblies such as SIP panels, advanced (2x6, 24 inches on center) framing, ICFs, or continuous exterior insulation
E. Battery storage

G5. Do you have an interest in any of the following smart connected technologies?
[Read G4a - G4b one at a time, receiving answers before moving on to the next one]

1. Yes
2. No

DK

REF

A. Systems that account for water savings
B. Increased electrification

G6. Are there any other technologies you are interested in but weren't previously mentioned?

1. [OPEN END]

DK

REF

G7. Would you be interested in Xcel Energy adding additional prescriptive opportunities to the <PROGRAM> program similar to the current ENERGY STAR clothes washer and heat pump water heater rebates?

1. Yes

2. No

DK

REF

Closing

CLOSE1. Is there anything we didn't cover that you'd like to mention or discuss about your experiences as a participant in the **<PROGRAM>** program, including recommendations for program improvements?

CLOSE2. These are all the questions I have. As a thank you for your input, we'd like to email you, or someone of your choosing, a $25 Tango gift card. We just need a bit of information to email the gift card to the intended recipient.

[COLLECT CONTACT INFORMATION]

[IF INTERVIEWEE ASKS ABOUT GIFT CARD] The $25 e-gift card is a Tango gift card whichh is a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, among others. In the next two weeks we will send you a link to redeem your gift card on the Tango website

[IF <CONTACT> ASKS]

We also have an option to donate the $25 to United Way.

[IF CONTACT ASKS FOR MORE INFO ABOUT UNITED WAY] United way is a worldwide non-profit that focus on education, income, and health which they believe are the building blocks for a good quality of life. They have local chapters throughout the US.

B.3 Lapsed Small Volume Builder Survey Instrument

Introduction

To support the process and impact evaluation of the 2020 Xcel Energy energy efficiency products, the TRC evaluation team will conduct telephone surveys with participants. For the purposes of this small volume builder survey, the evaluation team defined a participating small volume builderas any builder that closed fewer than 20 Colorado ENERGY STAR New Homes projects each year since 2013 but did not participate between January 2018 and December 2020 (i.e., lapsed participants). The research will be conducted to assess key process and impact evaluation objectives, including builders' perceptions and awareness, decision-making and barriers, and Product experience and satisfaction.

The remainder of the introduction provides the research questions which the participating builder survey is designed to address, a description of the sample population and the target number of completes, a description of the sample variables to support programming the survey, and fielding instructions for the survey house.

Evaluation Objectives

The process objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the Product. In doing so, the evaluation team will explore the following:

- Barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.
- Barriers for participating and non-participating builders serving medium- and low-income customers.

- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform Product improvements.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.

The participating builder survey does not address every evaluation objective, including both process and impact objectives. For reference, Table 7 provides the evaluation efforts used for each objective.

Table 7. Evaluation Objectives by Research Activity

Evaluation Objective	Impact or Process Objective	Research Activity	Small Volume Builder Survey Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, trade partner interviews, benchmarking interviews	✓
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, trade partner interviews	✓
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	Process	Participating builder survey, nonparticipating builder survey, trade partner interviews	✓

Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Benchmarking interviews, trade partner interviews	
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work	Process	Participating builder surveys, homeowner surveys	✓

This participating builder survey is designed to address the following research questions:

- What are builders' perceptions of electrification initiatives?
- What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?
- What are builders' perceptions of grid interactive technologies?
- How well are the product's processes working for builders?
- What aspects of the product are easy / challenging for builders?
- What barriers to participation have small volume builders faced in recent years?
- What prevents builders from achieving higher-tier energy code savings?
- How do builders and homeowners interact? How do builders and Xcel Energy interact?
- How many builders have participated in other energy efficiency products?
- How many builders serve moderate- or low-income communities? What is easy / challenging about serving these communities?
- What other opportunities do builders see that would help increase energy efficiency of new homes?
- Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?

Table 8 presents the link between each evaluation objective, research question, and survey question.

Table 8. Evaluation Objective, Research Question, and Survey Question Crosswalk

Evaluation Objective	Research Question	Survey Question Number(s)

Investigate the barriers preventing participating builders from achieving higher tier energy code savings	• What prevents builders from achieving higher-tier energy code savings? • How well are the product's processes working for builders? • What aspects of the product are easy / challenging for builders? • What barriers to participation have small volume builders faced in recent years?	E1 – E2, Section F, Section G
Connect the link between customers and the utilities, two parties which do not *have* to communicate to make the Product work.	• How do builders and homeowners interact? How do builders and Xcel Energy interact? • Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?	B4 – B6, E1
Understand the impacts of jurisdictional goals (e.g., electrification) and increasingly stringent energy codes and rising baselines on the product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	• What are builders' perceptions of electrification initiatives? • What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)? • What are builders' perceptions of grid interactive technologies? • How many builders have participated in other energy efficiency programs?	A3, B2 – B3, B7, F4, G4 – G6
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	• What other opportunities do builders see that would help increase energy efficiency of new homes?	G4 – G6
Identify where and how there is potential future coordination with other Xcel Energy products.	• How many builders have participated in other energy efficiency programs?	A3
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	• How many builders serve moderate- or low-income communities? • What is easy / challenging about serving these communities?	A5, A6, E1

B.4 Non-Participating Builder Interview Guide

Introduction

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency products, the TRC evaluation team will conduct interviews with nonparticipating builders. For the purposes of this guide, the evaluation team defined nonparticipating builders as those who have

not completed participation in the product recently, which includes both those who have not participated in the past (non-participants) and those who have participated in the product since 2013 but did not participate between January 2018 and December 2020 (lapsed participants). The research will be stratified to ensure sampling from builders that focus on medium- and low-income customers. The research will be conducted to assess key process and impact evaluation objectives including builders' perceptions and awareness, barriers to participation, and NTG impacts, such as nonparticipant spillover and market effects.

The remained of the introduction provides the research questions which the nonparticipating builder interview guide is designed to address, and a description of the sample population and the targeted number of completes by strata.

Table 9. Sample Population and Target Completes.

Sample Group	# Builders in Population	% Builders in Population	Target Completes
Nonpartipants	194	92%	12
Nonparticipants (Middle- / Low-Income Builders)	-	-	5
Lapsed	16[12]	8%	3[13]
Total	**210**	**100%**	**20**

Evaluation Objectives

The process objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the Product. In doing so, the evaluation team will explore the following:
  - Barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.

[12] The total population of lapsed participants is 79, however 63 of these individuals are small volume builders and will be included in the additional sample of small volume builders for the participating builder survey.
[13] Lapsed participants will be oversampled to produce more support for evaluation objectives.

- Barriers for participating and non-participating builders serving medium- and low-income customers.

- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform Product improvements.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.

The impact objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Determine NTG ratio for energy-efficient home rebates.
- Identify major drivers of free-ridership.
- Assess participant and nonparticipant spillover.
- Assess market effects of the Colorado ENERGY STAR New Homes Product.

The nonparticipating builder survey does not address every evaluation objective, including both process and impact objectives. For references, Table 10 provides the evaluation efforts used for each objective.

Table 10. Evaluation Objectives by Research Activity

Evaluation Objective	Impact or Process Objective	Research Activity	Non-Participating Builder Interview Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, trade partner interviews, benchmarking interviews	
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓

Identify barriers for participating and non-participating builders serving medium- and low-income customers.	Process	Participating builder survey, nonparticipating builder survey, trade partner interviews	✓
Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Benchmarking interviews, trade partner interviews	
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work	Process	Participating builder surveys, homeowner surveys	
Determine NTG ratio for energy-efficient home rebates, Including asessing participant and nonparticipant spillover and market effects of the Colorado ENERGY STAR New Homes Product	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓

The nonparticipating builder interview guide is designed to address the following research questions:

- What are nonparticipating builders' perceptions of electrification initiatives?
- What are nonparticipating builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?
- What are nonparticipating builders' perceptions of grid interactive technologies?
- What opportunities have nonparticipating builders identified to incorporate smart devices into new homes?
- What opportunities have nonparticipating builders identified to incoproate electrification initiatives into new homes?
- Are nonparticipating builders aware of the Colorado ENERGY STAR New Homes Product? How is the Product perceived among nonparticipating builders?
- What barriers impact nonparticipating builders decisions to pursue energy efficient designs?
- What barriers impact nonparticipating builders decisions to participate in the Colorado ENERGY STAR New Homes Product?
- How many nonparticipating builders serve moderate- or low-income communities? What are the benefits and challenges associated with serving these communities?
- Are nonparticipating builders installing energy efficient homes or equipment due to any influence from Xcel Energy outside of the Product?

Table 11 below presents the link between each evaluation objective, research question, and interview question.

Table 11. Evaluation Objective, Research Questions, and Survey Question Crosswalk

Evaluation Objective	Research Question	Interview Question Number(s)
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	• What are builders' perceptions of electrification initiatives? • What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)? • What are builders' perceptions of grid interactive technologies?	C2 - C6
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	• What opportunities have nonparticipating builders identified to incorporate smart devices into new homes? • What opportunities have nonparticipating builders identified to incoproate electrification initiatives into new homes?	C2, C3
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	• What prevents builders from pursuing energy efficient designs? • Are builders aware of the Product? How is the Product perceived among nonparticipating builders? • What prevents builders from participating in the Product?	Section B, E1
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	• How many builders serve moderate- or low-income communities? • What is easy / challenging about serving these communities?	A2, A4, A5, Section B, E2
Determine NTG ratio for energy-efficient home rebates, Including asessing participant and nonparticipant spillover and market effects of the Colorado ENERGY STAR New Homes Product	• Are builders installing energy efficient homes or equipment due to any influence from Xcel Energy outside of the Product?	Section D

Recruiting Instructions

The evaluation team plans to send advance emails to contacts. This email contain an explanation of the research, as well as both an Xcel Energy and TRC contact person the potential interviewee can reach out to if they have additional questions or would like to schedule an interview at their convenience.

Consultants on the evaluation team, who will be conducting interviews and have been trained on the purpose and goals of the CO ENERGY STAR New Homes qualitative research, will recruit potential respondents. The evaluation team will be as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews when possible to accommodate the busy schedules respondents may have. The evaluation 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 evaluation team will strive to attempt to contact each contact a minimum of 4 times before terminating contact, but depending on each unique situation, the evaluation team may need to attempt additional contacts to ultimately reach the correct person.

We will provide a $50 Tango e-gift card as an incentive for completed interviews.

Interview Instructions

This guide is designed to apply to a wide range of potential respondents. As such, the questions are written deliberately to be open-ended and flexible. The questions should be understood as concepts to explore rather than a verbatim script. In particular, the bulleted follow-up questions should be considered possibilities to probe further, but may not apply to all respondents.

Interview

Introduction/Recruitment

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

INTRO 2 We are working with Xcel Energy on a study to understand the residential new construction market and are offering a $50 gift card for eligible participants.

Are you the best person to talk to about new home construction?

[IF NO] Can you direct me to someone else who could discuss new home construction?

[IF YES] Does your organization build homes in Xcel Energy's service territory in Colorado (e.g., Denver County, Adams County, Jefferson County, Arapahoe County)?

[IF YES] Does your organization build single family and / or low-rise homes (e.g., townhomes, duplexes)?

[IF YES] Is now a good time to discuss the residential new construction market?

[IF NEEDED] We would like to interview you for this study, as you have been identified as a home builder in Xcel Energy's service territory in Colorado.

[IF NEEDED] In your interview, we would talk about energy efficient home design and your perceptions about building certification, smart home technologies, and electrification.

a. Yes [**BEGIN INTERVIEW]**
b. No, a later time is better [**RECORD CONTACT INFORMATION; SETUP INTERVIEW TIME,**]
c. No, not interested [**DISCUSS CONCERNS; ANSWER QUESTIONS; ATTEMPT TO CONVERT TO "YES**"]

[IF INTERVIEWEE ASKS ABOUT GIFT CARD] The $50 gift card is a Tango gift card which is a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, among others. Within a couple weeks after completing the interview, you will be sent a link to the Tango website where you can select the retailer of your choice.

[INTERVIEWER NOTE: Request participant permission to audio record the interview prior to beginning recording]

Section A: Introduction

To provide me with valuable context for each interview when completing the analysis later, it helps to begin each discussion with an overview of your role and responsibilities.

A1. To start, can you describe your role and scope of responsibilities at your business?

A1a. how long have you been in this role?

A1b. how long have you been in the homebulding industry?

A2. What areas of Colorado does your business typically serve?

[PROBE] Denver metro, Front Range, Western Slope

[PROBE] Does your organization build homes in states other than Colorado?

A2a. Does your organization build both single-family and multi-family housing?

A2b. Does your organization provide services other than new construction? **[IF YES]** Are you the person at your organization who is most knowledgeable about new construction?

[IF A2a OR A2b = YES, re-iterate that the interview is focused on single-family and small multi-family (i.e., townhome, duplex, triplex, fourplex) construction]

A3. On average, how many new homes does your business typically build in one year?

A3a. Has that number changed between 2020 and 2021? How so?

A3b. What do you think your rate of new construction will look like for the rest of 2021 and into 2022?

A4. Which housing market(s) do you typically serve?

[IF NEEDED] Multi-family, affordable, entry-level, move-up, luxury / custom, vacation / second

[IF MULTIPLE] In which housing market does your business build the most new homes?

A6. What is the typical selling price of the homes your organization builds?

[PROBE IF NEEDED; DO NOT READ]

1. Under $250,000
2. $250,000 to $399,999
3. $400,000 to $549,999
4. $550,000 to $699,999
5. $700,000 to $849,999
6. $850,000 to $999,000
5. $1,000,000 and over

[IF NEEDED] How does pricing differ among the various housing markets you serve?

Section B: Awareness and Barriers to Participation

[ASK IF NON-PARTICIPANT, IF LAPSED PARTICIPANT SKIP TO B8]

Next, I'd like to understand a little more about your awareness of the Colorado ENERGY STAR New Homes Product.

B1. Has your organization ever participated in the Colorado ENERGY STAR New Homes prouct offered by Xcel Energy?

[IF YES] Do you recall what year you last participated? **(Skip to B8a)**

B2. Before today, how familiar would you say you were with the ENERGY STAR New Homes product offered by Xcel Energy?

[PROBE FOR DETAIL]

[IF AWARE] How did you first hear about the Product offerings?

[IF UNAWARE] *The Colorado ENERGY STAR New Homes product provides incentives, as well as educational trainings, to encourage home builders to*

exceed local building codes and common construction practices. Additionally, Home Energy Rating System (HERS) Raters consult with participating builders during construction on energy efficient equipment to help builders incorporate these measures into their home design and ensure proper installation. Builders of single-family and small multifamily homes (duplexes, triplexes, fourplexes, and townhomes) may participate. Homes that achieve total energy savings of at least 10% better than code in their respective jurisdiction are eligible for rebates.

[IF NOT MENTIONED IN B2]

B3. How familiar are you with the energy code requirements for the areas your business typically builds new homes?

B3a. Has the energy code been updated recently in the jurisdications that you serve?

[PROBE] Which jurisdiction(s)? What energy code did these jurisdictions move to?

B2b. How have these changes to the energy code impacted your decision making process for building new homes, if at all?

B2c. Is there a certain percentage above energy code that you strive to achieve?

[IF YES] Does that differ based on housing market? How so?

[IF YES] Have changes to the energy code impacted your ability to achieve this target?

[IF NEEDED] How could receiving incentives impact your building decisions?

[IF NOT MENTIONED IN B2]

B4. How familiar are you with performance rebates Xcel Energy provides for exceeding local building energy code?

[IF NOT AWARE] How could receiving incentives impact your building decisions?

[IF NOT MENTIONED IN B2]

B5. How familiar are you with ENERGY STAR certified rebates provided through the ENERGY STAR New Homes Product, where a Home Energy Rating System (HERS) rater confirms certifications are met and an ENERGY STAR label is posted on the home's electrical breaker box?

[IF NOT MENTIONED IN B2]

B6. How familiar are you with *appliance rebates* offered by Xcel Energy through the ENERGY STAR New Homes program?

B6a. How might appliance rebates impact your decision on which appliances to include in a new home?

B7. What, if anything, has prevented you from participating in the Xcel Energy ENERGY STAR New Homes Product?

[PROBE FOR] Program processes (e.g., paperwork, HERS rating), rebate amount (e.g., not high enough to be worthwhile), customer interest, lack of knowledge/awareness

[ASK IF LAPSED PARTICIPANT]

B8. Next, I'd like to understand a little bit more about your experience with the Xcel Energy Colorado ENERGY STAR New Homes Product.

Xcel Energy's records indicate that your organization participated in the Colorado ENERGY STAR New Homes Product in **<YEAR>** is that correct?

[IF NO, SKIP BACK TO B2]

[IF YES]

B8a. Are you the person at your organization who is most knowledgeable about this participation?

[IF NO, SKIP BACK TO B2]

[IF YES]

B8b. What did you like most about your experiencee with the Colorado ENERGY STAR New Homes product? What did you like least?

B8c. What, if anything, prevented you from participating in the Colorado ENERGY STAR New Homes product since **<YEAR>**?

[PROBE FOR] Difficulty achieving above code savings, rebate amount, program processes, customer interest

B8d. On average, how has the energy efficiency of the homes you build changed since you last participated in the program, if at all**?**

Section C: Motivations

C1. What drives your building practices in relation to energy efficiency?

C1a. What role do market changes [e.g., changes in regulation, change in demand from customers, change in knowledge in customers, change in equipment available for homes] play in your decision making?

[IF NEEDED] How have you seen those market changes manifest themselves? [probe for: changes in regulation, change in demand from customers, change in knowledge in customers, change in equipment available for homes]

C2. What types of energy efficiency technologies are often included in your new construction homes, if any?

[PROBE] What about: electric vehicle chargers, hybrid and/or variable speed electric heat pump technology, grid-enabled heat pump water heaters, advanced building assemblies such as SIP panels, advanced (2x6, 24 inches on center) framing, ICFs, or continuous exterior insulation, battery storage, solar panels.

[PROBE] Are there any technologies that you do not typically include, but would like to include? **[IF YES]** Is there anything that Xcel Energy could do to help you include this technology? Would financial or technical support from Xcel Energy motivate you to participate in the ENERGY STAR New Homes program?

C3. How does your business incorporate smart home technologies into home design, if at all?

[IF NEEDED] This could include smart thermostats, home energy monitors, or smart meters for appliances or other large equipment

C3a. What challenges, if any, has your organization experienced installing smart home technologies? Is there anything that Xcel Energy could do to help you overcome these challenges?

C3b. In your experience, how are these technologies perceived by home owners? **Probe for:** overall convenience / comfort of the home owner, privacy / security concerns, energy savings

C4. How would you describe your overall opinion of electrification, as it relates to new home construction?

[IF NEEDED] *Electricification refers to the shift from any non-electric source of energy to electricity at the point where the energy is consumed (i.e., in the home).*

C5. Has your organization pursued any high performance building certifications such as ENERGY STAR® Homes, Zero Energy Ready Homes or Passive House?

[IF NEEDED]:

- **Passive House:** Passive house uses an approached best summarized as "optimizing gains and losses based on climate." It includes continuous insulation, an airtight building envelope, high performance windows, balanced heat- and moisture-recovery ventilation, and uses minimal space conditioning.

- **ENERGY STAR Homes:** A certification for residential new construction that is more energy efficient than typical new construction, built to standards set by the EPA, and inspected, tested, and verified.

- **Zero Energy Ready Homes:** A certification that builds upon ENERGY STAR for homes, it requires homes be verified that they are at least 40-50% more efficient than a typical new home. Homes must also be solar PV ready.

[IF YES]

C5a. What motivated you to pursue this certification?

C5b. What was challenging about pursuing this certification, if anything?

C6. How would you describe your overall opinion of high performance building certifications such as Passive House or Zero Energy Ready Homes?

C7. Do you, or someone from your organization, interact with the homeowners?

C7a. [IF YES] What do those interactions involve?

[PROBE IF NEEDED] Do the interactions include training on equipment / materials (specifically energy efficient equipment)? **[IF YES]** Do trainings include how to operate and maintain this equipment? **[IF NO]** What, if anything, prevents you from training homeowners on energy efficient equipment?

[ASK ALL]

C7b. Do you believe there are opportunities to improve interactions with homeowners that would increase energy savings? How so?

Section D: Spillover & Market Effects

D1. **[IF LAPSED = YES]**

Since your participation in the Program in the past,

[ASK ALL] Has your company built any efficient new homes without applying for a rebate form Xcel Energy? Specifically, new homes that were built in Xcel Energy service territory that would have been eligible for an Xcel Energy rebate?

D1a. Did you apply for or obtain a rebate from any alternative source?

[PROBE FOR DETAIL]

[IF D1 = YES]

D1b. For these efficient new homes in Xcel Energy territory that you did not receive a rebate for, why did you not apply an Xcel Energy rebate?

D3. What impacts, if anything, your decision to install efficient equipment in your new homes?

[PROBE FOR] Xcel Energy and/or Product influence

D4a. How has prior experience receiving rebates influenced your decision making process, if at all?

D4. Have you ever attended a trade group event that Xcel Energy sponsored or spoke at?

[IF YES] What topics were discussed at this event? Did you make any changes to your building or marketing practices based on information received at this event?

D5. Are you aware of Xcel Energy presenting at or contributing to any regulatory or policy discussions around building energy codes or new construction?

[PROBE FOR DETAILS]

[IF YES] Did you make any changes to your building or marketing practices based on these discussions?

D6. How familiar are you with Xcel Energy otherwise influencing the residential new homes construction market through talking with trade groups, state legislation, or other actions?

[PROBE FOR DETAILS]

Section E: Barriers to Energy Efficient Home Construction

E1. The following section will focus on barriers experienced in new home construction.

When building new homes, what common challenges impact your ability to pursue energy efficient designs?

[DO NOT READ LIST - PROBE FOR]

E1a. Lack of knowledge about local energy code

E1b. Cost concerns

E1c. Lack of knoweldge about additional energy efficiency measures

E1d. Operations and maintenance challenges

E1e. Installation challenges

E1f. Schedule concerns

E1g. Home affordability concerns

E1h. Lack of homeowner interest

E1i. Increasingly stringent energy codes

E2. Is there anything that Xcel Energy could do to help you overcome **[BARRIER MENTIONED IN E1]**?

[IF PROVIDE LOW-INCOME HOUSING]

E3. Are there any specific challenges to pursuing energy efficient designs that are specific to affordable or entry-level housing?

[DO NOT READ LIST - PROBE FOR]

E3a. Lack of knowledge about local energy code

E3b. Cost concerns

E3c. Lack of knowledge about additional energy efficiency measures

E3d. Operations and maintenance challenges

E3e. Installation challenges

E3f. Schedule concners

E3g. Home affordability concners

E3h. Lack of homeowner interest

E3i. Increasingly stringent energy codes

E4. Is there anything that Xcel Energy could do to help you overcome **[BARRIER MENTIONED IN E3]**?

Section F: Closing

F1. Is there anything that we haven't discussed today that you feel that we should know about?

F2. Those are all the questions I have for you today. Do you have any questions for me, or anything else you would like to add?

F3. Great! Thank you so much for your time. We really appreciate your feedback. As a thank you for your time and valuable input we would like to send you a $50 Tango e-gift card. What is the best email address to send this e-gift card to?

[IF INTERVIEWEE ASKS ABOUT GIFT CARD] The $50 e-gift card is a Tango gift card whichh is a digital gift card that can be redeemed at a variety of retailers, including Amazon,

Apple, and Target, among others. In the next two weeks we will send you a link to redeem your gift card on the Tango website.

B.5 Participating HERS Rater Interview Guide

Introduction

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency products, the TRC evaluation team will conduct 20 interviews with Home Energy Rating System (HERS) Raters. The research will be conducted to assess key process and impact evaluation objectives, including barriers to participation, product experience and satisfaction, and market growth.

The remainder of the introduction provides the research questions which the trade ally interview guide is designed to address.

Evaluation Objectives

The process objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the Product. In doing so, the evaluation team will explore the following:
  - Barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.
  - Barriers for participating and non-participating builders serving medium- and low-income customers.
- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform Product improvements.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.

The impact objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Determine NTG ratio for energy-efficient home rebates.
- Identify major drivers of free-ridership.
- Assess participant and nonparticipant spillover.

- Assess market effects of the Colorado ENERGY STAR New Homes Product.

The trade ally interview does not address every evaluation objective, including both process and impact objectives. For reference,Table 12 provides the evaluation efforts used for each objective.

Table 12. Evaluation Objectives by Research Activity

Evaluation Objective	Impact or Process Objective	Research Activity	Trade Ally Interview Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, benchmarking interviews	
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, nonparticipating builder interviews, trade ally interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, benchmarking interviews	
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, nonparticipating builder interviews, trade ally interviews	✓
Identify barriers for participating and non-participating builders serving medium-income and income qualified customers.	Process	Participating builder survey, nonparticipating builder survey, trade ally interviews	✓
Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Benchmarking interviews, trade ally interviews	✓
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.	Process	Participating builder surveys, homeowner surveys	
Determine NTG ratio for energy-efficient home rebates, Including assessing participant and nonparticipant spillover and market effects of the Colorado ENERGY STAR New Homes Product.	Impact	Participating builder survey, nonparticipating builder interviews, trade ally interviews	✓

The trade ally interview guide is designed to address the following research questions:

- What are HERS raters' perceptions of electrification initiatives?
- What opportunities have HERS raters identified to incorporate electrification initiatives into new homes?

- What are HERS raters' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?
- What are HERS raters' perceptions of grid interactive technologies?
- What aspects of the Product are easy / challenging for HERS raters?
- How well are the Product's processes working for HERS raters?
- What barriers do HERS raters believe impact builders decisions to pursue energy efficient designs?
- What information do HERS raters collect about the homes they inspect and test?
- What are HERS raters' experiences with marketing the Product? What strategies are used? What challenges do they experience?
- What proportion of the new home market is participating in the Product?
- Are builders installing energy efficient homes or equipment without participating in the Product?
- Does the program influence the underlying structure and functioning of the market?

Table 13 below presents the link between each evaluation objective, research question, and interview question.

Table 13. Evaluation Objective, Research Questions, and Survey Question Crosswalk

Evaluation Objective	Research Question	Interview Question Number(s)
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	• What are HERS raters' perceptions of electrification initiatives? • What opportunities have HERS raters identified to incorporate electrification initiatives into new homes? • What are HERS raters' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)? • What are HERS raters' perceptions of grid interactive technologies?	C4, C5, D5, D6

Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	• What aspects of the Product are easy / challenging for HERS raters? • How well are the Product's processes working for HERS raters? • What are HERS raters' experiences with marketing the Product? What strategies are used? What challenges do they experience? • Are builders installing energy efficient homes or equipment without participating in the Product? • What barriers do HERS raters believe impact builders decisions to pursue energy efficient designs?	A4, C3, D2, S0, S1, S2, S4, S5
Identify barriers for participating and non-participating builders serving medium-income and income-qualified customers.	• What barriers do HERS raters believe impact builders decisions to pursue energy efficient designs?	A4, C3, D2
Identify opportunities to collect and track additional data to inform Product improvements.	• What information do HERS raters collect about the homes they inspect and test?	B4
Determine NTG ratio for energy-efficient home rebates, Including assessing participant and nonparticipant spillover and market effects of the Colorado ENERGY STAR New Homes Product.	• Does the program influence the underlying structure and functioning of the market? • What proportion of the new home market is participating in the Product?	Section H

Recruiting Instructions

The evaluation team plans to send advance emails to contacts. This email contains an explanation of the research, as well as both an Xcel Energy and a TRC contact for the potential interviewee to reach out to with additional questions and/or to schedule an interview at their convenience.

Consultants on the evaluation team conducting interviews have been trained on the purpose and goals of the Colorado ENERGY STAR New Homes qualitative research and will recruit potential respondents. The evaluation team will be as flexible as possible in scheduling these interviews, including scheduling early morning or evening interviews when possible to accommodate respondents' schedules. The evaluation 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 evaluation team will attempt to contact each contact a minimum of 4 times before terminating contact. Depending on each unique situation, the evaluation team may need to attempt additional contacts to ultimately reach the correct person.

We will provide a $50 Tango e-gift card, a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, among others, as an incentive for completed interviews.

Interview Instructions

This guide is designed to apply to a wide range of potential respondents. As such, the questions are written deliberately to be open-ended and flexible. The questions should be understood as concepts to explore rather than a verbatim script. In particular, the bulleted follow-up questions should be considered possibilities to probe further but may not apply to all respondents.

Interview

Introduction/Recruitment

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

INTRO 2 We are working with Xcel Energy on a study to understand the residential new construction market and are offering a $50 gift card for eligible interview participants. We would like to interview you for this study, as our records show have previously participated as a HERS Rater for the Xcel Energy Colorado ENERGY STAR New Homes program.

Are you the best person to talk to about your company's experience with the Xcel Energy Colorado ENERGY STAR New Homes program, or at least as familiar as anyone else?

[IF NO] Can you direct me to someone else who could discuss the Xcel Energy Colorado ENERGY STAR New Homes program

[IF YES] Is now a good time to discuss the Xcel Energy program?

[IF NEEDED] In your interview, we would talk about your experience with the Xcel Energy program, as well as your experience with the energy efficient home market in general.

a. Yes [**BEGIN INTERVIEW]**
b. No, a later time is better [**RECORD CONTACT INFORMATION; SETUP INTERVIEW TIME**]
c. No, not interested [**DISCUSS CONCERNS; ANSWER QUESTIONS; ATTEMPT TO CONVERT TO "YES**"]

[IF INTERVIEWEE ASKS ABOUT GIFT CARD] The $50 gift card is a Tango gift card which is a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, among others. Within a couple weeks after completing the interview, you will be sent a link to the Tango website where you can select the retailer of your choice.

[INTERVIEWER NOTE: Request participant permission to audio record the interview prior to beginning recording. **Once the recording is in progress, verbally notify the interviewee of the recording**.]

Section A: Introduction

To provide me with valuable context for each interview, it helps to begin each discussion with an overview of your role and responsibilities.

A1. To start, can you describe your role and scope of responsibilities at your company?

[PROBE] How long have you been in your current role?

[IF IN ROLE LESS THAN 1 YEAR] What was your role prior to your current role? Were you involved with the ENERGY STAR New Homes program in this role?

A2. What areas of Colorado does your company typically serve?

[PROBE] Does your organization rate homes in states other than Colorado?

A2a. Does your organization rate both single-family and low-rise multi-family housing?

A3. On average, how many new homes does your company typically rate in one year?

A3a. What proportion of these homes go through the Colorado ENERGY STAR New Homes Program?

A3b. Has the total number of homes your company rates in a year changed over the past few years? How so? By how much?

A3c. Has the proportion of homes your company rates that participate in the ENERGY STAR New Homes program changed over the past few years? How so? By how much?

A4. Which housing market(s) do you typically serve?

[IF NEEDED] Multi-family, affordable, entry-level, move-up, luxury / custom, vacation / second

[IF MULTIPLE] In which housing market(s) does your company rate the most new homes?

A4a. In which housing market(s) does your company rate the most new homes that participate in the Colorado ENERGY STAR New Homes Program?

Section B: Trade Allies' Participation History & Identification of Projects

B1. When did your company first start working with the Xcel Energy Colorado ENERGY STAR New Homes Program?

B2. How do you identify builders and projects to work with?

B2a. Does this differ based on the type of builder or project (i.e., large developments vs custom homes)?

B2b. How early in the design and construction process do you identify builders and projects to work with?

B3. How do you determine which projects to recommend to the Colorado ENERGY STAR New Homes Program?

[IF NEEDED] How do you recruit builders to participate in the program?

B4. What type of information beyond what's required by the program do you track about the homes that you inspect and test, if any?

B4a. How do you use this information, if at all?

B4b. For the homes that participate in the ENERGY STAR New Homes program, is all this information submitted to Xcel Energy or their consultants?

Section C: Trade Allies' Motivations & Barriers to Participate

C1. What are the reasons your company participates in the ENERGY STAR New Homes Program?

C2. What are the benefits to your organization of participating in the Colorado ENERGY STAR New Homes Program, in your opinion?

C2a. How do you communicate those benefits to the builders, if at all?

C3. What, if anything, makes it difficult for you to participate in the ENERGY STAR New Homes Program?

Probe for: difficulties specific to entry level or affordable housing

C4. How would you describe your overall opinion of electrification, as it related to new home construction?

[IF NEEDED] Electrification refers to the shift from any non-electric source of energy to electricity at the point where energy is consumed (i.e., the home).

C5. How would you describe your overall opinion of high-performance building certifications such as Passive House or Zero Energy Ready Homes?

Section D: Trade Allies' Perspective on Customers Motivations & Barriers to Participation

D1. In your opinion, what drives builders' building practices in relation to energy efficiency?

D1a. In your opinion, what role do market changes [e.g., changes in regulation, change in demand from customers, change in knowledge in customers, change in equipment available for homes] play in the decision-making process of builders?

[IF NEEDED] How have you seen those market changes displayed in your work with builders?

[PROBE] Changes in regulation, change in demand from home buyers, change in knowledge of home buyers or builders, change in equipment available for homes.

D2. What challenges do builders face in meeting program requirements for participating in the ENERGY STAR New Homes Program?

D2a. Are there any other challenges builders face when constructing energy-efficient homes, in general?

[**PROBE]** Cost (financially or timewise) of installing measures? Overall home affordability concerns? Measures too difficult to install or for home buyers to operate/maintain? Lack of info about EE measures? Lack of home buyer interest in additional EE measures? Local energy code changes?

D2b. Are any of these challenges specific to builders who build entry level or affordable housing?

D2c. Are any of these challenges specific to small homes (homes with low cubic feet)?

D3. In your opinion, why do builders participate in the ENERGY STAR New Homes Program?

[**PROBE]** Rebate amount? Achieving ENERGY STAR certification? Promoting electrification or integrated homes?

D4. What do you see as new/emerging energy efficiency opportunities for the residential new home market?

D5. What types of energy efficiency technologies are often included in the homes you inspect and test, if any?

[PROBE] What about: electric vehicle chargers, hybrid and/or variable electric heat pump technology, grid-enabled heat pump water heaters, advanced building assemblies such as SIP panels, advanced (2x6, 24 inches on center) framing, ICFs, or continuous exterior insulation, battery storage, solar panels.

[PROBE] Are you aware of any technologies that builders do not typically include, but would like to include? **[IF YES]** In your opinion, is there anything that Xcel Energy could do to help you them include this technology?

D6. How does your company help builders incorporate smart home technologies into home design, if at all?

[IF NEEDED] These technologies could include smart thermostats, home energy monitors, or smart meters for appliances or other large equipment.

D6a. What challenges, if any, do builders experience when installing smart home technologies? In your opinion, is there anything that Xcel Energy could do to help you them overcome these challenges?

D6b. In your experience, how are these technologies perceived by home builders?

Section H: Free-ridership

H1. On a scale of 0 to 10 where 0 is NOT AT ALL IMPORTANT and 10 is EXTREMELY IMPORTANT, how important was the Xcel Energy Colorado ENERGY STAR New Homes Program, **including incentives as well as product services and information**, in influencing your decision to recommend builders make the energy efficiency improvements they did?

H2. How important was your company's past participation in the Colorado ENERGY STAR New Homes Program in recommending that builders install this energy efficient equipment?

H3. Using a 0 to 10 likelihood scale where 0 is NOT AT ALL LIKELY and 10 is EXTREMELY LIKELY, if the Colorado ENERGY STAR New Homes Program, **including incentives as well as product services and information,** *had not been available*, what is the likelihood that you would have recommended the same energy efficiency improvements?

H3a. In what percent of projects do you recommend integrating energy efficient design features?

H3b. Thinking only about these projects in which you recommend energy efficient design features, about what percent of these projects do you complete through the Xcel Energy Colorado ENERGY STAR New Homes Program?

H3c. For those projects you complete through the Xcel Energy Colorado ENERGY STAR New Homes Program, do you recommend specific energy efficient equipment before construction permits have been acquired?

H3d. **[IF H3c=YES]** Why do you make recommendations at this stage?

[PROBE] Standard practice in industry to make initial recommendations? Experience with customer preferences indicates preferred measures? Previous experience with recommended equipment via product?

H3e. **[IF H3c=YES]** Are the measures you recommend at this early stage the ones the builders wind up installing?

H3f. **[IF H3e=NO]** What causes them to select different measures?

****

Consistency check

[Ask If (H1 > 7 AND H3 >6 i.e., *Product was important AND would have recommended without product*) else skip to E1]

H4. You just gave **<H1 RESPONSE>** points to the importance of the program in your decision to recommend that builders install the energy efficient equipment they did in past projects. I would interpret that to mean that the program was quite important to your decision to recommend equipment. Later, when I asked about what you would have done in the absence of the program I recorded some answers that would imply that the program was not that important to you. Just to make sure I have recorded this properly, I have a couple of questions to ask you.

H4a. When I asked you about the importance of the program, including incentives and services, you gave a rating of **<H1 RESPONSE>** out of 10, indicating that the program and the incentives were important to you. Can you tell me why the program was important?

H4b. When I asked you about the likelihood you would have recommended installing these energy efficiency features without the program, you gave a rating of **<H3 RESPONSE>** out of ten, indicating that the program was not that important to you in that you would have recommended the measure anyway. Can you tell me why the program was not that important?

****

Section S: Product Interaction & Satisfaction

Finally, I'd like to ask you a few more questions about your experience with the Colorado ENERGY STAR New Homes Program.

S0. Could you describe the aspects of the program that were most helpful to you?

S0a. What about aspects of the program that were least helpful?

S1. For the next set of questions, I'll read a list of different tasks associated with the program. Please rate each from 1 to 5, where 1 means that part of the program is not at all easy to complete, and 5 means that part of the program was extremely easy to complete.

How difficult or easy would you say it was to…

S1a. Meet program deadlines

S1b. Recruit builders to participate in the program

S1c. Complete/Submit documentation (e.g. REM/Rate or Ekotrope files) through HouseRater

S1d. Get in touch with a program representative

S2. **[Ask for any E2 responses LOWER THAN 4]** What about this wasn't easy?

S3. From the time work started to project completion, did the project take less or more time than you expected to complete?

S4. Thinking about your experience from start to finish, what did you like most about your experience with the program as a whole?

S5. What did you like the least about your experience with the program as a whole?

S6. How satisfied are you with your experience with the program, using a scale from 1 to 5, where 1 is extremely dissatisfied and 5 is extremely satisfied?

S6a. Is there anything program representatives could do to increase your satisfaction with the ENERGY STAR New Homes Program?

Section F: Closing

F1. Lastly, is there anything that we have not discussed today that you feel that we should know about?

F2. Those are all the questions I have for you today. Do you have any questions for me, or anything else you would like to add?

F3. Great! Thank you so much for your time. We really appreciate your feedback. As a thank you for your time and valuable input, we would like to send you a $50 Tango e-gift card. What is the best email address to send this e-gift card to?

[IF INTERVIEWEE ASKS ABOUT GIFT CARD] The $50 e-gift card is a Tango gift card which is a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, among others. In the next two weeks we will send you a link to redeem your gift card on the Tango website.

B.6 Homeowner Survey Instrument

Introduction

To support the process and impact evaluation of the 2020 Xcel Energy energy efficiency programs, the TRC Companies (TRC) evaluation team will conduct web surveys with participant homeowners. For the purposes of this survey, the evaluation team defined a participant homeowner as any customer that owns a Colorado ENERGY STAR New Homes product-qualified home for which the builder was rebated between January 2019 and March 2021. The research will be conducted to assess key process evaluation objectives, including customer awareness, motivations, and barriers.

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

Evaluation Objectives

The objectives of the Colorado ENERGY STAR New Homes product evaluation are to:

- Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).
- Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.
- Identify where and how there is potential future coordination with other Xcel Energy products.
- Identify barriers to participation in the Product. In doing so, the evaluation team will explore the following:
  - Barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.
  - Barriers for participating and non-participating builders serving medium- and low-income customers.
- Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.
- Identify opportunities to collect and track additional data to inform Product improvements.
- Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work.
- Determine NTG ratio for energy-efficient home rebates.
- Identify major drivers of free-ridership.
- Assess participant and nonparticipant spillover.
- Assess market effects of the Colorado ENERGY STAR New Homes Product.

The participant homeowner survey does not address every evaluation objective. For reference, Table 14 provides the evaluation efforts used for each objective.

Table 14. Colorado ENERGY STAR New Homes Product Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Participating Homeowner Survey Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	

Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, homeowner survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, homeowner survey, trade partner interviews, benchmarking interviews	✓
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, trade partner interviews	
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	Process	Participating builder survey, nonparticipating builder survey, trade partner interviews	
Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	✓
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Homeowner survey, Benchmarking interviews, trade partner interviews	✓
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work	Process	Participating builder surveys, homeowner surveys	✓

Colorado ENERGY STAR New Homes Product Evaluation Objectives (continued)

Evaluation Objective	Impact or Process Objective	Research Activity	Participating Homeowner Survey Objective
Determine NTG ratio for energy-efficient home rebates.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	
Identify major drivers of freeridership.	Impact	Participating builder survey	
Assess participant and nonparticipant spillover.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	

Assess market effects of the Colorado ENERGY STAR New Homes Product.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews

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

- Are homeowners aware they are in an energy efficient new home?
- What were the motivations and barriers to buying and living in this particular home?
  - How much, if at all, did the energy efficiency of the home influence their purchasing decision?
- How exactly do homeowners and builders interact?
- How satisfied are homeowners with interactions with builders?
- How satisfied are homeowners with the comfort-level in the home (e.g. consistent temperature, any health and safety issues) and quality of construction, including maintenance issues related to health and safety.
- What additional efficient equipment are homeowners researching or installing in their homes?
- Are homeowners interested in information on other Xcel Energy programs, such as renewable energy programs, EVs, maintenance packages (e.g. HomeSmart) or solar?
- Do builders, builders' contractors, and home buyers know how to use energy efficient technologies?
- Do home buyers know how and when to service their energy efficient home features?
- What are homeowners' awareness and perception of grid interactive technologies?
- What are homeowners' perceptions of electrification?

Table 15 presents the link between each evaluation objective, research question, and survey question.

Table 15. Evaluation Objective, Research Question, and Survey Question Crosswalk

Evaluation Objective	Research Question	Survey Question Number(s)
Connect the link between customers and the utilities, two parties which do not *have* to communicate to make the Product work.	• How exactly do homeowners and builders interact? • How satisfied are homeowners with interactions with builders? • How satisfied are homeowners with the comfort-level in the home and quality of construction, including maintenance issues related to health and safety.	B1, B2, B3, B4, S1, S2, S3

Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home.	• Are homeowners aware they are in an energy efficient new home? • What were the motivations and barriers to buying and living in this particular home? • How much, if at all, did the energy efficiency of the home influence their purchasing decision? • Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?	A1, A2, A3, A4, A5, A6, C1, C2, C3, C5, C6
Identify where and how there is potential future coordination with other Xcel Energy products.	• Are homeowners interested in information on other Xcel Energy programs, such as renewable energy programs, EVs, maintenance packages (e.g. HomeSmart) or solar?	C7, C8
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	• What additional efficient equipment are homeowners researching or installing in their homes? • What are homeowners' perceptions of electrification? • What are homeowners' awareness and perception of grid interactive technologies?	A6, C3, C6, C9, C10, C11, C12
Identify opportunities to collect and track additional data to inform Product improvements.	• Do builders, builders' contractors, and home buyers know how to use energy efficient technologies? Do home buyers know how and when to service their energy efficient home features?	C1, C2, C5

Sample Variables

Table 16 includes the sample variables that will be used to conduct this survey, as well as descriptions of these variables and potential codes.

Table 16. Sample Variables

Sample Variable	Variable Description	Potential Codes
FIRST_NAME	Homeowner first name	e.g. Allie
LAST_NAME	Homeowner last name	e.g. Hotzfeld
EMAIL_ADDRESS	Homeowner's email address	e.g. ahotzfeld@trcsolutions.com
CITY	Homeowner's city	e.g. Seattle
STATE	Homeowner's state	e.g. WA
ZIPCODE	Homeowner's zipcode	e.g. 98112
ORGANIZATION	Name of organization / company that built participating home	e.g. TRC Companies
CLOTHES	Dummy variable for question logic, indicating whether a homeowner received an ENERGY STAR clothes washer through the Product	e.g. "1" or "2"

HEATPUMP	Dummy variable for question logic, indicating whether a homeowner received a heat pump water heater through the Product	e.g. "1" or "2"
LIGHTING	Dummy variable for question logic, indicating whether a homeowner received efficient lighting through the Product	e.g. "1" or "2"
THERM	Dummy variable for question logic, indicating whether a homeowner received a smart thermostat through the Product	e.g. "1" or "2"
FRIDGE	Dummy variable for question logic, indicating whether a homeowner received an ENERGY STAR Refrigerator through the Product	e.g. "1" or "2"

Fielding Instructions

- Field the survey through the Qualtrics online survey platform.
- Distribute survey to members of the TRC team for testing and timing prior to survey fielding. Revise survey as needed.
- Perform a pre-test of the survey by sending invitation emails to 50 homeowners in the sample.
- Examine the responses of pre-test survey respondents before fully launching the survey.
- Send three emails to the sampled participants: one initial invitation and two follow-up emails to those who have yet to complete the survey one week after in the field and then again 2 weeks after in the field.
- The survey is considered complete when CLOSE1 is answered.
- The survey will be closed when the target number of completes is reached, but no less than 5 days following the final reminder, while allowing open surveys to be completed. One final reminder will be sent to any open surveys containing a deadline to complete before the study is closed. After completing the survey, it will revert to the following message:

[Survey Closed Message]:

Thank you for your interest in participating in the Xcel Energy ENERGY STAR New Homes Homeowner Survey. At this time, we have reached our target number of responses and the survey is closed. For additional information about Xcel Energy's Residential products, visit www.xcelenergy.com/programs_and_rebates.

Early Termination Message

If a survey respondent is terminated early due to screening-out, we will not distribute an incentive gift card to the customer, and they will receive the following message depending upon their answer to **Intro2**. If a respondent drops-out of the survey before completing the incentive questions at the end of the survey, they will also not receive an incentive (although we will make an effort to contact customers who complete everything but the incentive questions so we can provide their incentive).

[IF EMAIL PROVIDED IN Intro3] Thank you, we will send the survey to the person you indicated. Thank you for your time. For additional information about Xcel Energy's Residential products, visit www.xcelenergy.com/programs_and_rebates.

[IF NO EMAIL PROVIDED IN Intro3] We appreciate your interest in our survey. However, based on your responses, you do not qualify for the survey. For additional information about Xcel Energy's Residential products, visit www.xcelenergy.com/programs_and_rebates.

Initial Survey Invitation Message

Subject: Earn $25 for feedback on your energy efficient home!

Body:

[INSERT XCEL ENERGY LOGO]

Hello **<FIRST_NAME>,**

Thank you for being a valuable Xcel Energy customer! Today, we are reaching out to invite you to participate in a brief 15-minute survey about your home. According to our records, you purchased a home from a builder that participated in Xcel Energy's ENERGY STAR New Homes product, a program that encourages home builders to construct energy efficient homes. Xcel Energy would like your feedback as a homeowner who purchased a home built through this program.

We know that your time is valuable. In appreciation for your contribution to this important research, we are offering a $25 Tango gift card, a digital gift card that can be redeemed at a variety of retailers, including Amazon, Apple, and Target, to customers who qualify and complete this 15-minute online survey.

To participate, please visit the following site on your computer or internet-accessible phone.

Follow this link to the survey:

[LINK]

Or copy and paste this into your browser:

[LINK]

Your participation in this study is voluntary and your responses are confidential. If you have questions about this survey, please contact Allie Hotzfeld at TRC, the national research firm conducting this survey on behalf of Xcel Energy. You can reach Allie Hotzfeld at (206) 388-0981 or ahotzfeld@trccompanies.com. If you would like to contact Xcel Energy to verify the legitimacy of this study, please contact the Customer Service Center at 1-800-895-4999.

Thank you in advance for sharing your experiences and your time.

Sincerely,

[NAME]

Consultant, Advanced Energy, TRC

Follow the link to opt out of future emails about this survey:

${l://OptOutLink?d=Click here to unsubscribe}

[END]

Reminder Survey Invitation Message

Subject: Reminder - $25 gift card for your feedback to Xcel Energy!

Body:

[INSERT XCEL ENERGY LOGO]

Hello **<FIRST_NAME> <LAST_NAME>**,

We recently sent you an email inviting you to take a brief survey regarding your experience with your energy efficient home that went through the Xcel Energy ENERGY STAR New Homes product.

We are still looking to hear from a few more customers to reach our goal of 70 completed surveys. **Can you be one of the people that get us to that goal?** Your feedback is crucial to helping Xcel Energy improve our service offerings for customers like you.

In appreciation for your valuable time and feedback we are offering a $25 Tango gift card to customers who qualify and complete this 15 minute online survey.

To participate, please visit the following site on your computer or internet-accessible phone.

Follow this link to the survey or copy and paste this into your browser:

[LINK]

Please know that any information you provide will remain strictly confidential and reported only in aggregate to inform future program planning. If you have questions about this survey, please contact Allie Hotzfeld at TRC, the national research firm conducting this survey on behalf of Xcel Energy. You can reach Allie Hotzfeld at (206) 388-0981 or ahotzfeld@trccompanies.com. If you would like to contact Xcel Energy to verify the legitimacy of this study, please contact the Customer Service Center at 1-800-895-4999.

Thank you in advance for sharing your experiences and your time.

Sincerely,

[NAME]

Consultant, Advanced Energy, TRC

Follow the link to opt out of future emails:

${l://OptOutLink?d=Click here to unsubscribe}

[END]

Survey Sections

- **Intro:** Introduction and Screening
- **A:** Awareness and Purchasing Decision
- **B:** Builder Interactions
- **C:** Implementation
- **S:** Satisfaction

- **CLOSE:** Closing

Survey

Section Intro: Introduction and Screening

Intro1. Thank you for your interest in our survey! Xcel Energy's ENERGY STAR New Homes product encourages home builders to construct energy efficient homes and provide educational opportunities to future homeowners. Today, we're interested in hearing from homeowners like you who purchased a home built through this program.

This survey should take about **15 minutes to complete**. As a thank you, we are offering a $25 Tango gift card upon valid completion of the survey. Please remember that your answers are strictly confidential and the level of information you provide is up to you. If you cannot accept a gift card, or would prefer to donate your incentive, we also can donate your incentive to a local United Way on your behalf.

To participate in the survey, please answer some questions to ensure that you qualify. Please click "Next" to continue.

[Page Break]

Intro2. Our records indicate that you purchased a home between [Month YYYY] and [Month YYYY] that was built through Xcel Energy's ENERGY STAR New Homes product.

Is that correct?

1. Yes, that is correct.
2. No, that is not correct. **[TERMINATE]**
3. No, that is someone else in this household.
98. Don't know **[TERMINATE]**

[ASK IF INTRO2=3]

Intro3. What is this person's name and email address?

1. **OPEN-END FORM [TERMINATE]**
98. Don't know **[TERMINATE]**
99. Prefer not to answer

[ASK IF Intro2=1]

Intro4. Which best describes the offered price of your home at time of sale?

1. Under $250,000
2. $250,000 to $399,999
3. $400,000 to $549,999

4. $550,000 to $699,999
5. $700,000 to $849,999
6. $850,000 to $999,000
7. $1,000,000 and over
98. Don't know **[TERMINATE]**
99. Prefer not to answer **[TERMINATE]**

Intro5. Which best describes your typical yearly household income?

1. Less than $40,000
2. Between $40,000 and $79,999
3. Between $80,000 and $120,000
4. Greater than $120,000
99. Prefer not to answer **[TERMINATE]**

Intro6. How long have you lived in Colorado?

1. Less than a year
2. 1-2 years
3. 3-5 years
4. More than 5 years
98. Don't know

Section A: Awareness and Purchasing Decision

Thank you! You qualify to take this survey. Once the survey is completed, you will be provided with more information on your $25 gift card. First, this section includes questions to help understand your decision to purchase the new home you are living in.

[ASK ALL]

A1. Please rate the importance of each of the following factors on your decision to purchase your home. The bigger the number, the greater the influence.

1. **[Scaled numeric response, from 1 - 5, where 1 means "not at all important" and 5 means "very important"]**
98. Don't know

(Randomize)

A1a. Buying a brand new home vs a pre-owned home

A1b. The specific builder of the home

A1c. The energy efficiency features of the home (e.g., high efficiency heating and cooling system)

A1d. The location of the home

A1e. The price of the home

A1f. The comfort of the home

A1g. The home's participation in the Xcel Energy ENERGY STAR New Homes program

A1h. Features of the home *not* related to energy efficiency.

[ASK ALL]

A2. Was there another top priority factor that was important to your decision to buy your new home?

1. Yes (Please explain): **[SPECIFY]**

2. No additional priority factor

98. Don't know

[ASK IF A2=1]

A2a. How would you rate the importance of that factor?

1. **[Scaled numeric response, from 1 - 5, where 1 means "not at all important" and 5 means "very important"]**

98. Don't know

[ASK ALL]

A3. What features would you consider to have the greatest impact on making a new home energy efficient? Select all that apply. **[MULTIPLE RESPONSE]**

1. Energy efficient appliances

2. LED lighting

3. Advanced lighting controls
4. Energy efficient furnace

5. Energy efficient central air conditioner

6. Efficient building envelope (i.e., high performance insulation, efficient windows, weatherstripping)

7. Electric vehicle (EV) charging equipment

8. Solar panels

9. Battery storage

10. Smart meters for appliances and larger equipment

11. Other [SPECIFY]

18. No features impact the efficiency of my new home

98. Don't know

[ASK IF A3 = 1]

A3a. With this in mind would you describe your new home as an energy efficient home?

1. Yes

2. No

98. Don't know

[ASK IF A3a = 1]

A4. Were there any particular energy efficient upgrades that were important in your decision to purchase your new home?

1. Yes

2. No

98. Don't know

[ASK IF A4 = 1]

A4a. Which of the following energy efficient equipment was important in your decision to purchase your new home? Please select all that apply. **[MULTIPLE RESPONSE]**

1. **[SHOW IF <CLOTHES> = 1]** ENERGY STAR clothes washer

2. **[SHOW IF <HEATPUMP> = 1]** Heat pump water heater

3. **[SHOW IF <LIGHTING> = 1]** Energy efficient lighting

4. **[SHOW IF <THERM> = 1]** Smart thermostat

5. **[SHOW IF <FRIDGE> = 1]** ENERGY STAR refrigerator

6. Other (Please specify): **[SPECIFY]**

7. No efficient equipment was important in my decision to buy my home**.**

98. Don't know

[ASK IF A1c> 2]

A5. Please rate the importance of each of the following factors on your decision to purchase a home with energy efficient equipment and/or materials.

How important was…

1. **[Scaled numeric response, from 1 - 5, where 1 means "not at all important" and 5 means "very important"]**

98. Don't know

99. Not applicable

(Randomize)

A5a. Lower energy costs

A5b. Better for the environment

A5c. Better resale value

A5d. Fewer maintenance concerns

A5e. Comfort

A5f. Indoor air quality

A5g. Other health and safety concerns **[anchor after A5f]**

[ASK IF A3 = 2]

A6. Which of the following energy efficient equipment would you have liked to see installed in your home prior to purchase? Please select all that apply. **[MULTIPLE RESPONSE]**

1. **[SHOW IF <CLOTHES> = 0]** ENERGY STAR clothes washer
2. **[SHOW IF <HEATPUMP> = 0]** Heat pump water heater
3. **[SHOW IF <LIGHTING> = 0]** Energy efficient lighting
4. **[SHOW IF <THERM> = 0]** Smart thermostat
5. **[SHOW IF <FRIDGE> = 0]** ENERGY STAR refrigerator
8. Triple-pane glazed windows
9. Electric vehicle (EV) charging equipment
10. LED Lighting
11. Solar panels
12. Battery storage
13. Other (Please specify): **[SPECIFY]**
14. Nothing, all efficient equipment I am interested in was installed
98. Don't know

Section B: Builder Interactions

Next, we have a few questions about your experiences with the builder of your home: **<ORGANIZATION>**.

[ASK ALL]

B1. Did you, or someone from your household, interact with the builder of your home?

1. Yes, **all** of the time
2. Yes, **some** of the time
3. No

98. Don't know

[ASK IF B1 = 1, 2]

B2. What did those interactions involve? Please choose all that apply. **[MULTPLE RESPONSE; RANDOMIZE 1-5]**

1. Administrative topics (e.g. schedule, progress)
2. Training on energy efficient equipment / materials
3. Cost / Financial considerations
4. Design considerations (e.g. finishes)
5. Other (please specify): **[SPECIFY]**

98. Don't know

[ASK IF B2 = 2]

B3. What type of training on energy efficient equipment and materials did you receive? Please choose all that apply. **[MULTIPLE RESPONSE]**

1. Information on how the energy efficient equipment / materials lowers energy costs
2. How to properly use the energy efficient equipment to maximize savings
3. How to properly maintain the energy efficient equipment
4. Other (please specify): **[SPECIFY]**

98. Don't know

[ASK IF B3 = 1, 2, 3, 4]

B3a. How was this information shared with you?

1. Online videos
2. Pamphlet or printed instructions
3. One-on-one training / interaction
4. Other **[SPECIFY]**

98. Don't know

[ASK IF B1 = 3 OR B2 = 1, 3]

B5. What education related to energy efficiency would you have liked to receive? Please choose all that apply. **[MULTIPLE RESPONSE]**

1. Information on how the energy efficient equipment / materials lowers energy costs
2. How to properly use the energy efficient equipment to maximize savings
3. How to properly maintain the energy efficient equipment
4. Other **[SPECIFY]**

98. Don't know

Section C: Implementation

Next, we want to ask you a few questions about your experience with the equipment in your home.

[ASK ALL]

C1. Please rate the ease or difficulty of the following tasks associated with purchasing or living in your home..

How easy it was to…

1. **[Scaled numeric response, from 1 - 5, where 1 means "very difficult" and 5 means "very easy"]**

98. Don't know

99. Not applicable

[RANDOMIZE C1a-C1f]

C1a. Decide whether or not to purchase an energy efficient home

C1b. Decide which energy efficient equipment and/or materials to have pre-installed in your new home vs. installing afterwards

C1c. Operate the energy efficient equipment in your home

C1d. Realize your target energy savings

C1e. Maintain the energy efficient equipment in your home

C1f. [If B2 = 2] Understand the energy efficiency training you received from the builder

[For any C1 < 3]

C2a – C2f. Why was it not easy to **<RESTORE QUESTION WORDING FROM C1a – C1f>?**

1. **[OPEN-END]**

98. Don't know

[ASK ALL]

C3. Which of the following additional energy efficient equipment and/or materials have you installed beyond what the builder installed? Please select all that apply. **[MULTIPLE RESPONSE]**

3. ENERGY STAR appliances
4. Electric Vehicle (EV) charging equipment
5. Battery storage
6. Efficient lighting
7. Advanced lighting controls (e.g., occupancy sensors, daylighting controls)
8. Other (please specify): **[SPECIFY]**
9. I have not installed any additional energy efficient equipment or materials since purchasing the home. **(Exclusive)**

98. Don't know

[ASK C5 FOR EACH SELECTION, C3 = 1-6]

C5. Please rate the importance of each of the following factors on your decision to install **<EQUIPMENT SELECTED IN C3>.**

How important was…

1. **[Scaled numeric response, from 1 - 5, where 1 means "not at all important" and 5 means "very important"]**

98. Don't know

[RANDOMIZE C5a-C5e]

[ASK C5 FOR EACH SELECTION, C3 = 1-5]

C5a. Your positive experience with the energy efficient equipment/materials already installed in your home

C5b. A recommendation(s) from someone you know

C5c. A recommendation(s) from your builder

C5d. Information from Xcel Energy (e.g. talking with a representative, visiting the website, viewing marketing materials, etc)

C5e. A rebate from Xcel Energy

C6. Was there another important factor in your decision to install **<EQUIPMENT SELECTED IN C3>**?

1. Yes (please specify): **[SPECIFY]**
2. No, there was no additional factor.

98. Don't know

[ASK IF C6=1]

C6a. How would you rate the importance of that factor?

1. **[Scaled numeric response, from 1 - 5, where 1 means "not at all important" and 5 means "very important"]**

98. Don't know

[ASK ALL]

C7. Has your household participated in an Xcel Energy program related to energy efficiency, electric vehicles, or distributed energy (e.g. rooftop solar)?

1. Yes (please specify): **[SPECIFY]**
2. No

98. Don't know

[ASK ALL]

C8. Which of the following Xcel Energy programs would you be interested in receiving information on? Please select all that apply.

Hover over "Renewable energy programs" to learn about which Xcel Energy programs this includes.

[MULTPLE RESPONSE]

1. Energy efficiency programs
2. Electric vehicle programs
3. Renewable energy programs (**HOVER OVER TEXT:** This includes Xcel Energy residential renewable opportunities such as Windsource®, Solar*Rewards Community®, Solar*Rewards®, and Renewable*Connect®)
4. None of the above **(EXCLUSIVE)**

5. Other (please specify): **[SPECIFY]**

98. Don't know

C9. What is the energy source for your water heater?

1. Natural gas

2. Electric

4. Propane / Butane / LP

5. Other **[SPECIFY]**

98. Don't know

C9a. What type of water heater is it?

1. Tank water heater
2. Tankless water heater
3. Heat pump water heater
4. Other (Specify:) _____
98. Don't know

C10. When heating the water in your home, do you prefer to use gas or electricity?

1. Prefer gas very much
2. Prefer gas somewhat
3. No preference
4. Prefer electric somewhat
5. Prefer electric very much
98. Don't know

[ASK IF C10 = 1,2]

C10a. Why do you prefer gas water heating?

1. **[OPEN-END]**
98. Don't know

[ASK IF C10 = 4,5]

C10b. Why do you prefer electric water heating?

1. **[OPEN-END]**
98. Don't know

[ASK ALL]

C11. What is the energy source for your space heater?

1. Natural gas
2. Electric
4. Propane / Butane / LP
5. Other **[SPECIFY]**

98. Don't know

[ASK ALL]

C12. When heating your home, do you prefer to use gas or electric heat?

1. Prefer gas very much
2. Prefer gas somewhat
3. No preference
4. Prefer electric somewhat
5. Prefer electric very much

[ASK IF C11 = 1,2]

C12a. Why do you prefer gas space heating?

1. **[OPEN-END]**

98. Don't know

[ASK IF C12 = 4,5]

C12b. Why do you prefer electric space heating?

1. **[OPEN-END]**

98. Don't know

[ASK ALL]

C13. How familiar are you with the following smart home technologies?

1. **[NUMERIC OPEN-END, 1 – 5, "Not familiar at all" to "Very familiar"]**

98. Don't know

[RANDOMIZE C11a-C11h]

C13a. Smart thermostats

C13b. Smart outlets

C13c. WiFi controlled outlets, lights, etc.

C13d. Home energy monitors

C13e. Smart hubs & speakers

C13f. Solar equipment or products

C13g. Smart meters for appliances and larger equipment

C13h. Battery storage (such as Tesla Powerwall)

C13i. Security cameras (such as Nest)

[ASK ALL]

C12. When considering buying smart devices for your home, how important are the following?

1. **[NUMERIC SCALE, 1 – 5, "Not important at all" to "Very important"]**

98. Don't know

[RANDOMIZE C12a-C12g]

C12a. Save energy

C12b. Save money

C12c. Improve the comfort of the home

C12d. Improve my quality of life

C12e. Ease of use

C12f. Security of my data

C12g. Adopting new technology

[ASK ALL]

C13. Do you have any concerns with purchasing smart home devices?

1. Yes (Please specify:) **[SPECIFY]**

2. No, I do not have any concerns.

98. Don't know

Section S: Satisfaction

This section includes questions regarding your satisfaction with your home's energy efficiency measures.

[ASK ALL]

S1. Please rate your satisfaction with each of the following.

1. **[NUMERIC OPEN END, 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied"]**

98. Don't know

99. Not applicable

[RANDOMIZE S1a-S1g]

S1a. The quality of the construction of your home

S1b. The comfort-level of your home

S1c. Your interactions with your builder

S1d. The indoor air quality of your home

S1e. The number of other health and safety-related maintenance issues

S1f. Your home energy costs

S1g. [If B2 = 2] The training you received from builders

[ASK FOR ANY D1 < 3]

S2a – S2f. Why weren't you satisfied with **<RESTORE QUESTION WORDING FROM S1A – S1F>**?

1. **[OPEN-END]**

98. Don't know

[ASK ALL]

S3. Thinking about your experience as a whole, how would you rate your satisfaction with the energy efficiency of your home?

1. **[NUMERIC OPEN END, 1 - 5, where 1 is "very dissatisfied" and 5 is "very satisfied"]**

98. Don't know

[ASK IF S3 < 3]

S3a. Why aren't you satisfied with the energy efficiency of your new home?

1. **[OPEN END]**

98. Don't know

Closing

[ASK ALL]

CLOSE1. That was the last question. As a thank you for your input, we'd like to send you a $25 Tango gift card, which will be sent to your email within the next 5 to 10 business days, unless you'd prefer to donate to your local United Way.

For reference: The United Way is a charitable organization founded in 1887 whose mission is to improve lives supporting the health, education, and financial stability of every person in every community. They work with local educators, health organizations, and community leaders to find new solutions to local (and global) problems.

Please select the gift card option you prefer.

1. Tango

2. United Way

[ASK IF CLOSE1 = 1]

CLOSE2A. We currently have the following information on file to email your Tango virtual gift card:

<EMAIL_ADDRESS>

Is this the email address where you would like us to send the $25 gift card?

1. Yes, email is correct
2. No, please send to: **(FILL OUT)**

[SHOW IF CLOSE1=1]

CLOSE3. You should expect to receive your virtual gift card within the next 5 to 10 business days. The gift card will be emailed directly from Tamgp, with a reference to “Thank you for your participation!”

If you have any questions or have not received your gift card within the next 5 to 10 business days, please contact [NAME] at [name]@trccompanies.com or by phone at 206-388-0981 and reference the Xcel Energy ENERGY STAR New Homes Homeowner survey.

To submit your responses, please click "Submit" below and to the right.

[ASK IF CLOSE1 = 2]

CLOSE4. In whose name should the check be made out to for the donation to United Way?

1. **OPEN-END**
2. I would like to stay anonymous

[ASK IF CLOSE1 = 2]

CLOSE4A. Please provide information for the nearest United Way chapter that we should donate to.

1. City: **[OPEN-END FORM, PIPE IN <CITY>]**
2. State: **[OPEN-END FORM, PIPE IN <STATE>]**
3. Zip code: **[OPEN-END FORM, PIPE IN <ZIPCODE>]**

If you have any questions or have not received your gift card within the next 5 to 10 business days, please contact [NAME] at [name]@trccompanies.com or by phone at 206-388-0981 and reference the Xcel Energy ENERGY STAR New Homes Homeowner survey.

To submit your responses, please click "Submit" below and to the right.

_____

[END OF SURVEY]

CUSTOM MESSAGE:

On behalf of Xcel Energy, thank you again for your input with this important study. For additional information about Xcel Energy's Residential products, visit www.xcelenergy.com/programs_and_rebates.

B.7 Peer Utility Benchmarking Interview Guide

Introduction

To support the process and impact evaluation of the 2021 Xcel Energy energy efficiency products, the TRC evaluation team will benchmark the Xcel Energy products against peer utilities. The objective of the benchmarking is to identify opportunities to improve the Xcel Energy products based on a comparison of peer utility programs' design, delivery, and processes. In addition, benchmarking allows the evaluation team to understand the performance of the product in 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. In addition to this secondary research and in-depth interviews, the evaluation team will draw on findings from the benchmarking conducted as part of the 2019 Minnesota Energy Efficient New Homes evaluation given the similarities between the two programs and how recently the evaluation was completed.

This document presents the in-depth interview guide for the Colorado ENERGY STAR New Homes Product peer utilities interviews. Interviews will be conducted with no more than 4 of Xcel Energy's peer utilities detailed in Table 17 below. Target respondents are managers of residential new construction energy efficiency programs. The below are listed in order of priority, with Idaho Power, Public Service Company of New Mexico (PNM), and Black Hills Energy as back-up.

Table 17: List of Peer Utilities

Utility	Program Name
Duke Energy	Residential New Construction
Arizona Public Service Electric (APS)	ENERGY STAR Homes Program
Eversource Massachusetts	Residential New Home Construction
Rocky Mountain Power	Wattsmart New Homes
Idaho Power	Residential New Construction Pilot Program
Public Service Company of New Mexico (PNM)	New Home Construction

Table 18 shows the objectives for the overall evaluation and indicates which of these objectives will be addressed by the peer utility interviews.

Table 18. Evaluation Objectives

Evaluation Objective	Impact or Process Objective	Research Activity	Peer Utility Interview Guide Objective
Understand the impacts of jurisdictional goals (e.g., electrification), increasingly stringent energy codes, rising baselines on the Product, and the relationship and impact to Xcel Energy's overall corporate goals and strategic initiatives (e.g., demand management programs to manage customer energy bills).	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify opportunities for smart connected homes, and supporting jurisdictional energy-related goals, such as electrification.	Process	Participating builder survey, nonparticipating builder interviews, trade partner interviews, benchmarking interviews	✓
Identify where and how there is potential future coordination with other Xcel Energy products.	Process	Participating builder survey, trade partner interviews, benchmarking interviews	✓
Investigate the barriers preventing participating builders from achieving higher tier energy code savings, including what is preventing non-participant and near-participant homes from meeting the 10% above code requirement.	Process	Participating builder survey, trade partner interviews	
Identify barriers for participating and non-participating builders serving medium- and low-income customers.	Process	Participating builder survey, nonparticipating builder survey, trade partner interviews	
Identify motivations and barriers of homeowners/end-users to purchasing an energy efficient home	Process	Homeowner survey	
Identify opportunities to collect and track additional data to inform Product improvements.	Process	Benchmarking interviews, trade partner interviews	
Connect the link between home buyers and the utilities, two parties which do not have to communicate to make the Product work	Process	Participating builder surveys, homeowner surveys	
Determine NTG ratio for energy-efficient home rebates.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews	✓

-Identify major drivers of freeridership.	Impact	Participating builder survey
Assess participant and nonparticipant spillover.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews
Assess market effects of the Colorado ENERGY STAR New Homes Product.	Impact	Participating builder survey, nonparticipating builder interviews, trade partner interviews

Table 19 identifies the interview questions related to each key performance indicator.

Table 19. Mapping of interview questions to indicators

Key Performance Indicator	Data Needed	Interview Question
Program energy savings goals	• 2020 program energy savings goals • 2020 program's savings • 2020 total energy efficiency portfolio goal	B2, B3, B4
Program budget cost of acquisition (e.g. $/MWh, $/Mcf)	• 2020 program budget • 2020 total gross energy savings for each peer program	B5
Participation Levels	• Number of incentive applications submitted 2020 • Number of participating builders in 2020 • Number of rebates issued in 2020	B1
Net-to-gross ratios (NTGRs)	• NTG methods	B3
Total resource cost test (TRC) values	• TRC values	B7

Table 20 identifies the interview questions related to each contextual theme.

Table 20. Mapping of interview questions to contextual themes

Contextual themes	Data Needed	Interview Question
Program description	• Overall program objectives, implementation strategies, participation target types • Program staffing, any recent changes that have been made to the program, and future outlook • Incorporation of jurisdictional goals (e.g., electrification), grid responsive technologies • Impacts of stringent energy codes	A1, A2, C1
Program processes	• Baseline setting process	A4
Net-to-gross (NTG) savings approach	• NTG method, ratio applied, calculation details	B3

Homeowner engagement practices	• Methods used to engage homeowners • Coordination with other programs	C1, C6
Builder engagement practices	• Methods to engage builders	C2
Measure types and incentives	• Rebate structure and incentive levels	A3
Program marketing practices	• Methods used to increase program awareness to new and existing customers	C1

Recruiting Instructions

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

Potential respondents 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 Colorado ENERGY STAR New Homes 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 TRC on behalf of Xcel Energy. Is CONTACT NAME available?

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

We would like to include UTILITY in this study, as your Residential New Construction program has been identified as an [innovative/peer] program. In your interview, we would talk about your Residential New Construction program's design and implementation, as well as its successes and challenges. We would be very happy to share an anonymized version of our report on peer Residential New Construction programs with you once we've completed our research.

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

INTRO 3 Can we include your utility in the study?

a. Yes **[RECORD CONTACT INFORMATION; SETUP INTERVIEW TIME; EMAIL INTERVIEW TOPICS]**
b. No **[DISCUSS CONCERNS; ANSWER QUESTIONS; ATTEMPT TO CONVERT TO "YES"]**

Section A: 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. Have there been any recent changes to the program?

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

d. How is the program addressing rising baselines due to more stringent energy codes?

e. How is the program incorporating beneficial electrification and other electricfication technologies such as EV chargers, or PV (if at all)?

f. How is the program incorporating grid responsive technology (if at all)?

g. Is fuel switching or substitution (e.g. propane to electric, electric to natural gas) permitted in new homes? If yes, how is this applied to baselines for new construction? What baseline is used for all-electric homes?

h. Is fuel switching or substitution permitted for other energy efficiency programs in your jurisdiction?

A2. Can you describe the implementation strategies used by staff or implementers?

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

b. Do program staff or implementers provide training to participants?

   a. Probe for: builders and consultants vs. homeowners, content (e.g., general, specific technologies), training format (e.g., virtual, in-person)

A3. Next, I'd like to talk about your program's efficiency incentives. **[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH. CAN ASK QUESTIONS BELOW OR ASK RESPONDENT IF OK TO FOLLOW UP VIA EMAIL]**

a. What types of measures do you offer? [PROBE**:** Whole-building, Prescriptive, Rater]

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

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

A4. How do you set baselines?

Section B: Savings goal/cost

Next, I'd like to talk about the participation and energy savings achieved through the program in 2020.
[ASK/CONFIRM BASED ON HOLES IN BACKGROUND RESEARCH. CAN ASK QUESTIONS BELOW OR ASK RESPONDENT IF OK TO FOLLOW UP VIA EMAIL]

B1. How many projects were completed in 2020?

a. How many incentive applications were submitted in 2020?

B2. What were the program's energy savings goals in 2020? (MWh)?

B3. Are these goals based on gross or net savings?

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

b. What NTG ratio do you use?

c. What methods are used to calculate NTG ratio?

d. Are NTG ratios estimated at the program level, measure level, or both?

B4. How much net/gross energy savings did the program report in 2020?

B5. What was the total energy efficiency portfolio goal in 2020?

B6. We'd like to know more about the budget or total operating costs of your program to get a sense of the utility cost of energy savings. Ideally, this includes program incentives, salaries of program staff (including support staff who may not work on the project full-time), marketing, consulting, and other overhead.

a. What is the program's total operating budget?

B7. What type of cost effectiveness test is applied to the program?

a. If Total Resource Cost (TRC), what was the TRC in 2020?

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. Who are the program participants? By participants, we mean who are all the actors involved in the program? (probe: builder, home-buyers, raters)

C1a. Which participants receive rebates from the program?

C2. Approximately how many builders are active in the program?

C2a. What housing market(s) do these builders typically serve (if known)? Do you include Multifamily (low-rise, mid-rise, high-rise)?

Probes: Affordable,
Entry-Level,
Move-Up,
Luxury/Custom,
Vacation/Second

C2b. What's the approximate distributions across housing markets? Building types?

C2c. Do you known whether homes are being used for other purposes?

Probe for: accessory dwelling units, investor built/purchased homes to rent, Airbnb

C3. What activities do program staff conduct to engage builders?

Probes: Provide training?
Allow rater selection?
Support connections between contractors and homeowners?

C4. What activities do program staff conduct to engage homeowners?

Probes: Provide training?

C5. Does the program engage homeowners after participation?

Probes: Track realized energy useage?
Use these data to inform building science consulting and/or energy savings?

C6. Do you follow up with customers after a project is complete to facilitate participation in other energy efficiency programs?

C6a. [IF NO] Do you coordinate with other energy efficiency or energy related programs in some other way?

Section D: Closing

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

Appendix C: Data Collection Findings

C.1 Staff Interview Findings

Introduction

To support the process and impact evaluation of the 2021 Xcel Energy DSM products, the TRC Companies (TRC) evaluation team conducted telephone interviews with key staff managing and implementing the Xcel Energy DSM products. The interview objectives were to collect staff feedback on product experiences and evaluation priorities. Members of the TRC evaluation team interviewed the following key staff managing and implementing the Colorado Energy Star New Homes (ESNH) product.

Xcel Energy Staff:

- Product Manager
- Strategic Segment Team Lead
- Engineering Team member

Implementer Staff:

- Vice President of Program Management

This memo contains our summary of the key takeaways, a description of the product, an inventory of the product's strengths and barriers, and feedback on evaluation priorities.

Key Takeaways

Below are key takeaways from staff experiences with the Colorado ESNH product. These key takeaways provide a summary of the product context and feedback received during both the kick-off meeting and the subsequent staff interviews.

- **The product is experiencing success in recent years.** Despite the challenges of the "seller's market" in Colorado, the program has had success meeting its goals. However, product staff noted that Colorado builders do not build to the standard, or achieve the level of above code savings, seen in Xcel Energy's Minnesota territory.
- **Product staff are interested in exploring the product's reach within moderate- and low-income communities.** It appears Xcel Energy is reaching homeowners who can afford higher-priced homes, especially within major metropolitan areas, however the reach of the product outside of these markets is unclear.
- **Product staff are interested in establishing a more direct relationship with builders and home buyers.** This relationship could include more direct marketing and outreach, as well as customer education. Ensuring customers are educated on the latest and future energy-saving technologies can push builders to increase energy-efficiency within the homes they build, thus influencing the housing market, while establishing a more direct relationship with builders could position Xcel Energy as a valuable expert resource.

- **Staff interviewee responses indicated an interest in continuing to support integrated homes and electrification.** Product staff indicated a desire to be a leader in this space as jurisdictions, such as Denver, adopt goals that support beneficial electrification; Xcel Energy hopes to support builders in meeting these jurisdictional goals. Product staff also discussed opportunities to leverage integrated homes in the future in a way that supports Xcel Energy's overall corporate goals.

Product Goals, Activities, and Resources

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

Goals and Objectives

- The product's goals track key performance indicators of gas and electric savings and participation. The savings goals are based on surpassing standards from energy codes.
-
- Table 21 below shows the 2020 savings goals and actuals.

Table 21. Xcel Energy CO Energy Efficient New Homes Energy Savings Goals & Actuals

	kW	kWh	Electric Participants	Budget/ Spend	Dth	Gas Participants	Budget/ Spend
2019 Goals	924	2,767,019	2,790	$1,038,889	83,456	4,000	$1,956,038
2020 Goals	808	2,626,700	2,521	$956,678	71,150	4,000	$1,823,925
2020 Actuals	728	4,350,331	2,397	$935,434	81,892	4,398	$2,193,149

- A primary focus of the product is to improve the performance of participating builders. One interviewee expanded upon this goal, highlighting the importance of encouraging repeat participation and fostering continuous improvement among participating builders. This is done in part through providing a quantitative, measured way to communicate and provide evidence of how builders continue to improve their building practices.
- All interviewees discussed the importance of delivering the best possible home to customers, a home that is comfortable and saves customers energy.
- Non-energy goals include providing education around energy efficiency to builders and educating customers to ensure they understand the energy efficient features of their new home.
- Broader, long-term goals include supporting electrification and integrated homes to support jurisdictions in their electrification goals, reducing grid load and total energy generation, and promoting grid reliability.
- With the adoption of more stringent energy codes and increasing baselines, the Xcel Energy product team sees potential to improve their position as a resource for builders interested in energy-efficiency and preparing homes for electrification.

- Additionally, Residential Science Resources (RSR) highlighted that the adoption of increasingly stringent energy codes across Colorado's jurisdictions has led to Home Energy Rating System (HERS) rater assistance functioning as a pass/fail score for code compliance. A core long-term goal for RSR is to provide additional tools for HERS raters, and support the use of HERS rating as a continuous improvement tool and vehicle to drive change.

- Additionally, Xcel Energy is starting to explore methods to expand product reach, especially among underserved groups. As one interviewee explained, Xcel Energy currently has an established group of builders producing increasingly high-tier, efficient homes, while there is room to build homes through the product that would be affordable for moderate- and low-income customers.

Activities

- Xcel Energy contracts with RSR to implement the product. Implementer staff interface primarily with HERS raters. HERS raters draw in builders, as they "are the throughput for the product", according to one Xcel Energy interviewee. In future years, Xcel Energy hopes to play a more active role in building relationships with Colorado builders to increase product awareness and improve builder satisfaction with and repeat participation in the product.
- Once enrolled in the program, HERS raters perform air tightness tests and final inspections, and submit the REM/Rate or Ekotrope file to RSR. HERS raters submit documentation electronically through HouseRater, the software tool used to track and manage builder progress through the product. RSR then reviews all documentation to ensure it is complete and accurate before submitting the application to Xcel Energy.
- Xcel Energy processes savings and incentives. After receiving an invoice for a home, Xcel Energy pays RSR who cuts the check to the builder after the homes have been completed through the program. Xcel Energy also provides a $75 incentive to raters to encourage them to bring in more builders.
- Prior to and during construction, RSR and the independent modelers consult with builders on energy-efficient equipment to incorporate into their home design, taking budget, target final home cost, HERS rating, and percent better-than-code into account.
- The products performance incentives are ordered by the local energy code requirement and percent energy savings buckets as shown in Table 22 and Table 23 below. Participants in homes that have both electric and gas service from Xcel Energy may also receive a $100 add-on bonus for ENERGY STAR certification. Additional add-on ENERGY STAR appliance rebates, as shown in Table 24 are available as well.

Table 22. Rebate Levels – 2009 IECC or Lower,and Percent Better-than-Code

Percent Better-than-Code	Rebate
10-14.999%	$200
15-19.999%	$350
20-24.999%	$500
25-29.999%	$650

30-34.999%	$800
35-39.999%	$1,000
40% and higher	$1,400

Note: Table adapted from Colorado 2019-2020 DSM Plan

Table 23. Rebate Levels – 2012 IECC or Higher and Percent Better-than-Code

Percent Better-than-Code	Rebate
10-14.999%	$250
15-19.999%	$400
20-24.999%	$600
25-29.999%	$900
30-34.999%	$1,300
35-39.999%	$2,000
40% and higher	$2,550

Note: Table adapted from Colorado 2019-2020 DSM Plan

Table 24. Appliance & Lighting Rebate Levels for Qualifying Homes

Appliance / Lamp	Rebate
ENERGY STAR Clothes Washer	$30
Heat Pump Water Heater	$450
High Efficiency Lighting – 2009 IECC or lower with LEDs – Minimum 20 lamps	$20
High Efficiency Lighting – 2012 IECC or higher with 100% High Efficiency (LEDs)	$10

Note: Table adapted from Colorado 2019-2020 DSM Plan

Marketing-Specific Activities

- Xcel Energy primarily relies on educational trainings and HERS raters to market the program. Xcel Energy provided one joint-training session in 2020 for the Colorado and Minnesota participating builders on Indoor airPLUS, put on by ICF (the vendor for Minnesota). Additionally, Xcel Energy sponsored a zero-energy-ready development in Denver to increase awareness among prospective builders around electrification measures and the program.

- RSR has a suite of trainings that builders can use with their sales teams to increase their familiarity with specifics of high-performing homes, and to provide them with tools to implement these designs and/or features.

- While marketing efforts were decreased during 2020 compared to prior years – due to the Covid-19 pandemic and product staff turnover in 2018/2019 – multiple interviewees discussed plans for increasing marketing activities in the coming year. Other anticipated incentive changes for Xcel Energy include offering more trainings for builders, reinstating builder awards, and enacting direct-to-consumer marketing that includes information on the program and past builders.

Resources

Product staff rely on the following resources to implement the product:

- Salesforce - An integral tool for tracking product data.
- RSR - A key resource for the product given their building science consulting expertise and their data-tracking tools.
- HouseRater - An online tool used to enroll a home in the product and submit required documentation.
- Other Xcel Energy Products and Departments - Other products and departments are playing an increasing role in product improvement. For instance, one interviewee mentioned that the product team is "engaging with all other programs that are end-use technology based as all of that technology [goes] in the homes."

Product Strengths and Challenges

During interviews, staff identified the following strengths and challenges to implementing the Colorado ESNH product in 2020. Strengths include factors that product staff identified as supporting the success of the product; challenges include factors that product staff identified as preventing the product from reaching its goals. As the core long-term goals continually shape the product, there is natural overlap between strengths and challenges.

Strengths

- Multiple interviewees mentioned strong brand representation as a result of Xcel Energy's legacy with participating builders and the product's track record building high quality homes. Multiple interviewees also discussed strong relationships between Xcel Energy, RSR and participating builders.
- Product staff also acknowledged that participating builders themselves are a core strength of the product. Among participating builders, there is a strong willingness to learn about and adopt emerging technologies related to energy efficiency.
- Interviewees discussed a belief that the Denver market is on the forefront of clean energy and energy efficiency. This includes a willingness to be early adopters of emerging technologies, creating opportunities for the product to "push the envelope" of what a new homes product can entail, according to one interviewee.
- The program has had success in recent years in meeting its goals for volume and achievement. This includes 2020; there was no perceived disruption due to the COVID-19 pandemic. Interviewees suggested that this is in part due to the growing population in the Denver metropolitan area, and expect this success to continue.

Challenges

- Product staff reported it can be challenging to communicate the value of building to a standard beyond a jurisdiction's minimum code requirements, especially when builders are incentivized by the "seller's market" (i.e., there is less of a need to distinguish oneself as an energy efficient builder).
- Energy codes vary by jurisdiction in Colorado given that it is a "home rule" state. Product staff expressed that this creates challenges for all involved. The patchwork of codes in Colorado can make communicating the benefits of building above code difficult, especially with concerns for cost-effectiveness and increasingly stringent codes.
- There is room for improvement in the product's education and training.
  - One interviewee mentioned that it is challenging to effectively educate HERS raters to "accurately and holistically value" the improvements and changes resulting from more stringent codes.
  - Additionally, not all subcontractors hired by participating builders are trained on the latest energy efficiency technologies and features; there is an opportunities for Xcel Energy to make sure these subcontractors are properly trained.
- There is also difficulty engaging builders to build affordable, above-code homes for Xcel Energy's income-qualified customers. One interviewee expressed that the product performs well in certain, often more high-end markets, but that the extent to which the product reaches other markets is unclear.
- Interviewees noted additional opportunities to improve coordination and collaboration between the ESNH product and other Xcel Energy departments and programs.

Feedback on Evaluation Priorities

During interviews, staff identified research topics they would like the evaluation to address. The following bullets compile these topics along with additional topics that the evaluation team identified based on staff interview findings. The evaluation team will consider these research topics when prioritizing portfolio-wide evaluation needs and as able, incorporate them into the final evaluation plan for the 2020 Colorado ESNH product.

- Identify barriers to participation for non-participating customers, including medium- and low-income customers and the builders who serve these market segments.
- Identify possible program design changes needed given increasingly stringent energy codes and rising baselines.
- Identify the potential for future coordination with other Xcel Energy products.
- Identify opportunities to collect and track additional data to inform product improvements.
  - Tracking realized customer energy usage within product homes 1-10 years after construction could aid in improving the product's building science consulting and forcasted energy savings. Additionally, this connects to Xcel Energy's long-term goals of continuous improvement, grid flexibility, and integration with other Xcel Energy programs in Colorado.

C.2 Participating Builder Survey Results

Introduction

This appendix presents results from the participating builder survey for the 2021 ENERGY STAR New Homes Product Evaluation. Specific research topics which this participating builder survey was designed to address are the following topics:

- **Product Awareness & Perceptions of Electrification:** We assessed how builders became aware of the ENERGY STAR New Homes Product to better understand how participating builders learned about the product. The survey asked builders about their familiarity with and opinion of electrification to better understand opportunities and barriers to supporting jurisdictions' electrification goals.
- **Product Experience & Satisfaction:** We discussed participating builders' experiences satisfaction with various aspects of the product and interactions with their HERS raters. Additionally, we asked builders if there were other electrification technologies and practices, smart connected technologies, or prescriptive opportunities that were of interest to builders.
- **Motivations & Barriers:** We asked participating builder respondents about the challenges of building to a standard above their local energy code. We also asked about when in the design and construction process they make decisions about energy efficiency and what motivates them to include energy efficiency in their designs.
- **Participating Builder Firmographics:** To better understand which housing markets the product serves, we also asked participating builders about the homes their organizations typically build, including typical selling price and housing markets served.

Survey Results

Section A: Firmographics, Operations, Participation

First, I'd like to gather some information about your organization's involvement with the Xcel Energy **<PROGRAM>** program, your organization, and your role at your organization.

A1. What is your occupational title within your company?

Verbatim Response
Owner
Senior Purchasing Agent
Director of Purchasing
President
Project Manager
Director of Purchasing
Manager

Director of Operations

General Manager

Owner

President

Senior VP of Operations

President

Project Manager

A2. Were you the primary contact between your organization and the Xcel Energy **<PROGRAM>** program staff?

	Count	Valid Percent
Yes	10	71%
No	4	29%

A3. Has your organization previously participated in any other Xcel Energy energy efficiency program?

	Count	Valid Percent
Yes	1	8%
No	12	92%

A4. What is the typical selling price of the homes your organization builds?

	Count	Valid Percent
Under $250,000	1	8%
$250,000 - $399,999	1	8%
$400,000 - $549,999	3	23%
$550,000 - $699,999	2	15%
$700,000 - $849,999	3	23%

$850,000 - $999,999	0	0%
$1,000,000 and over	3	23%

A5. Which housing markets do you typically serve?

	Count
Luxury / Custom	8
Affordable	5
Entry-level	4
Move-up	4
Vacation / Second	2
Other (“patio / ranch”)	1

Section B: Awareness, Electrification and Homeowner Interactions

B1. Next, I’d like to understand a little more about how you first became aware of Xcel Energy rebates for **<PROGRAM>**. Was it from:

	Count	Valid Percent
Xcel program staff	1	7%
HERS Rater	10	71%
Xcel educational training	0	0%
Xcel sponsored development	1	7%
Xcel website / marketing	1	7%
Xcel event(s)	0	0%
Xcel staff at trade show	0	0%
Another business / word of mouth	1	7%
Other	0	0%

B2. Are you familiar with the term "electrification"?

	Count	Valid Percent
Yes, very familiar	4	29%
Yes, somewhat familiar	3	21%
No, not familiar	7	50%

B2a. What does the term “electrification” mean to you?

Verbatim Response
Making the shift away from using fossil fuels and towards electric in homes
It can mean providing electricity to a product that didn't have electricity before, it can mean energizing a product with electricity that was previously not electrified, or it can mean, and that is probably where you are heading, just using electricity solely as an energy source for a home as opposed to gas, or any other energy in a home.
The term means the installation of electricity so humans can use it
Taking things away from natural gas and bringing them towards electric
It is the focus on electricity as the only energy source powering a neighborhood. Natural gas is eliminated.
It means to me moving to renewable energy. That's my understanding of it.
It means turning our home and heating strategies towards technology that rely upon electricity as the source energy

B3. How would you describe your overall opinion of electrification, on a scale from 1 to 5, where 1 is “not at all favorable” and 5 is “very favorable”?

	Count	Valid Percent
1 - not at all favorable	0	0%
2	1	14%
3	5	71%
4	0	0%
5 - very favorable	1	14%

[If B3 = 1]

B3a. Why did you rate your overall opinion of electrification a **<numeric response to B3>**?

Verbatim Response
We're in an extreme climate zone (heating only) and we don't think the technology currently exists to provide the adequate comfort level to eliminate gas fuel appliances
Because general public isn't ready for 100 percent electricity yet
Because I have no idea of what you are talking about it.
I don't think the technology is there for everything to be electric
I would say that as a concept and theory it works but renewables have not become a big enough supplier to make sense. In the northern climate zone 5 the technology for heat pump systems has not advanced enough and customized enough to become practical. Cost has to become affordable.
I feel that electrification is the next stage we need to get to as far as getting energy.
Its time is coming...technology has to catch up a bit more to reach that price point vs. natural gas.

Section C: Free-ridership

C0. In your own words, how would you describe the influence that the Xcel Energy <PROGRAM> had on your decision to build new home(s) better than code?

Verbatim Response
We were personally motivated. The Xcel program has given us additional education and training resources that help us do our job and the rebate is a nice perk but not the driver - it was more about us wanting to build better homes
Currently it has not played any impact. However, we are looking into changing that now to capitalizing on all the energy savings and the rebates that are available into recent development.
Very little. We actually don't see this as a big driver for most buyers. A lot of it is driven by requirements of specific communities and municipalities. The return on cost isn't that great. Buyers say they want energy efficient homes, but once you start adding in things like better insulation packages, higher efficiency furnaces and condensing water heaters, and/or heat pump water heaters, all of those cost adds up and suddenly they're not happy about how much their home costs.
Zero
We like building efficient homes and getting the credit return
The rebate is a great incentive. It helps as a differentiating factor from other home builders in the market
Honestly, the rebate helps a lot

I would say they had a big decision.

Not much - we build custom homes according to what our customers want - so they make most of the choices and decisions as far as how we build.

Rebate had a big influence, help pay for extra above required

It made me keen to do it, get the rebate and build better quality product

Definitely helped support to make cost feasible

No influence

It helped but the marketing advantage of ENERGY Star label was the primary motivation

C0_1. Making decisions can sometimes be relatively simple, involving one major factor, like price. Or, they can be relatively complex involving multiple factors, such as cost, information provided by your utility, and meeting customer preferences.

C1. There are of course many other possible reasons.

Next, I'm going to ask a few questions about your decision to build new homes at an average energy savings of **<AVERAGE_ENVELOPE_TIER>** above the code**.** Please rate the importance of each of the following factors on your decision using a scale from 0 to 10, where 0 means "not at all important" and 10 means "extremely important". The bigger the number, the greater the influence. If you don't know, just say "I don't know". If a factor is not applicable, say "Not applicable". Now, how important was…

C1a. The dollar amount of the rebate

	Count	Valid Percent
0 – Not at all important	0	0%
1	1	7%
2	0	0%
3	2	14%
4	1	7%
5	3	21%
6	2	14%
7	2	14%

8	2	14%
9	0	0%
10 – Extremely important	1	7%

C1b. An endorsement or recommendation by Xcel Energy staff

	Count	Valid Percent
0 – Not at all important	2	20%
1	2	20%
2	1	10%
3	1	10%
4	0	0%
5	3	30%
6	1	10%
7	0	0%
8	0	0%
9	0	0%
10 – Extremely important	0	0%

C1c. Information from Xcel Energy marketing or informational materials

	Count	Valid Percent
0 – Not at all important	1	8%
1	1	8%
2	4	31%
3	1	8%
4	0	0%

5	5	38%
6	0	0%
7	1	8%
8	0	0%
9	0	0%
10 – Extremely important	0	0%

C1d. Previous experience with energy efficient equipment or materials installed in the new home

	Count	Valid Percent
0 – Not at all important	0	0%
1	0	0%
2	0	0%
3	0	0%
4	1	8%
5	1	8%
6	0	0%
7	4	33%
8	2	17%
9	1	8%
10 – Extremely important	3	25%

C1d_1. Was this experience through an Xcel Energy program?

	Count	Valid Percent
Yes	6	60%
No	4	40%

C1e. Customer preference or request

	Count	Valid Percent
0 – Not at all important	0	0%
1	1	9%
2	1	9%
3	0	0%
4	1	9%
5	1	9%
6	1	9%
7	1	9%
8	2	18%
9	0	0%
10 – Extremely important	3	27%

C1f. Margin to install energy efficient equipment / materials

	Count	Valid Percent
0 – Not at all important	2	15%
1	0	0%
2	3	23%
3	0	0%
4	0	0%
5	2	15%
6	1	8%
7	3	23%
8	2	15%
9	0	0%

10 – Extremely important	0	0%

C1g. Your previous participation in an Xcel Energy program

	Count	Valid Percent
0 – Not at all important	0	0%
1	1	14%
2	0	0%
3	0	0%
4	0	0%
5	1	14%
6	1	14%
7	3	43%
8	0	0%
9	0	0%
10 – Extremely important	1	14%
DK	2	

C1h. Information received from any training or events conducted by Xcel Energy

	Count	Valid Percent
0 – Not at all important	2	22%
1	0	0%
2	1	11%
3	0	0%
4	0	0%
5	5	56%
6	0	0%

7	0	0%
8	0	0%
9	0	0%
10 – Extremely important	1	11%

C1i. Achieving a certification like ENERGY STAR

	Count	Valid Percent
0 – Not at all important	0	0%
1	0	0%
2	0	0%
3	0	0%
4	0	0%
5	1	8%
6	1	8%
7	0	0%
8	3	25%
9	1	8%
10 – Extremely important	6	50%

C1i_1. Did you learn about this certification through the Xcel Energy <PROGRAM> program?

	Count	Valid Percent
Yes	2	18%
No	9	82%

C1j. Environmental factors like reduced carbon emissions

	Count	Valid Percent
0 – Not at all important	1	8%
1	1	8%
2	0	0%
3	0	0%
4	1	8%
5	0	0%
6	1	8%
7	3	23%
8	3	23%
9	0	0%
10 – Extremely important	3	23%
DK	1	

C1o. Were there any other factors that were important to your decision to participate in the program?

	Count	Valid Percent
Yes	5	36%
No	9	64%

C1o_1. On the same scale from 0 to 10, how would you rate the importance of that factor?

	Count	Valid Percent
0 – Not at all important	0	0%
1	0	0%
2	0	0%

3	0	0%
4	0	0%
5	0	0%
6	0	0%
7	0	0%
8	2	40%
9	1	20%
10 – Extremely important	2	40%

C5a. If the incentive, information, and other support from the Xcel Energy **<PROGRAM>** was not available, would you have built the new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code**? If you are not sure, please let me know.

	Count	Valid Percent
Yes	12	86%
Maybe / not sure	1	7%
No	1	7%

C5b. Using a scale from 0 to 10, where 0 means “not at all likely” and 10 means “extremely likely”, please rate the likelihood that you would have built the new homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** if the Xcel Energy **<PROGRAM>** was not available.

	Count	Valid Percent
0 – Not at all likely	0	0%
1	0	0%
2	0	0%
3	0	0%
4	0	0%

5	1	8%
6	2	15%
7	1	8%
8	3	23%
9	2	15%
10 – Extremely likely	4	31%

C5c_1. We are trying to gain a deeper understanding of why builders use energy efficient building practices and would love to have additional feedback. You just told me that it is likely that you would have built new homes to the exact same efficiency level of **<AVERAGE_ENVELOPE_TIER> above code** if you did not have any support, information, or rebates from the Xcel Energy **<PROGRAM>** program. Can you elaborate on why?

Verbatim Response

We're personally motivated to build a better home. The benefits of building a more sustainable and efficient home translate to more comfort, better durability, and a better product. The marketing benefit isn't that important to us...when someone comes to us, they don't get an option of building an Energy Star home. We would build to the same level without the program, but its a nice perk.

Obviously we have to meet code. And then a lot of time we do look at the value of different things, understanding energy efficiency is valuable to the end user. Sometimes it makes sense to add a little bit extra and you get a lot out of it. For example, blown in insulation is not a ton more expensive but you get a lot of performance out of it. Really we look at what gives us the most bang for our buck recognizing that people value energy efficiency and it's stuff we can sell to our home buyers.

It's basically driven by municipal or developer requirements - if the developer says to build in this neighborhood you have to hit a HERS score of maximum of 50, then we are going to design a home to hit HERS score of maximum of 50. If we happen to get less than that through quality installation and quality construction, then that's an added bonus.

I would do it because it's the right thing to do.

It's an important factor

We are looking at long-term affordability for our home owners. We don't look specifically at automatic rebate but long term energy efficiency and utility savings that home owners get through having an energy efficient home.

Like I said before, we build custom homes - we build them according to customer preferences.

1. The performance based vs. prescriptive code, using an energy rater vs. building to the municipality's code 2. The impact of quality control by having higher levels of standards through Energy Star to hold subcontractors accountable to. So they have a higher level of checklist that leads to a higher quality product 3. Climate change ethos 4. Having Energy Star branding

I have been a certified professional for 12 years and understand the logic. We have been doing it all along. Personal preference such as durability and build better.

Because it's a great marketing advantage

C6. In absence of the Xcel Energy program, what is the likelihood you would have built fewer homes to the *exact same efficiency level* of **<AVERAGE_ENVELOPE_TIER> above code** you built through the **<PROGRAM>**? Please use a scale from 0 to 10, where 0 means "not at all likely" and 10 means "extremely likely".

	Count	Valid Percent
0 – Not at all likely	7	78%
1	2	22%
2	0	0%
3	0	0%
4	0	0%
5	0	0%
6	0	0%
7	0	0%
8	0	0%
9	0	0%
10 – Extremely likely	0	0%

C8. Before learning of the **<PROGRAM>** program, did you plan to build new homes to the same efficiency standard as you did as a participant in the program, **<AVERAGE_ENVELOPE_TIER> above code**?

	Count	Valid Percent
Yes	11	85%
No	2	15%

C8_1. We are trying to gain a deeper understanding of why builders use energy efficient building practices and would love to have additional feedback. You just told me

that you plan to build new homes to the same efficiency standard as you did as a participant in the program. Can you elaborate on why?

Verbatim Response
Most jurisdictions require a minimum, we always want us to be above. It's a selling and marketing factor of us to be above that.
Our company brand is of durability and efficiency, which resonates with the boomer graphic. Total cost of ownership is important when they are on age-related fixed income years

Section D: Spillover

D1. Since your participation in the **<PROGRAM>** program in **<YEAR>,** has your company built any efficient new homes without applying for a rebate from Xcel Energy? When I say "efficient new homes", I mean new homes that were built in Xcel Energy service territory and would've been eligible for an Xcel Energy **<PROGRAM>** rebate.

	Count	Valid Percent
Yes	1	7%
No	13	93%

D1a. For these efficient new homes in Xcel Energy territory that you did not receive a rebate for, why did you not apply an Xcel Energy rebate?

Verbatim Response
Time constraints

D2. For these new homes in Xcel Energy territory that you did not receive a rebate for, did your experience with the efficient equipment and/or materials you installed through the Xcel Energy **<PROGRAM>** influence your decision to install some or all of the additional efficient equipment?

	Count	Valid Percent
Yes	0	0%
No	1	100%

Section E: Barriers

E1. **[Question wording following pre-test]** What, if anything, prevents your organization from building to a standard greater than an average **<AVERAGE_ENVELOPE_TIER>** above the local energy code?

Verbatim Response
DK
DK
DK
Cost constraints
Consumers' willingness to pay for homes above code valuing efficiency vs. home finish
Budgetary concern coming from the client. if client wanted a better standard, we would do that.
Cost

E1. **[Pre-test question wording]** The following statements may or may not apply to your business, but please answer them to the best of your ability by indicating your level of agreement or disagreement, using a 5 point scale, where 1 is completely disagree and 5 is completely agree.

It is a challenge to build to a standard greater than *an average* **<AVERAGE_ENVELOPE_TIER>** above the local energy code because…

E1a. The cost of additional energy efficiency measures is too high

	Count	Valid Percent
1 – Completely disagree	2	29%
2	2	29%
3	1	14%
4	1	14%
5 – Completely agree	1	14%

E1b. We don't know enough about additional energy efficiency measures

	Count	Valid Percent
1 – Completely disagree	4	57%
2	1	14%
3	0	0%
4	1	14%
5 – Completely agree	1	14%

E1c. Additional energy efficiency measures would be too difficult for home buyers to operate or maintain

	Count	Valid Percent
1 – Completely disagree	5	71%
2	1	14%
3	1	14%
4	0	0%
5 – Completely agree	0	0%

E1d. Additional energy efficiency measures are too difficult to install

	Count	Valid Percent
1 – Completely disagree	5	71%
2	1	14%
3	1	14%
4	0	0%
5 – Completely agree	0	0%

E1e. Installing additional energy efficiency measures would take too long/add too much time to our construction schedule

	Count	Valid Percent
1 – Completely disagree	5	71%
2	1	14%
3	1	14%
4	0	0%
5 – Completely agree	0	0%

E1f. Additional energy efficiency measures would impact home affordability

	Count	Valid Percent
1 – Completely disagree	3	43%
2	0	0%
3	1	14%
4	2	29%
5 – Completely agree	1	14%

E1g. Home buyers are not interested in additional energy efficiency measures beyond what we already provide

	Count	Valid Percent
1 – Completely disagree	2	33%
2	2	33%
3	2	33%
4	0	0%
5 – Completely agree	0	0%

E1h. Changes to local energy codes have made it difficult to build above code (i.e., the local energy code has become too stringent).

	Count	Valid Percent
1 – Completely disagree	2	33%
2	1	17%
3	1	17%
4	2	33%
5 – Completely agree	0	0%

E2. Are there any challenges to building to a standard greater than an average **<AVERAGE_ENVELOPE_TIER>** above the local energy that are specific to affordable or entry-level housing?

	Count	Valid Percent
Yes	7	54%
No	6	46%

"Yes" Verbatim Response
We definitely need some financial support from Xcel Energy or equipment suppliers, things like that. The more efficient the product the more expensive it is.
Cost
Cost
Supply chain and labor shortage
The codes make it hard that you have to meet a certain criteria to get them and it takes more time to do so
Budgetary concern
Money. It's all in how you spend your money from the big pool that goes into development

E3. At what point in the design and construction process are you making decisions about energy efficiency building materials, equipment and/or appliances?

	Count	Valid Percent
Prior to construction permits	14	100%
After permits acquired	0	0%
Other	0	0%

[ASK IF E3 = 1]

E4. How far in advance of applying for construction permits are you making decisions about nergy efficiency building materials, equipment and/or appliances?

Verbatim Response
6 months
Usually several months before
During product design - a year in advance.
However long it takes to design - 90 days
Before building the community- as we are doing diligence deciding whether to buy the land.

3 months/90 days

Several months

3-4 months

DK

Design phase, 2 months

3-5 months

6-12 months

At the very beginning

30 days

Section G: Satisfaction (Programs and Components)

G1. Thank you for your patience; we have only a few questions left.

I'm going to ask you to rate your satisfaction with various aspects of the program. For each, please rate your satisfaction on a scale from 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied", or let me know if it is not applicable to your project. How would you rate your satisfaction with:

G1a. The amount of time it took to receive your rebate

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	8%
3	5	42%
4	3	25%
5 – Very satisfied	3	25%

[IF G1a <3]

G2a. Why weren't you satisfied with the amount of time it took to receive your rebate?

Verbatim Response
The program runs out of money by the end of the year. The houses I build at the end of the year and I don't get the rebate till Spring - built-in delay. I wish it was a little bit better.

G1b. The dollar amount of the rebate

	Count	Valid Percent
1 – Very dissatisfied	1	7%
2	3	21%
3	5	36%
4	4	29%
5 – Very satisfied	1	7%

[IF G1b<3]

G2b. Why weren't you satisfied with the dollar amount of the rebate?

Verbatim Response
It's very expensive to build up to that higher level and the rebate amount does not offset much of it
The level was low and declined over time
REF
It could always be more and it costs a lot to build efficiently

G1c. Your interactions with program staff

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	0	0%
3	0	0%
4	3	38%
5 – Very satisfied	5	63%

G1d. Your interactions with your rater

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	0	0%
3	1	8%

4	3	23%
5 – Very satisfied	9	69%

G1e. The structure of the rebate levels varying by percent better than code

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	8%
3	6	50%
4	3	25%
5 – Very satisfied	2	17%

[IF G1e<3]

G2e. Why weren't you satisfied with the structure of the rebate levels varying by percent better than code?

Verbatim Response
The municipalities and jurisdictions in my area are on the 2018 IECC code . It is the most advanced code and it makes it hard to differentiate between code and meet those higher tiers. The codes are getting better, harder to get to the 15-19% tier now as the codes are catching up.

G3. Thinking about your experience from start to finish, how would you rate your satisfaction with the **<PROGRAM>** as a whole?

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	0	0%
3	2	14%
4	5	36%
5 – Very satisfied	7	50%

[ASK IF G3 = 3-4]

G3b. What else could Xcel Energy do to improve your satisfaction with the **<PROGRAM>?**

Verbatim Response

More frequent communication about the program by email to let us know about the program and perhaps someone who would call us to walk us through the process. That might be helpful.

I think that they should pay more money to those of us who build at a higher energy rating. I think the pay should not be linear scale. People who build at a higher energy rating level should be rewarded more.

Things are going well. Nothing to offer here

I only have one piece of feedback- we get Energy Star certificates through the program which arrives way after we close the homes and the buyers are done. I wish those certificates came more quickly.

DK

REF

They could apply dollar amounts against specific builder upgrades or improvements as opposed to being relative to percent better than code.

G4. Do you have an interest in installing any of the following electrification technologies and practices?

F. Electric Vehicle chargers

	Count	Valid Percent
Yes	12	92%
No	1	8%

G. Hybrid and/or variable capacity electric heat pump technology

	Count	Valid Percent
Yes	6	50%
No	6	50%

H. Grid-enabled heat pump water heaters

	Count	Valid Percent
Yes	6	50%
No	6	50%

I. Advanced building assemblies such as SIP panels, advanced (2x6, 24 inches on center) framing, ICFs, or continuous exterior insulation

	Count	Valid Percent
Yes	10	83%
No	2	17%

G5. Do you have an interest in any of the following smart connected technologies?

A. Systems that account for water savings

	Count	Valid Percent
Yes	10	83%
No	2	17%

B. Increased electrification

	Count	Valid Percent
Yes	6	60%
No	4	40%

G6. Are there any other technologies you are interested in but weren't previously mentioned?

Verbatim Response
Wind energy and ground and water source (geothermal)
Solar
No
Natural gas
No
No

No

No

No

Solar

No

Credits or incentives for solar, motion sensor lighting, time of day light sensor

No

Ground heat pumps

G7. Would you be interested in Xcel Energy adding additional prescriptive opportunities to the <PROGRAM> program similar to the current ENERGY STAR clothes washer and heat pump water heater rebates?

	Count	Valid Percent
Yes	13	93%
No	1	7%

C.3 Lapsed Small-Volume Builder Survey Results

Introduction

This appendix presents the results of the lapsed small-volume builder survey. The evaluation team designed the lapsed small-volume builder survey to address the same process objectives addressed by the participating builder survey (outlined above). Because lapsed small-volume builders were not asked impact evaluation questions, we were able to address additional process topics with these respondents. The lapsed small-volume builder survey addressed two additional topics:

- **Homeowner Interactions:** We asked lapsed small-volume builders how they interact with homeowners, including what trainings are provided to homeowners, and what opportunities they see to improve interactions that would increase energy savings.
- **High-Performance Building Certifications:** We asked lapsed small-volume builders whether their organizations have pursued any high-performance building certifications. For those whose organizations have pursued these certifications, we asked what motivated them to do so and what challenges they encountered.

Survey Results

Section A: Firmographics, Operations, Participation

First, I'd like to gather some information about your organization's involvement with the Xcel Energy **<PROGRAM>** program in **<YEAR>**, your organization, and your role at your organization.

A1. What is your occupational title within your company?

Verbatim Repsonse
President
Secretary/Treasurer
Human Resources
President
President Purchasing manager

A2. Were you the primary contact between your organization and the Xcel Energy **<PROGRAM>** program staff?

	Count	Valid Percent
Yes	6	100%
No	0	0%

Intro2_1. Is there anyone else at your organization who is involved in the decision making about the energy efficiency of the homes your organization builds?

Verbatim Response
The slower answer is that they understand that I have a very high level interest to make energy efficient homes. So a lot of times we talk about the different options to create the best value for the owners. So it would be two or three other people we would talk about. So it would basically be a team. We work at these kind of decisions as a team effort.
[NAME], at the corporate level

A3. Has your organization previously participated in any other Xcel Energy energy efficiency program?

	Count	Valid Percent
Yes	1	20%
No	4	80%

A4. Given your knowledge of other Xcel Energy energy efficiency programs (whether as a participant or otherwise), do you see an opportunity for the **<PROGRAM>** program to work with these other programs?

A4a. Other energy efficiency programs

	Count	Valid Percent
Yes	5	100%
No	0	0%

A4b. Renewable programs

	Count	Valid Percent
Yes	4	80%
No	1	20%

A4c. HomeSmart program (the Xcel Energy home warranty program)

	Count	Valid Percent
Yes	3	75%
No	1	25%

A4d. Electric Vehicle programs

	Count	Valid Percent
Yes	4	100%
No	0	0%

A5. What is the typical selling price of the homes your organization builds?

	Count	Valid Percent
Under $250,000	0	0%
$250,000 - $399,999	0	0%
$400,000 - $549,999	1	17%
$550,000 - $699,999	0	0%
$700,000 - $849,999	4	67%
$850,000 - $999,999	0	0%
$1,000,000 and over	1	17%

A6. Which housing markets do you typically serve?

	Count
Luxury / Custom	4
Move-up	2
Entry-level	1
Affordable	0
Vacation / Second	0
Other	0

Section B: Awareness, Electrification and Homeowner Interactions

B1. Next, I'd like to understand a little more about how you first became aware of Xcel Energy rebates for **<PROGRAM>** program. Was it from:

	Count	Valid Percent
Xcel program staff	2	33%
HERS Rater	3	50%
Xcel educational training	0	0%
Xcel sponsored development	0	0%
Xcel website / marketing	0	0%
Xcel event(s)	0	0%
Xcel staff at trade show	0	0%
Another business / word of mouth	1	17%
Other	0	0%

B2. Are you familiar with the term "electrification"?

	Count	Valid Percent
Yes, very familiar	1	17%
Yes, somewhat familiar	2	33%
No, not familiar	3	50%

[IF B2 = 1 or 2]

B2a. What does the term "electrification" mean to you?

Verbatim Response
Electrification, in general to me, means that it is an attempt to go net zero with solar assist.
It means making things more electronically inclined
All the heating, cooling uses electrical energy, instead of natural gas or fossil fuels.

[IF B2 = 1 or 2]

B3. How would you describe your overall opinion of electrification, on a scale from 1 to 5, where 1 is “not at all favorable” and 5 is “very favorable”?

	Count	Valid Percent
1 - not at all favorable	0	0%
2	1	33%
3	1	33%
4	1	33%
5 - very favorable	0	0%

[IF B3 != 77, 88, 99]

B3a. Why did you rate your overall opinion of electrification a **<numeric response to B3>**?

Verbatim Response
Because this is a gas fired market place.
I don't know enough
Mainly operating costs, and natural gas still a very cost effective approach vs. full electrical, until renewable becomes more prevalent.

B4. Do you, or someone from your organization, interact with the homeowners (i.e., end-users)?

	Count	Valid Percent
Yes, all the time	3	50%
Yes, some of the time	3	50%
No	0	0%

[IF B4 = 1 or 2]

B5. What do those interactions involve?

	Count
Other	4
Finishes or other design considerations	3
Training on energy efficient equipment/materials	2
Administrative topics (e.g., schedule, progress	1
Cost/financial considerations	1

“Other” Verbatim Response
Solar and Water consolation
I build it for them, so of course for the first year, it's the warranty and everything. The last three little subdivisions I have done, I moved in, so I live in there. So I see them all the time. Same with this one.
Warranty and Maintenance

Reviewing specifications

[IF B5 = 2]

B5a. What type of training do you provide? Select all that apply.

	Count
Information on how the energy efficient equipment and/or materials reduce energy costs	2
Information on how to properly use the energy efficient equipment to maximize savings	2
Information on how to properly maintain energy efficient equipment	1
Other	1

"Other" Verbatim Response
The dollar value of savings for energy efficient homes

B6. Do you believe there are opportunities to improve the interactions with homeowners that would increase energy savings?

	Count	Valid Percent
Yes	4	100%
No	0	0%

B7. Has your organization pursued any high-performance building certifications such as Passive House or Zero Energy Ready Homes?

	Count	Valid Percent
Yes	2	33%
No, have researched but haven't pursued	2	33%
No, haven't researched or pursued	2	33%
No, haven't heard of it	0	0%

"Yes" Verbatim Response
Energy Star, Built Green Program and E-star but Built Green and E-Star are no longer in existence.
We did a couple of Zero Energy Readies and we are working with city of Denver in our desire to have all new residential constructions be Zero Energy Ready, and I think the goal is 2030 on that. We have done some one off or two offs in the past, it's not a product line that we do as ongoing, but we have partnered with Department of Energy on some one off we have done before.

[IF B7 = 1]

B7a. What motivated you to pursue this certification?

Verbatim Response
It started in 1974 when we started building homes to react to OPEC energy crisis. Learning experience. Understanding the cost and what the knowledge base for our trade-partners need to be to execute something of that level.

[IF B7 = 1]

B7b. What was challenging about pursuing this certification, if anything?

Verbatim Response
Just determining which were the best value techniques.
A couple of things. The skill set of our trade partners for the most part is geared toward a more traditionally built, while we build high performance homes, taking it to the next level. Sometimes it can be challenging. There is always additional cost involved in some of these things. Our homes are expensive, and with cost rising everywhere, sometimes there is not the buy-in or the perceived value in some of these things (energy efficiency)vs. tangible features (like granite countertops etc.). I don't know if people are looking at it on a long-term basis. The cost to build a home to the next level is usually not offset by the amount of time that a family will anticipate spending in that home. That's the biggest challenge I think. When it's going to be the last home they build, or it is a long term proposition, it's more tenable, but for a starter family, or people that anticipate moving up in another 5 or 7 years, that's usually not their area of focus.

Section E: Barriers

E1. The following statements may or may not apply to your business, but please answer them to the best of your ability by indicating your level of agreement or disagreement, using a 5 point scale, where 1 is completely disagree and 5 is completely agree.

It is a challenge to build to a standard greater than *an average* **<AVERAGE_ENVELOPE_TIER>** above the local energy code because…

E1a. The cost of additional energy efficiency measures is too high

	Count	Valid Percent
1 – Completely disagree	0	0%
2	1	17%
3	4	67%
4	0	0%
5 – Completely agree	1	17%

E1b. We don't know enough about additional energy efficiency measures

	Count	Valid Percent
1 – Completely disagree	1	17%
2	3	50%
3	0	0%
4	2	33%
5 – Completely agree	0	0%

E1c. Additional energy efficiency measures would be too difficult for home buyers to operate or maintain

	Count	Valid Percent
1 – Completely disagree	1	17%
2	3	50%
3	2	33%
4	0	0%
5 – Completely agree	0	0%

E1d. Additional energy efficiency measures are too difficult to install

	Count	Valid Percent
1 – Completely disagree	1	17%
2	3	50%
3	2	33%
4	0	0%
5 – Completely agree	0	0%

E1e. Installing additional energy efficiency measures would take too long/add too much time to our construction schedule

	Count	Valid Percent
1 – Completely disagree	1	17%
2	3	50%
3	2	33%
4	0	0%
5 – Completely agree	0	0%

E1f. Additional energy efficiency measures would impact home affordability

	Count	Valid Percent
1 – Completely disagree	0	0%
2	3	50%
3	0	0%
4	3	50%
5 – Completely agree	0	0%

E1g. Home buyers are not interested in additional energy efficiency measures beyond what we already provide

	Count	Valid Percent

1 – Completely disagree	0	0%
2	0	0%
3	6	100%
4	0	0%
5 – Completely agree	0	0%

E1h. Changes to local energy codes have made it difficult to build above code (i.e., the local energy code has become too stringent).

	Count	Valid Percent
1 – Completely disagree	3	50%
2	1	17%
3	2	33%
4	0	0%
5 – Completely agree	0	0%

E2. Are there any other challenges to building to a standard greater than an average **<AVERAGE_ENVELOPE_TIER>** above the local energy code that are specific to affordable or entry level housing?

	Count	Valid Percent
Yes	2	40%
No	3	60%

"Yes" Verbatim Response
Adding cost
Given current rise in materials cost, saving energy is exposed to be eliminated

E3. At what point in the design and construction process are you making decisions about energy efficiency building materials, equipment and/or appliances?

	Count	Valid Percent
Prior to construction permits	4	80%
After permits acquired	0	0%
Other	1	20%

"Other" Verbatim Response
We are always looking for them so it depends. A lot of the costs change and then we decide to add them.

[ASK IF E3 = 1]

E4. How far in advance of applying for construction permits are you making decisions about energy efficiency building materials, equipment and/or appliances?

Verbatim Response
In the design stage
At least 30 days
During the design process
That depends. We have a preferred list of manufacturers that we use, and we have vetted products that we stick to, but beyond that we take into account energy efficiency components as part of design process that happens a year before we actually start construction.

Section F: Program Implementation and Processes

F1. What did you like most about your experience with the Colorado ENERGY STAR New Homes product?

	Count
Other	5
Assistance from HERS Raters	2
Program processes	1
Rebate amount received	0
Assistance from Xcel Energy program staff	0
Achieving above-code savings	0
Providing a more comfortable home for future homeowners	0
Timeliness of receiving the rebate check	0

"Other" Verbatim Response
Sharing the rebates with the owners
Resources and options
Satisfaction of achieving the rating
Learning new processes
The program was easy to understand and easy to qualify for.

F2. What did you like least?

	Count	Valid Percent
Rebate amount received	0	0%
Assistance from XE program staff	0	0%
Assistance from HERS Raters	0	0%
Achieving above-code savings	0	0%
Providing a more comfortable home for future homeowners	0	0%
Program process	0	0%
Timeliness of receiving the rebate check	0	0%
Other	6	100%

"Other" Verbatim Response
The amount of time that it took to keep the records and follow up on it for the rebate Some of it was arbitrary, played it by ear a lot. I felt that I was paying for this and I could build to this standard myself and save 2 grand putting in a stove or something. Basically that's what I just put in there, build it to Energy Start standard, and I have had no problems. People are educated enough so they know that if you build a good house they can tell. Use the money and build it the
Cost. It's more expensive
Third party inspections were hard to schedule
Cost
I don't think I dislike anything about it

F3. What, if anything, prevented you from participating in the Colorado ENERGY STAR New Homes product since **<YEAR>**?

	Count	Valid Percent
Difficulty achieving above code savings	0	0%
Rebate amount too low	0	0%
Program processes too difficult	0	0%
Lack of customer interest	0	0%
Time it took to receive the rebate	0	0%
Other	6	100%

"Other" Verbatim Response
Most of our work has been in remodeling The rating itself is too expensive and it does not always make sense. But building to Energy Star rating was not hard.
We haven't used it a lot
The buyers had little regard for the rating
I didn't feel like I was getting any more money
Nothing

F4. On average, how has the energy efficiency of the homes you build changed since you last participated in the program, if at all?

	Count	Valid Percent
The energy efficiency of our homes has decreased significantly	0	0%
The energy efficiency of our homes has decreased somewhat	0	0%
The energy efficiency of our homes has remained the same	2	33%
The energy efficiency of our homes has increased somewhat	3	50%
The energy efficiency of our homes has increased significantly	1	17%

F5. Next, I'm going to ask you to rate how easy or difficult the following tasks associated with the **<PROGRAM>** program were to complete when you last participated in **<YEAR>** or in an earlier year, using a scale from 1 to 5, where 1 is "very difficult" and 5 is "very easy". You may also tell me if something was not applicable to your experience, or if you cannot remember.

How easy it was to…

F5a. Complete program applications, rebate forms, or other program paperwork

	Count	Valid Percent
1 – Very difficult	0	0%
2	1	17%
3	3	50%
4	1	17%
5 – Very easy	1	17%

[IF F5a<3]

F6a. Why was it not easy to complete program applications, rebate forms, or other program paperwork?

Verbatim Response
You get a lot of literature. if you could go online it would be straight forward everything was in one spot. It is kind of muddled with Xcel.

F7a. Did this challenge influence your decion to not participate in the **<PROGRAM>** program since **<YEAR>**?

	Count	Valid Percent
Yes, somewhat influential not to participate	0	0%
Yes, significantly influential not to participate	0	0%
No, not influential not to participate	1	100%

F5b. Get in touch with an HERS rater

	Count	Valid Percent
1 – Very difficult	0	0%
2	0	0%
3	3	50%
4	2	33%
5 – Very easy	1	17%

F5c. Get in touch with an Xcel Energy representative

	Count	Valid Percent
1 – Very difficult	0	0%
2	1	17%

3	3	50%
4	1	17%
5 – Very easy	1	17%

[IF F5c<3]

F6c. Why was it not easy to get in touch with an Xcel Energy representative?

Verbatim Response
It's gotten better but there is so many different people for each thing. I call one person who tells me to call someone else. It is a mess.

F7c. Did this challenge influence your decion to not participate in the **<PROGRAM>** program since **<YEAR>**?

	Count	Valid Percent
Yes, somewhat influential not to participate	0	0%
Yes, significantly influential not to participate	1	100%
No, not influential not to participate	0	0%

F5d. Determine eligibility and rebate tier

	Count	Valid Percent
1 – Very difficult	0	0%
2	0	0%
3	2	40%
4	1	20%
5 – Very easy	2	40%

F5e. Meet your desired rebate tier

	Count	Valid Percent
1 – Very difficult	0	0%
2	0	0%
3	3	60%
4	1	20%
5 – Very easy	1	20%

F5f. Meet program requirements

	Count	Valid Percent
1 – Very difficult	0	0%
2	0	0%

3	1	17%
4	4	67%
5 – Very easy	1	17%

F8. From what you remember, from the time you applied for **<PROGRAM>** program to the time you received your rebate, did the project take less or more time than you expected to complete? Please answer using a scale of 1 to 5, where 1 means the project took "much less time than expected" and 5 means "much more time than expected."

	Count	Valid Percent
1 – much less time than expected	0	0%
2	2	40%
3	2	40%
4	1	20%
5 – much more time than expected	0	0%

F9. What, if anything, could Xcel Energy do to make it easier for small builders like your organization to participate in the **<PROGRAM>** program?

Verbatim Response
More personal contact
A better internet site, just be more clear and not have layers and layers of people. Just be clear. A really good website would be great.
Offering more incentives or education
DK
More money to pay for the extra cost
I don't think they could do anything to make it easier. I think it's pretty easy as is.

Section G: Satisfaction (Programs and Components)

G1. I'm going to ask you to rate your satisfaction with various aspects of the program. For each, please rate your satisfaction on a scale from 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied", or let me know if it is not applicable to your project. How would you rate your satisfaction with:

G1a. The amount of time it took to receive your rebate

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	25%
3	0	0%
4	1	25%
5 – Very satisfied	2	50%

G2a. Why weren't you satisfied with the amount of time it took to receive your rebate?

Verbatim Response
It seemed like it took a while

G1b. The dollar amount of the rebate

	Count	Valid Percent
1 – Very dissatisfied	1	20%
2	0	0%
3	1	20%
4	1	20%
5 – Very satisfied	2	40%

G2b. Why weren't you satisfied with the dollar amount of the rebate?

Verbatim Response
They don't cover the cost and don't increase the sales price

G1c. Your interactions with program staff

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	17%
3	2	33%
4	0	0%
5 – Very satisfied	3	50%

G2c. Why weren't you satisfied with the your interactions with program staff?

Verbatim Response
It was mostly electronic and not a personal contact. We get inundated with so much stuff that it's just hard to have the time to handle all the priority stuff along with this program; Just by receiving electronic announcements. I literally get probably hundreds of those kind of things every couple of days. I just get overwhelmed with electronics and personal still means something to me.

G1d. Your interactions with your rater

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	0	0%
3	3	50%
4	0	0%
5 – Very satisfied	3	50%

G1e. The structure of the rebate levels varying by percent better than code

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	20%
3	2	40%
4	0	0%
5 – Very satisfied	2	40%

G2e. Why weren't you satisfied with the structure of the rebate levels varying by percent better than code?

Verbatim Response
They don't cover the cost and don't increase the sales price

G3. Thinking about your experience from start to finish, how would you rate your satisfaction with the **<PROGRAM>** program as a whole?

	Count	Valid Percent
1 – Very dissatisfied	0	0%
2	1	17%
3	2	33%
4	2	33%
5 – Very satisfied	1	17%

[IF G3<3]

G3a. Why weren't you satisfied with your experience with the <PROGRAM>?

Verbatim Response
It is almost kind of phony. There were different things in the billing process that didn't make sense to me. Seemed like they were just trying to make their $1700. And they give you the little HERS rating at the end but it didn't mean nothing. You show that to a lot of your people and they don't know what it means. Just a stack of paperwork. I think if there was some money involved we got some rebates back it would be good.

G3b. What else could Xcel Energy do to improve your satisfaction with the <PROGRAM>?

Verbatim Response
More personal contact. Even zoom meetings would be a help.
DK
DK
Make the process easier and raise the rebate

G4. Do you have an interest in installing any of the following electrification technologies and practices?

G4a. Electric Vehicle chargers

	Count	Valid Percent
Yes	5	83%
No	1	17%

G4b. Hybrid and/or variable capacity electric heat pump technology

	Count	Valid Percent
Yes	4	67%
No	2	33%

G4c. Grid-enabled heat pump water heaters

	Count	Valid Percent
Yes	1	33%
No	2	67%

G4d. Advanced building assemblies such as SIP panels, advanced (2x6, 24 inches on center) framing, ICFs, or continuous exterior insulation

	Count	Valid Percent
Yes	4	67%
No	2	33%

G4e. Battery storage

	Count	Valid Percent
Yes	2	40%
No	3	60%

G5. Do you have any interest in any of the following smart connected technologies?

G5a. Systems that account for water savings

	Count	Valid Percent
Yes	4	67%
No	2	33%

G5b. Increased electrification

	Count	Valid Percent
Yes	3	60%
No	2	40%

G6. Are there any other technologies you are interested in but weren't previously mentioned?

Verbatim Response
No
Solar
DK
DK
No
Solar

G7. Would you be interested in Xcel Energy adding additional prescriptive opportunities to the **<PROGRAM>** program siliar to the current ENERGY STAR clothes washer and heat pump water heater rebates?

	Count	Valid Percent
Yes	4	80%
No	1	20%

C.4 Non-Participating Builder Interview Results

Introduction

This appendix presents results from the non-participating builder interviews. Non-participating builder research addressed the following topics:

- **Product Awareness & Barriers to Participation:** To better understand awareness of the product among non-participating builders, we assessed how familiar builders were with the ENERGY STAR New Homes Product, including the performance and prescriptive rebates offered through the product. We also asked builders about their familiarity with local energy code requirements and organizational above code targets to gauge potential builder readiness for product participation.
- **Motivations & Barriers to Energy-Efficient Home Construction:** The evaluation team asked non-participating builders what drives their decision-making related to energy efficiency, including what energy-efficient and smart home technologies are typically included in homes their organization builds. We also asked builders what challenges impact their ability to pursue energy-efficient designs and what could help them overcome those barriers.

- **Perceptions of Electrification & High-Performance Building Certifications:** The evaluation team asked builders about their familiarity with and opinion of electrification and high-performance building certifications to better understand opportunities and barriers to supporting jurisdictions' goals.

The remainder of this appendix includes results from the non-participating builder interviews organized by process topic and research question.

Non-Participating Builder Firmographics

What area(s) of Colorado does your business typically serve?

Verbatim Response
Boulder
Boulder
Frisco
Denver Metro and Summit County
El Paso and Pueblo Counties
Boulder
Mesa County
Not asked question

What housing market(s) do you typically serve?

Verbatim Response
Luxury / custom
Luxury / custom
Single-family, multifamily (condos and townhomes), custom
Affordable housing
Custom
Custom
Luxury / custom
Not asked question

What is the typical selling price?

Verbatim Response
$1-2 million
$2-4 million
$1.5 million for townhomes, +$2 million for single-family
60% area median income
Median $600,000
$1-3 million
$300 per square-foot
Not asked question

Product Awareness & Barriers to Participation

Are builders aware of the Product? How is the Product perceived among non-participating builders? What prevents builders from participating in the Product?

Overall, non-participating builder interviewees are aware of the Product.Three non-participating builders were more knowledgeable about the Product when it began, but haven't kept up with Product changes or participation requirements. Four non-participating builders noted that lack of awareness about the current Product has prevented them from participating. Three non-participating builders perceive rebates to be too low, or too slow to participate.

- One non-participating builder interviewee noted that they don't participate in the Product because they focus on incentive programs that go directly to the builder, such as rebates for solar. This builder also cited lack of knowledge of the Product as a barrier to participation.
- One non-participating builder interviewee noted that for the markets they work in rebate levels aren't enough to participate.
- One non-participating builder interviewee noted that in order to participate they would need to receive rebates faster than what they believe to be the current timeline.
- One non-participating builder interviewee noted that they don't focus on the extent above code achieved, but rather just building an efficient home.
- One non-participating builder noted that it's "all about costs" and they would appreciate larger rebates.

Motivations & Barriers to Energy-Efficient Home Construction

What prevents builders from pursuing energy-efficient designs?

Non-participating builder interviewees pointed to cost and a lack of client interest as a primary barriers to pursuing energy-efficient designs. Other commonly mentioned barriers include material shortages and lead times.

- Four non-participating builders mentioned the cost of high-efficiency equipment, including electric equipment specifically, and the need to balance the cost of energy efficiency with other budget requirements as a barrier to energy-efficient design and construction.
- Three non-participating builder interviewees noted that the decision whether to pursue energy-efficient designs is based on client interest.
- Three non-participating builders mentioned material shortages or lead times as a barrier to energy-efficient design and construction.
- One non-participating builder noted that jurisdictional requirements limit customer ability to pursue energy-efficient designs. This interviewee gave the example of wall thickness counting toward the maximum allowed floor area, leading customers to include less efficient spray foam insulation.
- One non-participating builder interviewee mentioned lack of subcontractor or trade partner experience with energy-efficient technologies as a barrier to energy-efficient home construction.

How many builders serve moderate-income or income qualified communities? What is easy / challenging about serving these communities?

Only one non-participating builder interviewee served moderate income or income qualified communities. This builder noted that income qualified buildings typically have very tight budgets, which vary based on the funding organization. This builder also noted that these projects take years to develop.

Perceptions of Electrification & High-Performance Building Certifications

What are builders' perceptions of electrification initiatives? What opportunities have non-participating builders identified to incorporate electrification technologies into new homes?

Overall, non-participating builder interviewees are on board with the shift toward all-electric buildings that they are noticing in the region. Non-participating builders did discuss some hesitations around electrification in cold climate zones, and barriers related to gas heating and cooking.

- Six non-participating builder interviewees had positive overall opinions of electrification, thought that electrification was critical, or stated they were on board with a shift to all-electric homes. One of these six builders noted that they promote electrification, but find that customers aren't interested unless solar is included.
  - One non-participating builder had no opinion of electrification, stating that that the decision to pursue all electric buildings is up to the client. The final non-participating builder believes that electrification is not feasible for some areas, and ends up being too expensive.
- Two non-participating builders indicated that they are hesitant about electrification in cold climate zones. One builder noted that they feel all-electric heating technologies are not sufficient in these cold climates, and that their customers use very efficient gas heating instead. This builder noted that they believe there would be more of a shift toward all electric building in cold climates if there were more reasonably priced electric altneratives to gas space heating.

- Several non-participating builder interviewees mentioned that the biggest barriers to electrification are customer preference for gas stoves (n=2) and gas space heating (n=2).
- Several non-participating builder interviewees discussed inclusion of solar (n=2) and electric vehicle (EV) (n=1) charging in new homes, with two noting that the inclusion of solar is helpful for meeting jurisdictional energy codes.
    - Three non-participating builder interviewees noted that electrification technologies are included based on homeowner interest.

What are builders' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?

Overall non-participating builder interviewees have positive opinions of high-performance building. Some, though not all, non-participating builders have pursued high-performance building certifications.

- Some non-participating builders noted that high-performance building certifications aren't typically pursued either because it's too cumbersome (n=1) or because customers opt to not pursue certification (n=1).
- Seven non-participating builders believe that high-performance building certifications can be useful, bring more awareness to energy efficiency, and are good for the environment and/or meeting climate goals.
    - Four non-participating builders noted that high-performance building certifications result in a better built home.
    - One non-participating builder noted that high-performance building certifications are beneficial from an advertising and marketing perspective.
- Two non-participating builders noted that pursuing high performance building certifications can lead to higher upfront costs in their experience.
- One non-participating builder does not pursue high-performance building certifications due to stringent energy codes in the jurisdictions in which they operate.

What are builders' perceptions of grid interactive technologies? What opportunities have non-participating builders identified to incorporate smart devices into new homes?

Some non-participating builder interviewees noted that smart thermostats are commonly installed in new homes, but beyond that grid interactive technologies are not common and installation is dependent on client interest or request.

- Three non-participating builder interviewees noted that smart thermostats are very common.
    - One non-participating builder interviewee stated that 90% of homes they build include smart thermostats.
    - One non-participating builder interviewee noted that smart thermostats are often included because they are not cost prohibitive.
    - One non-participating builder noted that smart thermostats are important in cold climates.

- Three non-participating builder interviewees noted that grid interactive technologies are installed based on customer request.
  - One non-participating builder interviewee noted that only approximately 10% of homes include grid interactive technologies other than smart thermostats.
- Two non-participating builder interviewees noted that for many grid interactive technologies, customers are able to install them on their own, it is just important to make sure that the home is ready for that technology.

C.5 Participating HERS Rater Interview Results

Introduction

This appendix presents results from the HERS rater interviews. The HERS rater research addressed the following process topics:

- **Awareness/Motivations:** We asked HERS raters how they became aware of the product and what their motivations were to recommend projects to the ENERGY STAR New Homes Product. We also asked HERS raters how they identify prospective builders and how early in the design and construction processes they engage builders.
- **Builder Decision-Making & Barriers:** We assessed HERS rater feedback on builder awareness, motivations, and barriers to product participation. Our assessment provides insight into broader market experiences to help supplement findings from the participating builder surveys, lapsed small-volume builder surveys, and non-participating builder interviews.
- **Product Experience/Satisfaction:** We discussed HERS raters' product experiences and their satisfaction with the product, including their interactions with product staff (whether it be with Xcel Energy and/or the implementer), recruiting builders, and completing and submitting product documentation.

The remainder of this appendix includes results from the HERS rater interviews organized by process topic and research question.

Awareness/Motivations

Why do builders participate in the ENERGY STAR New Homes Product?

HERS rater interviewees cited incentives, homeowner comfort, energy code requirements, ENERGY STAR brand recognition, and builder values as motivations for participating in the Product.

- Five HERS rater interviewees noted that incentives motivate builders to participate in the Product. These HERS raters noted that incentives make it easier for builders to build above code.
- Two HERS rater interviewees noted that homeowner comfort motivates builders to pursue energy efficient designs and participate in the Product. These HERS raters noted that particularly in cold climate zones, they have had success marketing the product through highlighting the increased comfort energy efficiency can provide to homeowners.
- Two HERS rater interviewees noted that energy code requirements motivate builders to pursue energy efficient designs and participate in the Product. These HERS raters

argued that stringent, performance-based energy codes lead builders to think about energy efficiency, and in some cases build beyond what code requires.

- Four HERS rater interviewees noted that ENERGY STAR brand recognition motivates builders to participate in the Product and pursue energy efficient designs.
- One HERS rater noted that builder values drive them to pursue energy efficient designs and participate in the Product. This HERS rater noted that some builders pursue energy efficiency "out of the goodness of their heart;" that internal motivation is the main driver.

When discussing builder motivations for Product participation, HERS raters also discussed their role in influencing builders to build to a standard above the local energy code.

- Four HERS rater interviewees described a consulting relationship with participating builders. This included providing recommendations to builders for how to exceed code, talking through options and trade-offs to strategies for achieving their target HERS score.

What proportion of the new home market is participating in the Product?

How many homes does your firm rate each year?

Verbatim Response
4000
50
100
35-50
2400
20

What proportion of the homes you rate go through the Product?

Verbatim Response
70%
50%
10%
About 60%
50%

What information do HERS raters collect about the homes they inspect and test?

Four HERS raters noted that they collect additional data beyond what is required for Product participation. Additional collected information included building orientation, additional photos, including pictures of all testing and verification of the home, and additional information on the building envelope and wall assembly to address warranty issues.

One additional HERS rater noted that they do not collect data beyond what is required by the Product, but they do perform additional analysis based on these data. This HERS rater provides additional information to the builders they serve including analysis of community level testing results to identify where re-training of trades may be required.

What are HERS raters' perceptions of electrification initiatives?

All interviewed HERS raters had positive opinions of electrification, with some caveats, and think that increased electrification is where the industry is headed in the future. Interviewed HERS raters reported builder skepticism about all-electric systems in colder climate regions (i.e., the mountain corridor), as well as broader builder distrust of electrification.

- Three HERS raters discussed concerns with electrification in cold climate zones including concerns that cold climate heat pumps don't work as well at very low temperatures. One HERS rater also discussed cost concerns with cold climate heat pumps.
- Three HERS raters discussed builder distrust of electrification. HERS raters noted that in many cases this is due to a lack of builder understanding and education on electrification technologies such as heat pumps.
- One HERS rater felt that Colorado is not ready for electrification due to a lack of energy storage. This HERS rater also discussed challenges with energy storage in cold climate zones.

What opportunities have HERS raters identified to incorporate electrification initiatives into new homes?

One HERS rater noted that they do not believe electrification makes sense in the mountain region. Two HERS raters noted that they recommend heat pumps, including ground-source heat pumps to builders. One of these two HERS raters noted that they believe the biggest driver for electrification technologies will be consumer demand brought about by consumer education.

What are HERS raters' perceptions of high-performance building certifications (e.g., Passive House, Zero Energy Ready Homes)?

Interviewed HERS raters have a generally positive opinion of high-performance building certifications with some caveats.

- One interviewed HERS rater noted that they believe high-performance building certifications are good, but are not a magical solution to building a better home.
- Two interviewed HERS raters discussed a preference for Passive Homes over Zero Energy Ready Homes, stating that Zero Energy Redy Homes doesn't do much to improve the efficiency of the home.
- One HERS rater noted that Passive House is great, but to be cost effective it needs to be incorporated early in the design process. This HERS rater also noted that Zero

Energy Ready Homes includes a lot of prescriptive requirements that don't always make sense.

- One HERS rater noted that the large number of different certifications can create confusion, expressing a desire for just one or two certification to focus on.
- Three HERS rater interviews noted that they believe ENERGY STAR has not kept up with code. These HERS raters noted that ENERGY STAR certification is now roughly equivalent with more recent versions of the IECC and that meeting code has become more important than ENERGY STAR certification.

What are HERS raters' perceptions of grid interactive technologies?

Several interviewed HERS raters discussed perceptions of grid interactive technologies.

- One HERS rater said that they don't push grid interactive technologies, noting that other than smart thermostats they don't see smart technologies in homes.
- One HERS rater noted that the builders they work with seem interested in grid interactive technologies, but that the market is not ready to pay for it. This HERS rater noted that builders are price sensitive and hesitant to change. Specifically, this HERS rater said that builders are change sensitive due to worries about the number of callbacks they will receive.
- One HERS rater noted that they believe consumer demand will be the biggest driver in this area, and with electrification technologies.

Builder Decision-Making & Barriers

What barriers do HERS raters believe impact builders decisions to pursue energy efficient designs?

HERS rater interviewees cited cost related barriers including small rebates and upfront costs as builder barriers to participation. Some HERS rater interviewees also discussed a lack of homeowner interest or awareness, and specific ENERGY STAR equipment requirements as barriers to builder participation.

- Two HERS rater interviewees noted that small rebate amounts are a barrier to participation for the builders they work with. These HERS raters stated that in some cases the small "bonus" is enough to encourage builders to build above code, but generally they did not feel it was large enough to be a major motivator for builders.
- Four HERS raters noted that upfront cost is often a barriers to pursuing energy efficient designs for the builders that they work with. These HERS raters noted that sometimes this is due to the sellers market in many Colorado metro areas, and that in some cases appraisals don't fully recognize the value of energy efficiency.
- Two HERS rater interviewees described a lack of homeowner interest as a barrier to pursuing energy efficient designs. One of these two HERS raters believes this is due in part to stringent energy codes; they think homeowners believe that the home is already efficient enough and that it doesn't need to be built to a higher standard.
- Two HERS rater interviewees noted that specific ENERGY STAR equipment requirements, including furnace and air conditioning sizing requirements, and ventilation requirements, are a barrier to builders pursuing energy efficient designs.

- When asked about barriers specific to income qualified builders, one HERS rater interviewee noted that these builders are sometimes too busy to participate in the Product.

Product Experience / Satisfaction

What aspects of the Product are easy / challenging for HERS raters? How well are the Product's processes working for HERS raters?

In general, interviewed HERS raters find working with Xcel Energy and the Product implementer to be easy; five of seven HERS rater interviewees described interactions with Xcel Energy and the implementer as a strength of the product. Data and administrative requirements were the most commonly cited difficulty with the Product's processes.

- Four HERS rater interviewees described data and administrative requirements as extensive and time consuming. Three of these four HERS rater interviewees described similar data entry frustrations, including minor, time-consuming edits. One HERS rater contradicted this finding, noting that HouseRater is easy to work with.
- Two HERS raters discussed the the HERS rater incentive. One HERS rater expressed that the HERS rater incentive was not enough to cover the work HERS raters performed. One HERS rater noted that they appreciate the HERS rater incentive, as it makes it easier to participate in the Product. However, this HERS rater expressed a desire for the incentive to scale with their level of effort.
- Two HERS raters noted that lack of builder interest makes it difficult to participate in the Product.
- One HERS rater noted that it's difficult to find information about the Product on Xcel Energy's website, including benefits of participating in the Product and how to participate.

How difficult or easy would you say it was to meet program deadlines?

Response	Count
1 – Not at all easy	
2	1*
3	
4	2
5 – Extremely easy	3
Not asked	2

* This respondent provided two separate responses, a 5 for a normal year, and a 2 for the current year they had in which they had a backlog of projects.

How difficult or easy would you say it was to recruit builders to participate in the Product?

Response	Count

1 – Not at all easy	1
2	1
3	1
4	1
5 – Extremely easy	1
Not asked	2

How difficult or easy would you say it was to complete / submit documents through HouseRater?

Response	Count
1 – Not at all easy	
2	1
3	1
4	2
5 – Extremely easy	1
Not asked	2

How difficult or easy would you say it was to get in touch with program representatives?

Response	Count
1 – Not at all easy	
2	
3	1
4	1
5 – Extremely easy	3
Not asked	2

How satisfied are you with your experience with the Product?

Response	Count
1 – Not at all satisfied	

2	
3	2
4	4
5 – Extremely satisfied	1
Not asked	

What are HERS raters' experiences with marketing the Product? What strategies are used? What challenges do they experience?

Most HERS rater interviewees market the Product through repeat business or existing relationships. HERS rater interviewees also noted that incentives are helpful in marketing the Product. Two HERS described canvassing or cold calling behavior, while others noted that builders reach out to them about participation on occasion.

- Five HERS rater interviewees noted that most of their work is repeat business, drawing on existing relationships. In some cases, this was because it was difficult to find builders who were interested in participating in the Product.
- Three HERS rater interviewees noted that they recommend Product participation to all of their clients.
- Two HERS rater interviewees said that builders at times reach out to them when they realize that they need a HERS rating to comply with code, or when a new customer is interested in ENERGY STAR. HERS rater interviewees noted that when this happens, they encourage builders to participate in the Product.
- Two HERS rater interviewees noted that incentives help them to market the Product; one HERS rater described incentives as helpful in pushing builders to the next step or next level.
- Two HERS rater interviewees described cold calling or canvassing behavior. One of these two HERS raters noted that they will drive around looking for builder signs or new developments to identify new business.

Are builders installing energy efficient homes or equipment without participating in the Product?

Four HERS rater interviewees discussed ENERGY STAR brand recognition as well as using ENERGY STAR certification, separate from the Product, as a marketing tool. Two of these four HERS raters provided examples of builders pursuing ENERGY STAR certification without participating in the Product.

C.6 Homeowner Survey Results

This appendix presents results from the homeowner web survey for the 2021 ENERGY STAR New Homes Product Evaluation. Specific research topics which this homeowner survey was designed to address are the following:

- **Product Awareness & Purchasing Decisions:** The evaluation team asked homeowners about the importance of various factors in their decision to purchase their

energy-efficient home, including the importance of the ENERGY STAR New Homes Product.

- **Builder Interactions:** The evaluation team asked homeowners about the type of interactions that they had with their home builder, including what trainings about energy-efficient equipment were offered, if any. We also asked homeowners about the energy efficiency education they would have liked to receive if they didn't receive any.
- **Experience & Satisfaction:** We assessed homeowners' experiences with purchasing and living in their energy-efficient home, as well as how satisfied they were with their ENERGY STAR New Home product experience. This included asking about home energy costs, comfort, and the quality of construction. We also assessed homeowner fuel type preferences for space and water heating, and homeowner familiarity with smart home technologies.

Section Intro: Introduction and Screening

Intro4. Which best describes the offered price of your home at time of sale?

Response	Count	Percentage
Under $250,000	2	2%
$250,000 to $399,999	10	12%
$400,000 to $549,999	37	44%
$550,000 to $699,999	19	23%
$700,000 to $849,999	12	14%
$850,000 to $999,000	3	4%
$1,000,000 and over	1	1%

Intro5. Which best describes your typical yearly household income?

Response	Count	Percentage
Less than $40,000	1	1%
Between $40,000 to $79,999	11	15%
Between $80,000 to $120,000	25	34%
Greater than $120,000	36	49%

Intro6. How long have you lived in Colorado?

Response	Count	Percentage
Less than a year	4	5%

1-2 years	17	20%
3-5 years	9	11%
More than 5 years	55	65%

Awareness and Purchasing Decision

A1. Please rate the importance of each of the following factors on your decision to purchase your home. The bigger the number, the greater the influence.

A1a. Buying a brand new home vs a pre-owned home

Response	Count	Percentage
1 – Not at all Important	1	1%
2	6	7%
3	22	26%
4	18	21%
5 – Very Important	38	45%

A1b. The specific builder of the home

Response	Count	Percentage
1 – Not at all Important	6	7%
2	8	9%
3	28	33%
4	22	26%
5 – Very Important	21	25%

A1c. The energy efficiency features of the home (e.g., high efficiency heating and cooling system)

Response	Count	Percentage
1 – Not at all Important	1	1%
2	4	5%

3	5	6%
4	29	34%
5 – Very Important	46	54%

A1d. The location of the home

Response	Count	Percentage
1 – Not at all Important	0	0%
2	1	1%
3	2	2%
4	20	24%
5 – Very Important	62	73%

A1e. The price of the home

Response	Count	Percentage
1 – Not at all Important	0	0%
2	0	0%
3	4	5%
4	18	21%
5 – Very Important	63	74%

A1f. The comfort of the home

Response	Count	Percentage
1 – Not at all Important	0	0%
2	0	0%
3	1	1%
4	9	11%
5 – Very Important	75	88%

A1g. The home's participation in the Xcel Energy ENERGY STAR New Homes program

Response	Count	Percentage
1 – Not at all Important	6	8%
2	10	13%
3	17	21%
4	26	33%
5 – Very Important	21	26%

A1h. Features of the home *not* related to energy efficiency

Response	Count	Percentage
1 – Not at all Important	0	0%
2	1	1%
3	7	8%
4	31	36%
5 – Very Important	46	54%

A2. Was there another top priority factor that was important to your decision to buy your new home?

1. Yes (Please explain):

Response	Count	Percentage
Yes	33	40%
No additional factor	50	60%

Verbatim Response
55+ community
Do I stay in a 1924 Craftsman rental, with high electricity and gas expenses, with rent going up, or buy this new townhouse with lower expenses?
Size, preferred something new, but also smaller, which is hard to find.
Having an office space, and a guest room.

distance from workplace

There was a discount to sale price for school workers.

Low maintenance

Proximity to family; design of the house.

I needed a single story home because I'm unable to walk up/down stairs
Price point
Neighborhood

Schools

Near state parks and bike paths
Floor plan
No yard maintenance
No HOA

Mountain proximity

Proximity to friends and low maintenance

Closer to family, more local amenities…restaurants, walking trails

Commute to Office.

One level, no stairs

Incentives and layout of home

Community/Neighborhood.

Accessibility of the bedrooms, being near family and work

design

Soil movement protection

Layout and wife loving the colors.

house design/layout

Size of the home and yard

Location, future value prospects, house upgradability

Floor plan

Type of lot

Proximity to family, country, grocery, safety, traffic
Having a clean brand new home was a huge factor for my son's asthma and allergies. We had a terrible mold situation at a rental home and I just wanted to go new after that experience.

View of the mountains

Close to family

[IF A2=1]

A2a. How would you rate the importance of that factor?

Response	Count	Percentage
1 – Not at all Important	0	0%
2	0	0%
3	0	0%
4	2	6%

5 – Very Important	31	94%

A3. What features would you consider to have the greatest impact on making a new home energy efficient? Select all that apply.

Feature	Count	Percentage
Energy efficient central air conditioner	75	89%
Energy efficient furnace	74	88%
Energy efficient appliances	73	87%
Efficient building envelope	72	86%
LED lighting	56	67%
Solar panels	26	31%
Advanced lighting controls	24	29%
Smart meters for appliances and larger equipment	13	15%
EV charging equipment	11	13%
Battery storage	3	4%
Other	1	1%
No features impact the efficiency of my new home	0	0%

Verbatim Response
Hot water heater efficient

A3a. With this in mind would you describe your new home as an energy efficient home?

Response	Count	Percentage
Yes	72	85%
No	5	6%
Don't know	8	9%

[IF A3a = 1]

A4. Were there any particular energy efficient upgrades that were important in your decision to purchase your new home?

Response	Count	Percentage
Yes	29	40%
No	38	53%
Don't know	5	7%

[IF A4 = 1]

A4a. Which of the following energy efficient equipment was important in your decision to purchase your new home? Please select all that apply.

Response	Count	Percentage
Other	24	89%
No efficient equipment was important in my decision to buy my home	2	7%
Energy efficient lighting	1	4%
ENERGY STAR clothes washer	0	0%
Heat pump water heater	0	0%
Smart thermostat	0	0%
ENERGY STAR refrigerator	0	0%

"Other" Verbatim Response

Tight envelope, good construction, double-pane windows...not sure if 3rd party solar panels are a good idea
Solar
Furnace and lighting
All of the energy efficient equipment in the home
solar
Ceiling fans
High efficiency insulation and HVAC
solar panels
Appliances and insulation
Smart appliances
SEER rating for the A/C

Insulation
solar, insulation, design
Leds, furnace, ac
overall HERS rating
Thermostat control, schedule, and smart features
foam insulation fill in
Insulation rating all energy efficient appliances
energy efficient windows and appliances
Tankless water heater
Heat: water: air
Appliances selected, smart factor from the builder
Solar panels, led lights
Car charger. Energy efficient furnace.

[IF A1c> 2]

A5. Please rate the importance of each of the following factors on your decision to purchase a home with energy efficient equipment and/or materials.

How important was…

A5a. Lower energy costs

Response	Count	Percentage
1 – not at all important	0	0%
2	1	1%
3	3	4%
4	20	25%
5 – very important	56	70%

A5b. Better for the environment

Response	Count	Percentage
1 – not at all important	3	4%
2	2	3%
3	11	14%
4	22	28%

5 – very important	42	53%

A5c. Better resale value

Response	Count	Percentage
1 – not at all important	2	3%
2	3	4%
3	14	18%
4	19	24%
5 – very important	41	52%

A5d. Fewer maintenance concerns

Response	Count	Percentage
1 – not at all important	1	1%
2	1	1%
3	7	9%
4	12	15%
5 – very important	58	73%

A5e. Comfort

Response	Count	Percentage
1 – not at all important	0	0%
2	1	1%
3	1	1%
4	14	18%
5 – very important	63	80%

A5f. Indoor air quality

Response	Count	Percentage
1 – not at all important	0	0%
2	0	0%
3	3	4%
4	19	24%
5 – very important	58	73%

A5g. Other health and safety concerns

Response	Count	Percentage
1 – not at all important	4	6%
2	1	2%
3	12	19%
4	17	27%
5 – very important	29	46%

A6. Which of the following energy efficient equipment would you have liked to see installed in your home prior to purchase? Please select all that apply.

Feature	Count	Percentage
Triple-pane glazed windows	42	51%
Smart thermostat	34	41%
Solar panels	31	37%
ENERGY STAR clothes washer	28	34%
Energy efficient lighting	27	33%
LED lighting	26	31%
Heat pump water heater	21	25%
ENERGY STAR refrigerator	21	25%
EV charging equipment	20	24%

Nothing, all efficient equipment I am interested in was installed	11	13%
Battery storage	10	12%
Other	3	4%

"Other" Verbatim Response

geo thermal
Efficient HVAC unit
concreate siding

Section B: Builder Interactions

B1. Did you, or someone from your household, interact with the builder of your home?

Yes, all the time	38	45%
Yes, some of the time	36	42%
No	11	13%

[IF B1 = 1, 2]

B2. What did those interactions involve? Please choose all that apply.

Administrative topics	58	30%	78%
Cost / Financial considerations	54	28%	73%
Design considerations	50	26%	68%
Training on energy efficient equipment / materials	27	14%	36%
Other	4	2%	5%

"Other" Verbatim Response

Was misled by thinking I was getting one model, but moved into a different, less desirable model. That was a bummer.
Warranty repairs
Required to have 4 meetings during construction,
Maintenance concerns

[IF B2 = 2]

B3. What type of training on energy efficient equipment and materials did you receive? Please choose all that apply.

Information on how the energy efficient equipment/materials lowers energy costs	20	38%	83%
How to properly maintain the energy efficient equipment	17	33%	71%
How to properly use the energy efficient equipment to maximize savings	15	29%	63%
Other	0	0%	0%

[IF B3 = 1, 2, 3, 4]

B3a. How was this information shared with you?

One-on-one training / interaction	17	50%	74%
Pamphlet or printed instructions	13	38%	57%
Online videos	3	9%	13%
Other	1	3%	4%

"Other" Verbatim Response
Verbal explainations

[IF B1 = 3 OR B2 ≠ 2]

B5. What education related to energy efficiency would you have liked to receive? Please choose all that apply.

How to properly maintain the energy efficient equipment	33	36%	72%
How to properly use the energy efficient equipment to maximize savings	30	33%	65%
Information on how the energy efficient equipment / materials lowers energy costs	26	28%	57%
Other	3	3%	7%

"Other" Verbatim Response
Brochure was sufficient.
none - we received all the above
None

Section C: Implementation

C1. Please rate the ease or difficulty of the following tasks associated with purchasing or living in your home.

How easy it was to…

C1a. Decide whether or not to purchase an energy-efficient home

Response	Count	Percentage
1	0	0%
2	1	1%
3	10	12%
4	15	18%
5	56	68%

C1b. Decide which energy efficient equipment and/or materials to have pre-installed in your new home vs. installing afterwards

Response	Count	Percentage
1	2	2%
2	2	2%
3	15	19%
4	26	32%
5	36	44%

[IF C1b<3]

C2b. Why was it not easy to decide which energy efficient equipment and/or materials to have pre-installed in your new home vs. installing afterwards?

Verbatim

House was a "spec-home" which we purchased after all the equipment was decided upon by the builder. We did not get to choose.

I bought a spec home so the building specifications where already decided and I could not make changes

We did not have a choice

C1c. Operate the energy efficient equipment in your home

Response	Count	Percentage
1	0	0%
2	1	1%
3	14	17%
4	24	29%
5	45	54%

C1d. Realize your target energy savings

Response	Count	Percentage
1	1	1%
2	6	8%
3	26	36%
4	18	25%
5	22	30%

[IF C1d<3]

C2d. Why was it not easy to realize your target energy savings?

Verbatim

I don't have the information for this.

Solar company will not explain how they determine their rate for production of electricity. Seems I'm paying more than in the previous 1924 rental.

Solar panel information on our Xcel bill is beyond complicated to understand.

The envelope is not as efficient as it could be. In full disclosure, I've run green building and energy efficiency programs, and my wife previously designed HVAC systems, so our standard for "efficient" is much higher than most builders. Similarly, most of the builder reps we interacted with really only had minimal understanding of

energy efficiency. For example, they'd brag about how great the insulation was when it was, in fact, code minimum in our city.

C1e. Maintain the energy efficient equipment in your home

Response	Count	Percentage
1	1	1%
2	2	2%
3	23	28%
4	27	33%
5	29	35%

[IF C1e<3]

C2e. Why was it not easy to maintain the energy-efficient equipment in your home?

Verbatim
Didn't receive sufficient information from builder.
Wasn't showed how to.

C1f. [If B2 = 2] Understand the energy efficiency training you received from the builder

Response	Count	Percentage
1	1	4%
2	1	4%
3	8	30%
4	6	22%
5	11	41%

[IF C1f<3]

C2f. Why was it not easy to understand the energy efficiency training you received from the builder?

Verbatim
Didn't receive training
Pamphlets are a poor education mechanism. We didn't read them.

C3. Which of the following additional energy efficient equipment and/or materials have you installed beyond what the builder installed? Please select all that apply.

ENERGY STAR appliances (1)	39	30%	46%
Efficient lighting (4)	26	20%	31%
I haven't installed anything else	23	18%	27%
Advanced lighting controls (5)	22	17%	26%
Other	9	7%	11%
EV charging equipment (2)	8	6%	9%
Battery storage (3)	1	1%	1%

"Other" Verbatim Response
Solar panels
Insulation
smart thermostat, HVAC fan speed controls
solar panels
Smart thermostat
solar panels
upgraded thermostat
higher efficiency furnace
Solar Panels

C5. Please rate the importance of each of the following factors on your decision to install **<EQUIPMENT SELECTED IN C3>.**

How important was…

C5a. Your positive experience with the energy efficient equipment/materials already installed in your home

Response	Count	Percentage
1	2	5%
2	2	5%
3	3	8%
4	15	38%

5	17	44%

C5b. A recommendation(s) from someone you know

Response	Count	Percentage
1	6	16%
2	3	8%
3	7	19%
4	5	14%
5	16	43%

C5c. A recommendation(s) from your builder

Response	Count	Percentage
1	11	30%
2	3	8%
3	5	14%
4	11	30%
5	7	19%

C5d. Information from Xcel Energy (e.g. talking with a representative, visiting the website, viewing marketing materials, etc)

Response	Count	Percentage
1	7	21%
2	4	12%
3	10	30%
4	4	12%
5	8	24%

C5e. A rebate from Xcel Energy

Response	Count	Percentage
1	5	14%
2	3	8%
3	12	32%
4	6	16%
5	11	30%

C6. Was there another important factor in your decision to install **<LIST EQUIPMENT SELECTED IN C3>**?

	Count	Percent
Yes	7	20%
No additional factor	28	80%

Verbatim
Future of car industry
I had purchased an EV
online research
Owning an EV
We want to buy an EV.
Appearance
Increased energy savings
lighting I was already using
Market availability (i.e. bulbs burnt out and LEDs were all that's available from store)
Same, environmental impact, resilience
Saving money
Smart control
we had it in our last home

equipment already using

function

Smart control.

Best way to reduce energy usage for HVAC

comfort - purchased a variable speed modulating furnace

Comfort and energy saving

homekit compatibility

making the home more efficient than builder's specs

Reduce costs and help the environment

[ASK IF C6=1]

C6a. How would you rate the importance of that factor?

Response	Count	Percentage
1	0	0%
2	0	0%
3	1	14%
4	1	14%
5	5	71%

C7. Has your household participated in an Xcel Energy program related to energy efficiency, electric vehicles, or distributed energy (e.g. rooftop solar)?

	Count	Percent
Yes	10	13%
No	65	87%

"Yes" Verbatim Response
rooftop solar
solar panels
With solar
Solar
rooftop solar
Use of energy at times of day with lower demand

Windsource
Saver Switch
rooftop solar
Solar and Smart Thermostat

C8. Which of the following Xcel Energy programs would you be interested in receiving information on? Please select all that apply.

	Count		
EE programs	43	35%	53%
Renewable energy programs	34	28%	42%
None of the above	28	23%	35%
EV programs	17	14%	21%
Other	1	1%	1%

"Other" Verbatim Response
We only get gas from Xcel, so we don't qualify for most rebates.

C9. What is the energy source for your water heater?

	Count	Percent
Natural gas	57	75%
Electric	18	24%
Propane / Butane / LP	1	1%
Other	0	0%

C9a. What type of water heater is it?

	Count	Percent
Tank water heater	53	67%
Tankless water heater	24	30%
Heat pump water heater	2	3%
Other	0	0%

C10. When heating *the water* in your home, do you prefer to use gas or electricity?

	Count	Percent
Prefer gas very much	27	36%
Prefer gas somewhat	11	15%
No preference	25	34%
Prefer electric somewhat	4	5%
Prefer electric very much	7	9%

[IF C10 = 1,2]

C10a. Why do you prefer gas water heating?

Verbatim
cost
Better recovery time and water heater performance
Can get warm water during electric outage.
Cheaper in the long run for high use
Clean inexpensive
cleaner energy
Cost
cost of natural gas has historically been lower than cost of electricity
Don’t like coal fired electric plants. Less expensive.
Effective
energy cost and faster recycle rate
Fast heating and lower cost.
faster source of energy and generally less expensive
Feel it is more efficient.
Heats faster
Heats faster and cost less than. Electricity
I think it is more efficient than electric

It is much more thermodynamicly efficient.

It seems to be more energy efficient?

It's what I am used to

Less expensive

More cost effective

More efficient and cleaner energy.

More efficient and cost effective

more efficient and lower cost

More energy efficient

No efficient

Rapid water heat up

Time to get the water hot, energy savings

[IF C10 = 4,5]

C10b. Why do you prefer electric water heating?

Verbatim
Carbon emissions, connecting it to renewable energy and battery storage.
cost
Easier maintenance
For some reason, gas always makes me nervous. Possibility of an explosion - I know it's unlikely but I am paranoid about thst
Future solar utilitization prospects
Move away from gas to renewable electricity
Only want a gas furnace for safety purposes.
So that our bill stays low and we can use some of our solar panel credits.

C11. What is the energy source for your space heater?

	Count	Percent
Natural gas	34	58%

Electric	15	25%
Propane / Butane / LP	1	2%
Other	9	15%

C12. When heating your home, do you prefer to use gas or electric heat?

	Count	Percent
Prefer gas very much	34	48%
Prefer gas somewhat	9	13%
No preference	19	27%
Prefer electric somewhat	5	7%
Prefer electric very much	4	6%

[IF C11 = 1,2]

C12a. Why do you prefer gas space heating?

Verbatim
Cost
Less expensive
More cost effective
Same
Cheaper than electric. Especially with 'renewable' electric driving up costs and decreasing reliability of electricity
clean inexpensive
cleaner energy
cleaner than oil, longer lasting burner, no need to clean or adjust, can get higher efficiency than oil (I'm from the North East). HP is not really that cost effective due to the initial equipment cost.
cost
cost of natural gas has historically been lower than electric
Effective
efficient

Energy

Gas heats better than electricity. I have had electricity for heating before and it's not the same and uses more energy to heat.

heat pump is slower to warm air with a lower temp delta

Heats home better and a less expensive than electricity

I don't like coal fired electric plants.

I don't like the other choices. I am used to gas

It's cheaper

It seems a bit more expensive, however it seems to heat faster. Don't have much experience to know which type is more efficient.

Lower cost and faster heating

More efficient

More efficient and cheaper

More efficient and cost effective

More efficient than electric

More energy efficient

Provides the desired heat quickly.

runs cleaner

thermodynamic efficiency

Think it's cheaper.

[IF C12 = 4,5]

C12b. Why do you prefer electric space heating?

Verbatim
Already purchased
cost
Easier to use
Future solar prospects

Motor runs on electrics.

Same, carbon emissions, want to move to renewable energy and battery storage.

Solar panels

C13. How familiar are you with the following smart home technologies?

C13a. Smart thermostats

Response	Count	Percentage
1	6	7%
2	3	4%
3	13	15%
4	19	22%
5	44	52%

C13b. Smart outlets

Response	Count	Percentage
1	20	24%
2	11	13%
3	11	13%
4	12	14%
5	29	35%

C13c. WiFi controlled outlets, lights, etc.

Response	Count	Percentage
1	14	17%
2	11	13%
3	15	18%
4	14	17%

5	30	36%

C13d. Home energy monitors

Response	Count	Percentage
1	26	31%
2	16	19%
3	13	16%
4	15	18%
5	13	16%

C13e. Smart hubs & speakers

Response	Count	Percentage
1	15	18%
2	10	12%
3	13	15%
4	14	17%
5	32	38%

C13f. Solar equipment or products

Response	Count	Percentage
1	22	27%
2	11	14%
3	18	22%
4	12	15%
5	18	22%

C13g. Smart meters for appliances and larger equipment

Response	Count	Percentage
1	33	39%
2	14	17%
3	13	15%
4	15	18%
5	9	11%

C13h. Battery storage (such as Tesla Powerwall)

Response	Count	Percentage
1	43	53%
2	13	16%
3	11	14%
4	6	7%
5	8	10%

C13i. Security cameras (such as Nest)

Response	Count	Percentage
1	13	15%
2	4	5%
3	13	15%
4	14	17%
5	40	48%

C14. When considering buying smart devices for your home, how important are the following?

C14a. Saving energy

Response	Count	Percentage
1 – Not at all important	3	4%
2	1	1%
3	7	8%

4	27	32%
5 – Very Important	47	55%

C14b. Saving money

Response	Count	Percentage
1 – Not at all important	1	1%
2	0	0%
3	11	13%
4	15	18%
5 – Very important	58	68%

C14c. Improving the comfort of my home

Response	Count	Percentage
1 – Not at all important	1	1%
2	0	0%
3	7	8%
4	21	25%
5 – Very important	56	66%

C14d. Improving my quality of life

Response	Count	Percentage
1 – Not at all important	1	1%
2	1	1%
3	7	8%
4	21	25%
5 – Very important	54	64%

C14e. Ease of use

Response	Count	Percentage
1 – Not at all important	1	1%
2	0	0%
3	5	6%
4	17	20%
5 – Very important	62	73%

C14f. Security of my data

Response	Count	Percentage
1 – Not at all important	1	1%

2	2	2%
3	8	9%
4	13	15%
5 – Very important	61	72%

C14g. Adopting new technology

Response	Count	Percentage
1 – Not at all important	4	5%
2	10	12%
3	15	18%
4	23	28%
5 – Very important	31	37%

C15. Do you have any concerns with purchasing smart home devices?

Response	Count	Percentage
Yes	12	15%
No	67	85%

"Yes" Verbatim Response

Yes, I have no idea what they are, or if they are appropriate for my use. Usually not, i find out.
The data, security, and privacy standards are abysmal. I think only an idiot would trust most of the companies peddling smart equipment.

Lack of experience.

Not worth the time and effort.

security issues

Security of personal information

Security

Vulnerability of WiFi

Privacy and ease of use

I am concerned with what data is going to the internet and how hacker can get into the system
Online security, hacking, and government monitoring/control. No smart devices in my house because of these concerns.

becoming too reliant on internet connectivity

Section S: Satisfaction

S1. Please rate your satisfaction with each of the following.

S1a. The quality of the construction of your home

Response	Count	Percentage
1 – Very dissatisfied	2	2%
2	4	5%

3	23	27%
4	29	34%
5 – Very satisfied	27	32%

S2a. Why weren't you satisfied with the quality of the construction of your home?

Verbatim Response
So many issues with the builder.
Sloppy technique, edges aren't even close to 90 degrees, poor installation of many measures
Not a quality work
Builder met minimum codes and standards. Poor workmanship. Minimum acceptable materials.
There were too many mistakes, poor quality workmanship
Still having repairs performed

S1b. The comfort level of your home

Response	Count	Percentage
1 – Very dissatisfied	0	0%
2	2	2%
3	13	15%
4	30	35%
5 – Very satisfied	40	47%

S2b. Why weren't you satisfied with the comfort level of your home?

Verbatim Response
I don't think my sliding glass door was I stalled correctly. Which makes me feel that I lose heat and air from it. Hot in some rooms, cold in others
Our air conditioner was not cooling our home due to two levels of living space

S1c. Your interactions with your builder

Response	Count	Percentage
1 – Very dissatisfied	4	5%
2	6	7%
3	30	37%
4	20	25%
5 – Very satisfied	21	26%

S2c. Why weren't you satisfied with your interactions with your builder?

Verbatim Response
No so much with them since they changed so many employees and communication was dropped

Our house was the first on our block. The builder and subs regularly blocked our driveway and would refuse to move for hours at a time. I missed a bunch of time at work because of that. They'd also drop materials in our driveway and then wait a week to move it. They still haven't completed many warranty measures, and now we have to go to court to get compensated.

Built during Covid. Production builder warranty services were inadequate.

We bought a spec house. They weren't very nice.

Lack of response to issues in a timely manner.

was less than cooperative on getting pricing for upgrades

Very difficult to get a response from. They didn't want to help me get my warranty claims resolved

Mediocre follow-through with post construction issues.

Not responsive enough to our concerns

S1d. The indoor air quality of your home

Response	Count	Percentage
1 – Very dissatisfied	0	0%
2	2	2%
3	20	24%
4	33	40%
5 – Very satisfied	28	34%

S2d. Why weren't you satisfied with the indoor air quality of your home?

Verbatim Response
A radon test indicates that the indoor air quality is not good in the basement
We wanted a filter on our house

S1e. The number of other health and safety-related maintenance issues

Response	Count	Percentage
1 – Very dissatisfied	0	0%
2	4	5%
3	15	19%
4	28	35%
5 – Very satisfied	34	42%

S2e. Why weren't you satisfied with the number of health and safety-related maintenance issues?

Verbatim Response
Low quality detectors, poor installation.
Our house was left with trash and construction materials. Also not regulated air.

S1f. Your home energy costs

Response	Count	Percentage
1 – Very dissatisfied	2	2%
2	4	5%
3	25	30%
4	29	35%
5 – Very satisfied	24	29%

S2f. Why weren't you satisfied with your home energy costs?

Verbatim Response
Seems high
Poor installation, home doesn't perform anywhere near to builder's claims.
Too expensive.
Too expensive and going up
Appliance gas consumption is higher.
tankless hot water heater is expensive to run

S1g. [If B2 = 2] The training you received from builders

Response	Count	Percentage
1 – Very dissatisfied	2	7%
2	2	7%
3	7	26%
4	11	41%
5 – Very satisfied	5	19%

S2g. Why weren't you satisfied with the training you received from builders?

Verbatim Response
They had no idea what they were talking about. They didn't even fully know what kinds of systems we had.
I didn't receive any
Didnt get much training at all
Received training regarding operation of appliances, but no training regarding cost-savings or energy savings

S3. Thinking about your experience as a whole, how would you rate your satisfaction with the energy efficiency of your home?

Response	Count	Percentage
1 – Very dissatisfied	0	0%
2	2	2%
3	20	24%
4	33	40%
5 – Very satisfied	28	34%

S3a. Why aren't you satisfied with the energy efficiency of your new home?

Verbatim Response
This was our first new home, the builder sucked, and we didn't do enough due diligence.
I wish I could pay less money.

C.7 Peer Utility Benchmarking Interview Results

Introduction

As part of the TRC Companies (TRC) evaluation of the Xcel Energy ENERGY STAR New Homes Product in 2021, TRC conducted secondary research and in-depth interviews with key staff at peer utilities that operate residential new construction programs. The objective of the peer utility benchmarking research was to understand how peer utilities approached key issues related to implementing residential new construction programs. The evaluation team's findings are informed by interviews with key informants (e.g., program managers) at four utilities (shown in this memo as Utilities A-D). These utilities were selected because they have comparable territories and/or programs to the Xcel Energy ENERGY STAR New Homes Product. This enables the evaluation to provide an "apples-to-apples" comparison, and to evaluate the set of circumstances (such as regulation, construction growth, demographics) that impact program plans at peer utilities.

The interviews and secondary research focused on assessing program design delivery, and key performance indicators (e.g., participation levels, free-ridership) of peer utilities. Key themes the evaluation team explored with peer utilities included:

- Program descriptions including their objectives, relevant features of their implementation strategy, characteristics of their target customers, recent changes to the program, and future outlook;
- Net-to-gross (NTG) savings approach and results;
- Homeowner and builder engagement methods;
- Measure types and incentive levels including whether peer utilities offer prescriptive rebates, and how rebates and incentives are structured;
- Accounting for adoption of updated energy codes and rising baselines within programs, if at all, including changes that equip utilities to effectively support buildings, and;
- Support for electrification and integrated homes, and how programs support broader utility goals related to these topics, if at all.

The remainder of this memo presents results based on each research objective.

Residential New Construction Program Structures

This section details findings from interviews with peer utilities and secondary research related to overall program structure, including implementation strategies, recent program changes, and future program outlook.

Peer Utility Descriptions

TRC conducted interviews with four of Xcel Energy's peer utilities with comparable residential new construction programs. Program 2020 savings goals, actual savings, and budget are shown in Table 25 below. Program 2020 participation, both the number of incentive applications and participating builders, is shown in Table 26 below.

Table 25. Program Savings & Budget

	2020 Program Savings Goal	2020 Program Savings Actual	2020 Program Budget
Xcel Energy	808 kW 2,626,700 kWh 71,150 Dth	728 kW 4,350,331 kWh 81,892 Dth	Electric - $956,678 Gas - $1,823,295
Utility A	Not provided	Total program savings not provided Average unit savings: 2,810 kWh	Not provided
Utility B	18,311 MWh[1]	19,771 MWh[1]	$3,355,522
Utility C	5,764 MWh	5,180 MWh	$9,605,000
Utility D	Not provided	2,697,062 kWh	$14,827,395[2]

[1] Included savings (goal and actual) are for all residential programs.

[2] Included budget is for both residential and retrofit programs.

Table 26. Program Participation

	Number of Incentive Applications Submitted	Number of Participating Builders
Xcel Energy	Electric – 2,397 Gas – 4,398	52
Utility A	6,453	300
Utility B	8,500	60
Utility C	8,185	Not provided
Utility D	5,211	Not provided

Incentive structures across interviewed peer utilities varied, however most included both a performance based program track, based on percent above code or kWh savings achieved, and prescriptive incentives or a prescriptive track. Peer utility incentive structures are outlined in Table 27 below.

Table 27. Program incentive structure

	Xcel Energy	Utility A	Utility B	Utility C	Utility D[1]

Performance incentive structure		Tier 1: meet stretch code Tier 2: $/kWh	Meet ENERGY STAR v3 requirements	Total incentive = savings * $/kWh or MMBtu + savings percentage * specified $ amount	Percent above code, HERS rating required
Incentivized prescriptive measures		• HVAC (15 SEER or higher) • Quality Installation • Heat pump water heater	• Smart thermostat • Communicating electric water heater • Level 2 EV charger or pre-wired circuit	N/A	• Central air conditioner • Heat pumps • Smart thermostat
HERS rater incentives	Yes	No	No	Yes	No
Builder incentive for HERS rating (prescriptive track only)	No	No	No	No	Yes
ENERGY STAR Certification	Yes	No	Yes	No	Yes

[1] Must choose either the prescriptive or the performance track. Unable to receive additional prescriptive incentives if performance track chosen.

Two utilities (utility A and utility C) said that it is possible for the incentive to go directly to the home owner, in custom builds for example where the homeowner is involved from the beginning of the design process, but that this is rare. Two utilities (utility B and utility D) work primarily with production builders, while others worked with a split of large and small volume builders, similar to Xcel Energy. Additional detail on the markets served by the interviewed peer utilities is included in the bullets below.

- Builders who participate in utility A's program typically serve the entry-level, single family market. Some townhomes participate, but the utility noted that this is in the "single digits."
- Seventy to eighty precent of the builders in utility B's territory serve the region's largest metropolitan area. Additionally, most participating builders in utility B's program are repeat participants.
- Utility D noted that while they feel they capture all aspects of the market, it has become more difficult to serve the affordable housing market in recent years and fewer participating builders seem to focus on this market.

All interviewed peer utilities noted that HERS raters are key to driving program participation; Xcel Energy staff noted that HERS raters drive program participation in the ENERGY STAR New Homes program as well. Similar to Xcel Energy, most interviewed peer utilities partner with a third-party implementation firm to delivery the program. Only one utility (utility A) implements the program in house.

Recent & Upcoming Program Changes

We asked interviewees to describe changes made to their residential new construction program in recent years, as well as anticipated changes expected in the near future. Utility interviewees described recent and upcoming changes enacted to drive innovation, particularly around electrification, and increase builder and homeowner engagement. These changes are summarized in the bullets below.

- Utility B began offering incentives for duct in conditioned space in recent years. The utility chose this measure as it was an innovation they were seeing in the market, that was not yet the typical practice; the utility wanted to help encourage this change. Utility B also recently introduced a realtor training, the “front line” to prospective home buyers, hoping that it would help to promote the value of an ENERGY STAR subdivision.
- Utility D recently began offering incentives for specific HVAC measures in order to help push heat pumps into the market. HVAC incentives are the only standalone measure incentives offered through this program.
- Utility C is in the process of creating a new offering that would take some elements of the Passive House offering currently available for multi-family homes (4 stories or more), and tailor it to the needs of single-family and low-rise multifamily builders. This utility has found that the Passive House incentives have helped in promoting electrification in high-rise residential buildings. The potential offering for residential new home construction would likely include requirements around electrification, efficiency, air infiltration and HERS scores.
- In 2016, utility A redesigned the residential new construction program to align with the statewide stretch code, which the utility had a hand in drafting. Now, the “entry-level” tier for the program entails meeting the stretch code, and the higher tier includes meeting the stretch code as well as HERS rating requirements. The utility made this program change in part because builders were moving away from ENERGY STAR.

Homeowner and Builder Engagement

We asked interviewees about strategies they use to engage participating builders. Summary findings can be found in the bullets below.

- Three utilities are active with the Home Builders Associations (HBAs) in their service territory. These utilities see this engagement as an opportunity to interact with builders and identify new program participants, as well as venues for providing builder trainings.
- Three utilities conduct direct, one on one training and outreach with participating builders.
  - Utility A meets with new participants to review typical building plans and possible upgrades, and provides builders with a typical expected incentive. This utility also completes quarterly visits with their top 25 builders and sends out monthly emails with technical bulletins.

  - Utility B has a dedicated builder representative that is responsible for meeting with every participating builder. Through their relationships with builders, this representative promotes the program, conducts subdivision and model home site visits, and consults with builders on upcoming developments and subdivisions.
  - Utility D also works directly with builders, helping them on a one on one basis as needed.
- Two utilities offer in-person and online trainings to participating builders.
  - Utility B offers building science trainings that teach the science of high-performance homes to participating builders. These trainings include both a classroom and walkthrough component, where trainers and builders walk homes and identify areas that need attention.
  - Utility C offers Passive House training; this training is focused mostly on their high-rise builders, but it is completed by some participating HERS raters and low-rise multifamily builders. These trainings include both desktop and hands on sessions. Utility C also offers ad hoc trainings to single-family and low-rise multifamily builders.
- Utility A also conducts three site inspections for each home, which they feel is a selling point for builders, as it allows for engagement with and training of subcontractors. This utility has seen evidence of spillover that they feel is due in part to these inspections as it allows for others involved in new home construction, including superintendents and tradespeople, to apply lessons learned to non-program homes.

We also asked builders about any direct engagement of homeowners that they might conduct. Interviewed peer utilities have limited engagement with homeowners. However, three peer utilities described some homeowner engagement, which is described in the below bullets.

- Two utilities provide builders with tailored, branded marketing collateral for their homeowners.
  - Utility B provides customized marketing collateral for builders that includes information about the program and ENERGY STAR, as well as additional information specific to the home and/or subdivision.
  - Utility D provides builders with leave behinds that note that the home has been HERS rated, and includes the home's specific HERS rating. These leave behinds are optional for builders.
- Utility A offers a 3-year heating and cooling guarantee for its highest performance program component. The guarantee states that the home won't use more electricity for heating and cooling than the amount specified by the energy model. However, this utility noted that since they began offering this guarantee in 2015, no homeowner has filed a claim.

Updated Energy Codes, Electrification and Grid Responsive Technologies

We asked interviewees about how their address rising baselines due to updated energy codes, how they incorporate electrification technologies, and how they incorporate grid responsive technologies, if at all. Summary findings can be found in the bullets below.

- Utilities varied in their approach to addressing rising baselines due to updated energy codes. One utility noted that their approach to rising baselines is to tailor marketing to

builders and help them focus on the right above code building practices. One utility noted that they are exploring breaking out all-electric construction and dual fuel construction for claiming savings, which they are hoping will allow them to capture more savings from all-electric homes. This utility noted that they are more focused on electrification, and how to put electrification technologies in homes. A third utility noted that they don't set the baseline relevant to code, but to a User Defined Reference Home (UDRH) value. This utility is also exploring whether to engage in the code development process.

- Two interviewed utilities currently include incentives for electrification technologies. Two utilities are exploring including incentives for electrification technologies in the near future. One of these two utilities is also exploring incentivizing kW savings and including technologies that would allow for participation in demand response (DR) programs.
  - Utility A is exploring including incentives for electric vehicle supply equipment (EVSE), including an incentive for solar coupled with batteries, as well as incentivizing kW savings and prioritizing DR. This utility has filed for a tariff that would incentivize EVSE.
  - Utility B currently includes incentives for communicating electric water heaters and level 2 electric vehicle (EV) chargers.
  - Utility C is exploring including electrification technologies in the new program component currently under development.
  - Utility D includes incentives for heat pumps and heat pump water heaters. This utility coordinates with program managers for the utility's standalone EV program, bringing these program managers into conversations with interested builders.
- Two program managers coordinate with program managers for standalone DR programs, but both feel they are not as active with grid responsive technologies as they are with electrification technologies.

Net-to-Gross Ratios

As part of the evaluation team's assessment of the Xcel Energy net-to-gross ratio (NTGR), Xcel Energy wanted to better understand what other utilities use for their NTGR and any drivers leading to the NTGR. The NTGR for each peer utility can be found in Table 28. All NTGR fall between 0.91 and 1.05.

Table 28. Peer Utility Net-to-Gross Ratios

Utility	NTGR	Source
Utility A	1.05	Evaluated
Utility B	1.00	Stipulated
Utility C	0.96	Evaluated
Utility D	0.91	Evaluated

Energy Star New Homes Evaluation

2021 Program Evaluation: Recommendations and Responses

The Xcel Energy Energy Star New Homes product in Colorado product provides builders of single-family and small multifamily homes with an incentive to exceed local building codes and elementary construction practices. Homebuilders are encouraged to look at the house as a system when considering deployment of energy saving and load reducing construction methods and installation of energy-efficient mechanicals and appliances.

Xcel Energy ("the Company") engaged a team of researchers led by TRC Companies to conduct a process and impact evaluation of the Energy Star New Homes product. The evaluation team completed the following activities as part of that evaluation:

- Calculated the retrospective and prospective Net-to-Gross Ratio ("NTGR");
- Assessed the HERS rater experience;
- Assessed product awareness and identified builder barriers to participation;
- Evaluated the impact of jurisdictional goals and energy codes on the product; and
- Identified motivations & barriers of customers to purchasing energy efficient homes.

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

Recommendation	Response
1) The evaluation team recommends using a prospective NTGR of 0.73 if the product team incorporates recommendations 1a, 1b, and 2a.	The Company will implement the required recommendations and adopt a prospective NTGR of 0.73 for the product.
1a) Provide targeted trainings and outreach to large-volume builders.	The Company agrees to develop trainings & market them to large-volume builders.
1b) Dilute free-ridership by targeting non-participating builders, including non-ENERGY STAR builders and builders outside of front range communities.	The Company agrees to target non-participating builders for training & participation.
2a) Scale HERS rater incentives with savings to encourage participation from higher savings projects.	The Company agrees to update the rater incentives to include higher compensation for higher performance tiers.
2b) Collaborate with the product implementer to explore pain points in administrative requirements, including clarifying HouseRater documentation as applicable.	The Company has completed its review of the vendor's software and the Raters' pain points. Discovered issues have been fixed.
3) Develop targeted marketing materials for homeowners.	The Company will develop materials for direct-to-customer marketing.
4) Consider creating an alternative offering based on high-performance building certifications to improve product influence among participating builders.	The Company is exploring incentives for high performance certifications for inclusion in future energy efficiency filings.

5) Consider expanding prescriptive new construction rebate offerings, including incentivizing technologies and practices for all-electric homes to support jurisdictions in achieving their electrification goals.	The Company is reviewing the feasibility of adding prescriptive rebates for beneficial electrification measures and is moving heat pump water heaters from the performance path to a prescriptive path in response to this evaluation.

ENERGY STAR New Homes

A. Description

The ENERGY STAR® New Homes ("ESNH") product provides builders of single-family and small multifamily homes with an incentive to exceed local building codes and elementary construction practices. Homebuilders are encouraged to look at the house as a system when considering deployment of energy saving and load reducing construction methods and installation of energy-efficient appliances. Homeowners benefit with lower energy bills, fewer maintenance concerns, higher resale value, and a more comfortable, quiet home. With interval data, homeowners will also see how efficient their home is starting out and gain a deeper appreciation and understanding of that efficiency.

The current product structure gives builders the flexibility to mix and match efficient technologies and building practices to meet the product requirements and qualify for a rebate. To qualify for a rebate, participants are required to build homes that exceed local building jurisdictions' energy codes by at least 10%. To measure this, a rating must be completed on each home by a Residential Energy Services Network ("RESNET") certified Home Energy Rating System ("HERS") rater. The HERS rater provides a valuable service by consulting with the homebuilder during the construction phase and ensures the designed energy efficiency measures have been properly installed in the home. HERS raters will complete the rating for each home using a RESNET accredited software approved by the Company and will provide select informational details to the Company's third-party implementer for evaluation. Energy savings are determined individually for each home based on the difference between the energy used by the reference home (or baseline home; modeled to match the local jurisdictional energy code) and the energy used by the new as-built home. The Company will continually evaluate this product structure to determine necessary adjustments to help the product remain cost-effective while adapting to accommodate higher energy codes.

One new program enhancement in 2021 is to pro-actively encourage and support jurisdictions to adopt the latest building codes within the residential new construction sector. It will give those communities the tools to improve the compliance with the new codes and ultimately help them reach their energy performance and economic development goals. This support will be designed to meet each jurisdiction where they are in the code adoption cycle and address current gaps in new code adoption across the state including: a lack of resources, lack of knowledge, and internal and external opposition to increasing code standards.

The Company utilizes a third-party implementer that works directly with local HERS raters to get homes enrolled in the product. HERS raters in the state of Colorado have established strong relationships with the builder community. HERS rating companies have the flexibility to participate in this product by completing a standard scope of work administered and managed by the Company's third-party implementer. The HERS rater will model each home and test the home to measure the level of energy efficiency achieved. Once the home is completed, the HERS rater provides the required information to the third-party implementer who then determines if the home meets the product requirements and is eligible for a rebate. The third-party implementer is

responsible for reviewing the information submitted by the rater, working with the rater to correct or provide missing information and then reporting it to the Company. The third-party implementer provides product training for the rater and will assist with builder training as needed.

B. Targets, Participants & Budgets

Targets and Participants

The product targets builders who construct single-family and small multi-family homes up to four units. Energy savings and participation targets are based on historical product performance and growth forecast assumptions in the residential new construction marketplace. New construction growth continues to improve and barring any significant impacts to the financial sector, the Company anticipates this growth will continue to occur around 5% year over year. As predicted in the prior filing, more stringent International Energy Conservation Code® ("IECC") adoption has continued throughout Company service territory, resulting in heaviest participation in the lowest performance tier. The Company has evaluated the incentives based on fuel type, mechanicals, and technological innovation and adjusted the incentive levels accordingly. The goal is to shift participation toward advanced performance tiers and more electric-only development, enabling decarbonization in the new construction sector.

Budgets

The product budget is primarily driven by forecasted participation for 2021 and 2022 and established rebate levels are designed to shift participation to more desired fuels and performance tiers. Additional costs include; product administration, promotional and outreach activities, measurement and verification. Product administration costs include Company labor and third-party implementer services, which are being competitively bid in 2020. Builder rebates and energy rater administrative fees comprise the majority of the product budget, followed by measurement & verification and advertising/promotion.

C. Application Process

Enrollment for this product is typically completed by the HERS raters on behalf of their clients (builders). HERS raters have strong, long established relationships with most of the builders operating within the Company's Colorado service territory. To initiate the enrollment process, HERS raters will contact builders to encourage their participation, or the builder will contact a rater and express interest in constructing an energy-efficient home. The rater will explain the product offering and potential rebates available, review the home's blueprints and building schedule, and enter the home details into the third-party implementer's tracking database. The rater consults with the builder throughout the construction phase to build a home that qualifies for the product rebate.

When the home is completed, the HERS rater will perform an air-tightness test on the house and determine the energy impacts using an accredited RESNET rating software that has been approved for use by the Company. This information is submitted to the third-party implementer who will review and approve each home. The builder will receive a rebate based on the local energy code requirement and the percent savings beyond the code (BTC) achieved. Specific gas and electric

energy savings are determined by the Company using the HERS rater's modeling information. There is no rebate application for the builder or rater to complete since all required information is entered by the HERS rater into the third-party implementer's database using a web portal interface. The third-party implementer reviews and ensures all information is accurate and captured and works directly with the energy rater to correct any omissions or errors. Once the data is deemed complete, the third-party implementer is responsible for manually entering selected portions of the collected data for each home into the Company's database.

D. Marketing Objective & Strategies

The Company will update existing builder and homebuyer marketing materials and make them available to participants. ESNH has been very successful for the last two years. As a result, marketing efforts will change from enrolling builders in the Program to encouraging builders to build better homes. The objective of some of the builder marketing material is to increase product awareness and effectively communicate product benefits (energy savings, economics, and comfort/durability) along with the requirements for participation. The homebuyer collateral will continue to be an aid for builders to easily explain the benefits of an energy efficient home to their potential clients. A certificate of completion demonstrates the home successfully completed the product requirements and contains useful information such as the HERS index achieved and who rated the home. New, highly targeted direct to consumer marketing will highlight the primary benefits of efficient construction of comfort, durability, and resiliency, while highlighting the best builders in the Program. The cornerstone of this channel will be a new customer-facing website with information on the features and benefits of high-performance houses. It will also have resources to connect interested customers with capable high performance builders.

The Company's third-party implementer will engage in outreach activities with participants and stakeholders. The outreach objectives are intended to maintain good working relationships with builders and raters, ensuring they are satisfied with the product offering and to provide education and training support where needed. The third-party implementer will initiate monthly product update communications to all participants and hold in-person and conference-call meetings with raters along with routine email and phone communications.

The third-party implementer will provide training to participants (primarily raters) on the product requirements, the Company approved modeling software and use of their database system to improve efficiency and ensure more accurate data reporting. These activities are expected to encourage energy-efficient building practices resulting in increased energy savings. The Company is seeking partnerships with national organizations to extend the impact that energy efficiency measure implementation can have on market value of homes. While builders have the skills and resources to build more efficient housing, realtors, appraisers, and mortgage bankers lack the experience to properly assign and support a cash value to these improvements. Making efficient housing more valuable will drive increased efficiency deployment in the new homes market, with the ancillary benefit of extending into the built market.

The Company is also considering how renewable and electric vehicle programs and the ESNH product may be jointly marketed to customers. Other types of training will be identified with the assistance of the product participants, key stakeholders and the third-party implementer who will

be responsible for developing specific outreach plans. Key stakeholders include organizations such as local homebuilder associations, the Colorado Energy Office, the Colorado Code Compliance Collaborative and other related industry organizations.

To assist in building code compliance, the Company will continue and improve its one-on-one support for local officials, marketing materials available through various channels, and trainings designed to support awareness and implementation.

E. Product-Specific Policies

This product currently applies to builders of residential single-family buildings, small multifamily buildings and townhomes that receive combined electric and natural gas service, natural gas-only service, or year-round electric space conditioning from Public Service. Structures that have common conditioned space such as hallways and elevator shafts are not eligible to participate in the product. Additional product requirements are:

1. Raters must be RESNET certified and use the RESNET modeling software approved by the Company to model each home.
2. Raters must provide a RESNET-registered HERS rating for each home. Sample ratings are not accepted.
3. Raters must complete a Rater Field Checklist and the home must pass the applicable sections.
4. Builders will receive a rebate based on the local energy code requirement and the percent BTC. The percent improvement is determined using the Company approved modeling software to model the energy used by the reference home (or baseline home; modeled to match the local jurisdictional energy code) and the energy used by the new as-built home. The energy use is converted to MMBTU and the following formula is used to determine the percent improvement: Ref_Home_MMBTU - As-Built_Home_MMBTU) / Ref_Home_MMBTU.
5. Homes that achieve ENERGY STAR certification and receive a percent BTC rebate (as detailed in Section G below) may be eligible for an additional $100 rebate.
6. Natural gas-only participants are not eligible to receive the rebates for ENERGY STAR® radon fans or heat pump water heater measures.
7. ~~Electric-only homes are not eligible to receive the prescriptive rebates for the heat pump water heater or the clothes washer measures.~~
8.7. Homes qualifying for a product rebate are not eligible for Company's *separate prescriptive* rebates under the following products; Evaporative Cooling, Heating Efficiency, High Efficiency A/C, Insulation & Air Sealing, Thermostat Optimization, and natural gas Water Heating.
9.8. Impacts from PV or other renewable generation systems installed in the home will not be included in the percent BTC improvement (rebate) or energy savings calculations.

F. Stakeholder Involvement

The Company maintains ongoing relationships with the U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy, which jointly oversee the national ENERGY STAR

program. The Company is an active Sponsor and participant in the national program, recognizing the strong customer awareness of the ENERGY STAR brand, and has received several ENERGY STAR awards for this product.[1]

This product has received significant interest and input from external Colorado stakeholders in preparation of Plan filings and during Plan Settlement. This input has been valuable and taken under consideration for the product design.

The Company serves on the new home construction committee of the Consortium for Energy Efficiency, which meets regularly and works closely with the EPA. The third-party implementer attends RESNET conferences on behalf of the Company.

Public Service will strive to work with and engage Colorado stakeholders, such as the Colorado Energy Office, Southwest Energy Efficiency Project, Energy Efficiency Business Coalition, the Colorado Energy Code Collaborative, the City of Denver and others to partner when possible and continue the product's success. The Company is also seeking partnerships with national organizations like the Energy & Environmental Building Alliance (EEBA) to bring top class training and events to Colorado builders.

The Company will issue monthly communications to participating builders and energy raters, providing year-to-date product updates on participation, achievement, expenditures, and other important product information as it arises. The Company's third-party implementer communicates regularly with participating energy raters and builders, including requests for their input on training and education gaps related to energy efficiency and more specifically, how the product can assist filling those gaps.

G. Rebates & Incentives

Builders with qualifying homes are eligible to receive a rebate based on the local energy code requirement and the percent BTC improvement achieved (see *Product-Specific Policies* for details). A builder's home must achieve a minimum 10% BTC improvement to qualify.

Combo Homes - Rebate Levels – 2009 IECC or Lower and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$200
15% - 19.999%	$350
20% - 24.999%	$500
25% - 29.999%	$650
30% - 34.999%	$800
35% - 39.999%	$1,000
40% and higher	$1,400

[1] View the ENERGY STAR Awards Archive: https://www.energystar.gov/about/awards/awards-archive

Gas Only Homes - Rebate Levels – 2009 IECC or Lower and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$100
15% - 19.999%	$175
20% - 24.999%	$250
25% - 29.999%	$325
30% - 34.999%	$400
35% - 39.999%	$500
40% and higher	$700

Combo Homes - Rebate Levels – 2012, 2015, or 2018 IECC ~~or Higher~~ and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$250
15% - 19.999%	$400
20% - 24.999%	$600
25% - 29.999%	$900
30% - 34.999%	$1,300
35% - 39.999%	$2,000
40% and higher	$2,550

Gas Only Homes - Rebate Levels – 2012, 2015, or 2018 IECC and Percent BTC ~~2012 IECC or Higher and Percent BTC~~

Percent BTC	Rebate
10% - 14.999%	$125
15% - 19.999%	$200
20% - 24.999%	$300
25% - 29.999%	$450
30% - 34.999%	$650
35% - 39.999%	$1,000
40% and higher	$1,275

Electric Only Homes - Rebate Levels – 2012, 2015, or 2018 IECC and Percent BTC ~~2012 IECC or Higher and Percent BTC~~

Percent BTC	Rebate
10% - 14.999%	$500
15% - 19.999%	$800
20% - 24.999%	$1,200
25% - 29.999%	$2~~1~~,800
30% - 34.999%	$3,9~~2,6~~00
35% - 39.999%	$5,2~~4,0~~00
40% and higher	$6,7~~5.1~~00

Combo Homes - Rebate Levels – 2021 IECC and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$300
15% - 19.999%	$550
20% - 24.999%	$1,000
25% - 29.999%	$1,500
30% - 34.999%	$2,500
35% - 39.999%	$4,000
40% and higher	$4,750

Gas-only Homes - Rebate Levels – 2021 IECC and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$150
15% - 19.999%	$275
20% - 24.999%	$500
25% - 29.999%	$750
30% - 34.999%	$1,250
35% - 39.999%	$2,000
40% and higher	$2,375

Electric-only Homes - Rebate Levels – 2021 IECC and Percent BTC

Percent BTC	Rebate
10% - 14.999%	$600
15% - 19.999%	$1,100
20% - 24.999%	$2,000
25% - 29.999%	$3,000
30% - 34.999%	$5,000
35% - 39.999%	$8,000
40% and higher	$9,500

HERS raters who consult on qualifying homes are eligible to receive a rebate based on the rated home's performance better than local energy code. As with builder incentives, the rated home must achieve a minimum of 10% BTC for Raters to qualify.

Rater Incentives – All codes and Percent BTC of Rated home

Percent BTC	Rebate
10% - 19.999%	$75
20% - 29.999%	$150
30% and higher	$225

The ENERGY STAR certified rebate is an *add-on* rebate available to qualifying homes that have earned ENERGY STAR certification and meet the following:

a) Home must have both electric and gas service from Public Service or year-round electric space conditioning. Gas-only or electric-only homes served by the Company are not eligible;

b) Home must qualify for a percent BTC rebate;
c) HERS rater verifies the home meets all national ENERGY STAR certification requirements and;
d) ENERGY STAR label is applied to the home's electrical breaker box.

ENERGY STAR Certified Rebate

ENERGY STAR certified	$100

The table below lists prescriptive rebates as another *add-on* rebate available to qualifying homes that have earned a percent BTC rebate and installed one or any combination of the qualifying measures listed below. Homes that receive natural gas-only service from the Company are not eligible for rebates associated with electric measures.

Appliance Rebate Levels for Qualifying Homes

Appliance	**Rebate**
ENERGY STAR Clothes Washer	$40
ENERGY STAR Clothes Dryer	$30
Heat Pump Water Heater	$~~400~~600
Heat Pump Water Heater with CTA2045 port	$~~500~~800
ENERGY STAR certified Smart Thermostat*	$50
ENERGY STAR radon fan	$20
High efficiency shower head (1.5 GPM)	$3.50
High efficiency kitchen aerator (1.5 GPM)	$1.25
High efficiency lavatory aerator (0.5 GPM)	$1.50

* To qualify for the rebate, the device must be a certified ENERGY STAR connected thermostat and be compatible with the Company's Residential Demand Response program requirements.

15.1 Modeled Residential New Construction

Algorithms

$$Customer\ kWh = kWh_{Reference\ Home} - kWh_{As\ Built\ Home}$$

$$Summer\ Peak\ kW = Summer\ Peak\ kW_{Reference\ Home} - Summer\ Peak\ kW_{As\ Built\ Home}$$

$$WinterPeak\ kW = Winter\ Peak\ kW_{Reference\ Home} - Winter\ Peak\ kW_{As\ Built\ Home}$$

$$Customer\ Dth = Dth_{Reference} - Dth_{As\ Built\ Home}$$

$$\%\ Better\ Than\ Code = \frac{(MMBTU_{Reference\ Home} - MMBTU_{As\ Built\ Home})}{MMBTU_{Reference\ Home}}$$

$$MMBTU_{Reference\ Home} = \{(Heating\ kWh_{\ Reference\ Home} + Cooling\ kWh_{Reference\ Home} + Water\ Heating\ kWh_{Reference\ Home} + Lighting\ and\ Appliance\ kWh_{\ Reference\ Home}) \times \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ th_{Reference\ Home} + Water\ Heating\ th_{Reference\ Home} + Lighting\ and\ Appliance\ th_{\ Reference\ Home}) \times \frac{1}{10}\}$$

$$MMBTU_{As\ Built\ Home} = \{(Heating\ kWh_{\ As\ Built\ Home} + Cooling\ kWh_{As\ Built\ Home} + Water\ Heating\ kWh_{As\ Built\ Home} + Lighting\ and\ Appliance\ kWh_{\ As\ Built\ Home}) \times \frac{3{,}412}{1{,}000{,}000}\} + \{(Heating\ th_{As\ Built\ Home} + Water\ Heating\ th_{As\ Built\ Home} + Lighting\ and\ Appliance\ th_{\ As\ Built\ Home}) \times \frac{1}{10}\}$$

$$ICC\ As\ Built\ Home = \left(\frac{ICC}{SFa} \times \%\ Better\ Than\ Code^3 + \frac{ICC}{SFb} \times \%\ Better\ Than\ Code^2 + \frac{ICC}{SFc} \times \%\ Better\ Than\ Code + \frac{ICC}{SFd}\right) \times ICC\ Adj\ Factor$$

$$ICC\ Adj\ Factor = 1 + (ICCAdj\ a \times \ln(Home\ Size) + ICCAdj\ b)$$

Variables

Coincidence Factor	90%	Deemed concidence factor
Lifetime	20	Deemed lifetime
$ICC_{ADJ\ a}$	Table 15.1.1	Constants for use in calculating an Incremental Cost / Square Foot of home. The cost curve is derived from information provided by Residential Science Resources estimates and home modeling of the most common measures implemented to improve the envelope performance over local codes (Reference 4 and Reference 5).
$ICC_{ADJ\ b}$	Table 15.1.1	
ICC/SF_a	Table 15.1.2	Constants for use in calculating an adjustment factor to correct the incremental cost for home size. An increase in homes size reduces the cost per square foot for the same set of measures due to economies of scale. This factor is used in conjunction with the As Built ICC SF cost formula (Reference 4 and Reference 5).
ICC/SF_b	Table 15.1.2	
ICC/SF_c	Table 15.1.2	
ICC/SF_d	Table 15.1.2	

Modeler Inputs	M&V Verified	
Percent Better Than Code	Yes	Calculated percent better than baseline code
Baseline Energy Code	Yes	IECC 2006 thru ~~IECC 2018~~ IECC 2021
Home Area (sq/ft)	Yes	Total modeled conditioned space of home (sqft)
Final HERS Index NoPV	Yes	As-Built Home's HERS Index Score calculated by the Home Rater using a software modeling tool and provided under HERS Index (Final)
EStar Certified	Yes	Energy Star v3 certified
Ref Home Heat Therms	Yes	Reference home gas heating energy
Ref Home Heat kWh	Yes	Reference home electric heating energy
Ref Home Cool kWh	Yes	Reference home electric cooling energy
Ref Home Water Heat Therms	Yes	Reference home gas water heating energy
Ref Home Water Heat kWh	Yes	Reference home electric water heating energy
Ref Home LightApp Therms	Yes	Reference home gas lights & appliance energy
Ref Home LightApp kWh	Yes	Reference home electric lights & appliance energy
As Built Home Heat Therms	Yes	As-built home gas heating energy
As Built Home Heat kWh	Yes	As-built home electric heating energy
As Built Home Cool kWh	Yes	As-built home electric cooling energy
As Built Home Water Heat Therms	Yes	As-built home gas water heating energy
As Built Home Water Heat kWh	Yes	As-built home electric water heating energy
As Built Home LightApp Therms	Yes	As-built home gas lights & appliance energy
As Built Home LightApp kWh	Yes	As-built home electric lights & appliance energy
Ref Home Peak kW Winter	Yes	Reference home winter demand
Ref Home Peak kW Summer	Yes	Reference home summer demand
As Built Home Peak kW Winter	Yes	As-built home winter demand
As Built Home Peak kW Summer	Yes	As-built home summer demand
Des OAT	Yes	Low Outdoor Ambient Temperature for caluclating heating load profile for electric heating equipment. Based on Low Temp Rating from NEEP QPL Data Sheets. Modeled at 5F (Reference 6)

Table 15.1.1 Incremental Cost per Square Foot Adjustment Factor Constants

Customer Type	Cost / SF Adjustment Factor Constants	$ICC_{ADJ\ a}$	$ICC_{ADJ\ b}$
Combo & Gas Only	IECC 2006	-0.7237094011964	5.8253260979282
	IECC 2009	-0.7237094011964	5.8253260979282
	IECC 2012	-0.2389969816525	1.9388419806113
	IECC 2015	-0.2389969816525	1.9388419806113
	IECC 2018	-0.2389969816525	1.9388419806113
	IECC 2021	-0.1239486286142	1.7564234894150
Electric Only	IECC 2006	-0.0331223345001	0.2235513199389
	IECC 2009	-0.0331223345001	0.2235513199389
	IECC 2012	-0.0331223345001	0.2235513199389
	IECC 2015	-0.0331223345001	0.2235513199389
	IECC 2018	-0.0331223345001	0.2235513199389
	IECC 2021	-0.0294627894100	0.2183458931159

Table 15.1.2 Incremental Cost per Square Foot Formula Constants

Customer Type	Cost / SF Adjustment Factor Constants	ICC/SF_a	ICC/SF_b	ICC/SF_c	ICC/SF_d
Combo & Gas Only	IECC 2006	0.0000000000000	-1.5873776258178	3.7927326153691	-0.0238069137844
	IECC 2009	0.0000000000000	-1.5873776258178	3.7927326153691	-0.0238069137844
	IECC 2012	0.0000000000000	27.2773059522290	-1.5760510381200	0.1307241656023
	IECC 2015	0.0000000000000	27.2773059522290	-1.5760510381200	0.1307241656023
	IECC 2018	135.4064974001910	-32.1556080746469	3.6616218361661	-0.0002624153096
	IECC 2021	10.8580000000000	-2.8741000000000	2.8922000000000	0.0442000000000
Electric Only	IECC 2006	0.0000000000000	56.7265518419520	-0.7931310460476	0.0501196304125
	IECC 2009	0.0000000000000	56.7265518419520	-0.7931310460476	0.0501196304125
	IECC 2012	0.0000000000000	56.7265518419520	-0.7931310460476	0.0501196304125
	IECC 2015	0.0000000000000	56.7265518419520	-0.7931310460476	0.0501196304125
	IECC 2018	0.0000000000000	13.3182292174891	3.9975225576078	-0.0978142722627
	IECC 2021	0.0000000000000	10.4625000000000	2.8553000000000	0.0254000000000

References:

~~1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).~~
~~2. RSR (Residential Science Resources) energy savings measure modeling, 2016~~
~~3. RSR (Residential Science Resources) energy savings measure modeling, 2019~~
4. RSR (Residential Science Resources) energy savings measure modeling, 2020 and 2021
5. RSR (Residential Science Resources) energy savings measure modeling, 2022
6. NEEP QPL Data Sheets

Changes from Recent Filing:

Added IECC 2021 Incremental Cost Data to the program
Added in 3 Tiers of Rater Incentives
Modeling Software Updated to Ekotrope v4.0
Modeled Design OAT is defined at 5F for Electric Heating Equipment

Program	Measure Group	Measure Lifetime (years)	Rebate Amount ($)	Incremental Cost ($)	Annual Customer kWh Savings (kWh/yr)	Annual Customer Peak Coincident Demand Savings (PCkW)	Gas Savings (Dth)	Non-Energy O&M Savings ($)	Electric NTG (%)	Gas NTG (%)	Install Rate (%)	2021 Electric Units	2022 Electric Units	2021 Gas Units	2022 Gas Units
Energy Star Homes	ENERGY STAR Clothes Dryer	12	$30	$75	98	0.011	0.0	$0.00	73%	73%	100%	375	375	0	0
Energy Star Homes	ENERGY STAR Clothes Washer	11	$40	$120	92	0.014	2.4	$12.52	73%	73%	100%	375	375	643	643
Energy Star Homes	Builder Incentive	1	$505	$0	0	0.000	0.0	$0.00	73%	73%	100%	0	500	0	500
Energy Star Homes	IECC 2006 - IECC 2009	20	$585	$2,189	1,693	0.333	38.7	$0.00	73%	73%	100%	1,511	1,447	1,803	1,953
Energy Star Homes	IECC 2012 - IECC 2015	20	$331	$1,970	1,202	0.249	18.4	$0.00	73%	73%	100%	2,663	2,546	3,983	4,960
Energy Star Homes	IECC 2015	20	$1,437	$7,520	4,988	1.634	0.0	$0.00	73%	73%	100%	525	420	0	0
Energy Star Homes	IECC 2018	20	$1,149	$3,812	3,066	0.487	10.8	$0.00	73%	73%	100%	381	433	203	262
Energy Star Homes	IECC 2021	20	$1,648	$5,216	3,316	0.568	11.2	$0.00	73%	73%	100%	0	48	0	27
Energy Star Homes	Rater Incentive	1	$115	$0	0	0.000	0.0	$0.00	73%	73%	100%	0	850	0	850
Energy Star Homes	Codes & Standards	20	$0	$0	146	0.019	0.8	$0.00	13%	13%	100%	21,230	21,018	21,230	21,018
Energy Star Homes	Energy Star Smart Thermostat	10	$50	$215	81	0.123	8.0	$0.00	73%	73%	100%	170	170	292	295
Energy Star Homes	ES Radon Fans	10	$20	-$4	273	0.031	0.0	$0.00	73%	73%	100%	5	5	0	0
Energy Star Homes	Aerators - EWH	10	$1	$1	60	0.008	0.0	$4.33	73%	73%	100%	75	75	0	0
Energy Star Homes	Aerators - GWH	10	$1	$1	0	0.000	0.3	$4.33	73%	73%	100%	0	0	150	150
Energy Star Homes	Heat Pump Water Heater	12	$700	$1,059	2,243	0.365	0.0	-$5.00	73%	73%	100%	104	104	0	0
Energy Star Homes	Showerheads - EWH	10	$3	$3	433	0.031	0.0	$22.39	73%	73%	100%	50	50	0	0
Energy Star Homes	Showerheads - GWH	10	$3	$3	0	0.000	1.8	$22.39	73%	73%	100%	0	0	100	100

ENERGY STAR NEW HOMES

2022 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Modified Total Resource Test ($Total)
Benefits				
Avoided Revenue Requirements				
Generation Capacity	N/A	$2,447,194	$2,447,194	$2,447,194
Trans. & Dist. Capacity	N/A	$306,480	$306,480	$306,480
Marginal Energy	N/A	$2,649,276	$2,649,276	$2,649,276
Avoided Emissions (CO2)	N/A	N/A	N/A	$1,821,717
Subtotal				$7,224,667
Non-Energy Benefits Adder (20.0%)				$1,080,590
Subtotal	N/A	$5,402,950	$5,402,950	$8,305,257
Participant Benefits				
Bill Reduction - Electric	$19,514,611	N/A	N/A	N/A
Participant Rebates and Incentives	$2,413,158	N/A	N/A	$2,413,158
Incremental Capital Savings	$20	N/A	N/A	$15
Incremental O&M Savings	$22,361	N/A	N/A	$16,324
Subtotal	$21,950,150	N/A	N/A	$2,429,496
Total Benefits	$21,950,150	$5,402,950	$5,402,950	$10,734,753
Costs				
Utility Project Costs				
Program Planning & Design	N/A	$0	$0	$0
Administration & Program Delivery	N/A	$341,644	$341,644	$341,644
Advertising/Promotion/Customer Ed	N/A	$60,000	$60,000	$60,000
Participant Rebates and Incentives	N/A	$2,413,158	$2,413,158	$2,413,158
Equipment & Installation	N/A	$0	$0	$0
Measurement and Verification	N/A	$150,960	$150,960	$150,960
Subtotal	N/A	$2,965,762	$2,965,762	$2,965,762
Utility Revenue Reduction				
Revenue Reduction - Electric	N/A	N/A	$14,307,459	N/A
Subtotal	N/A	N/A	$14,307,459	N/A
Participant Costs				
Incremental Capital Costs	$9,469,417	N/A	N/A	$6,931,510
Incremental O&M Costs	$4,939	N/A	N/A	$3,605
Subtotal	$9,474,355	N/A	N/A	$6,935,115
Total Costs	$9,474,355	$2,965,762	$17,273,221	$9,900,877
Net Benefit (Cost)	$12,475,795	$2,437,188	($11,870,271)	**$833,876**
Benefit/Cost Ratio	2.32	1.82	0.31	**1.08**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2022 ELECTRIC GOAL

Input Summary and Totals

Program "Inputs" per Customer kW and per Participant		
Lifetime (Weighted on Generator kWh)	A	19.8 years
T & D Loss Factor (Energy)	B	6.38%
T & D Loss Factor (Demand)	C	9.13%
Net-to-Gross (Energy)	D	51.94%
Net-to-Gross (Demand)	E	64.12%
Installation Rate (Energy)	F	**100.00%**
Installation Rate (Demand)	G	**100.00%**
Net coincident kW Saved at Generator	H	0.07 kW
Gross Annual kWh Saved at Customer	I	560.95 kWh
Net Annual kWh Saved at Generator	J	311.24 kWh

Program Summary All Participants		
Total Budget	K	**$2,965,762**
Net coincident kW Saved at Generator	L	**1,933 kW**
Gross Annual kWh Saved at Customer	M	15,939,660 kWh
Net Annual kWh Saved at Generator	N	**8,844,080 kWh**
Total MTRC Net Benefits with Adder	O	**$833,876**
Total MTRC Net Benefits without Adder	P	**($246,714)**
Utility Program Cost per kWh Lifetime	K/(A x N)	**$0.0169**
Utility Program Cost per kW at Gen	K/ L	**$1,535**
Avoided Lifetime CO2 Emissions, Total Program (tons CO2)		**46,812**

ENERGY STAR NEW HOMES

2022 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Modified Total Resource Test ($Total)
Benefits				
Avoided Revenue Requirements				
Commodity Cost Reduction	N/A	$5,423,377	$5,423,377	$5,423,377
Variable O&M Savings	N/A	$81,471	$81,471	$81,471
Demand Savings	N/A	$570,655	$570,655	$570,655
Subtotal				$6,075,503
Non-Energy Benefits Adder (20.0%)				$1,215,101
Subtotal	N/A	$6,075,503	$6,075,503	$7,290,603
Participant Benefits				
Bill Reduction - Gas	$9,666,859	N/A	N/A	N/A
Participant Rebates and Incentives	$1,992,430	N/A	N/A	$1,992,430
Incremental Capital Savings	$0	N/A	N/A	$0
Incremental O&M Savings	$78,682	N/A	N/A	$57,438
Subtotal	$11,737,971	N/A	N/A	$2,049,868
Total Benefits	$11,737,971	$6,075,503	$6,075,503	$9,340,471
Costs				
Utility Project Costs				
Program Planning & Design	N/A	$0	$0	$0
Administration & Program Delivery	N/A	$613,837	$613,837	$613,837
Advertising/Promotion/Customer Ed	N/A	$240,000	$240,000	$240,000
Participant Rebates and Incentives	N/A	$1,992,430	$1,992,430	$1,992,430
Equipment & Installation	N/A	$0	$0	$0
Measurement and Verification	N/A	$429,615	$429,615	$429,615
Subtotal	N/A	$3,275,882	$3,275,882	$3,275,882
Utility Revenue Reduction				
Revenue Reduction - Gas	N/A	N/A	$9,666,859	N/A
Subtotal	N/A	N/A	$9,666,859	N/A
Participant Costs				
Incremental Capital Costs	$11,661,567	N/A	N/A	$6,427,471
Incremental O&M Costs	$0	N/A	N/A	$0
Subtotal	$11,661,567	N/A	N/A	$6,427,471
Total Costs	$11,661,567	$3,275,882	$12,942,741	$9,703,353
Net Benefit (Cost)	$76,404	$2,799,621	($6,867,238)	**($362,882)**
Benefit/Cost Ratio	1.01	1.85	0.47	**0.96**

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

2022 GAS **GOAL**

Input Summary and Totals

Program "Inputs" per Dth		
Lifetime (Weighted on Dth)	A	19.8 years
Net-to-Gross (Weighted on Dth)	B	63.75%
Install Rate (Weighted on Dth)	C	100.00%

Program Summary per Participant		
Gross Annual Dth Saved	D	7.1
Net Annual Dth Saved	E	4.5

Program Summary All Participants		
Total Budget	F	**$3,275,882**
Gross Annual Dth Saved	G	**218,019 Dth**
Net Annual Dth Saved	H	**138,984 Dth**
Total MTRC Net Benefits with Adder	I	**($362,882)**
Total MTRC Net Benefits without Adder	J	**($1,577,982)**
Utility Program Cost per Dth Lifetime	F /(A x H)	**$1.1894**