

2013 Comprehensive Evaluation: Colorado Home Performance with ENERGY STAR®

Recommendations and Responses

June 2014

Executive Summary

The Home Performance with ENERGY STAR® product (HPwES) is a comprehensive, “whole house” retrofit product. This product is designed to give cash rebates to customers for implementation of measures identified during the Home Energy Audit (HEA). It is only available to Public Service residential combination gas and electric customers and all-electric customers with electric space heating.

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

Recommendation	Response
<u>Marketing and Communication</u>	
Continue to communicate program opportunities through a variety of customer marketing channels, emphasizing money savings and energy cost reduction.	
1. Continue to use bill inserts and mailings to communicate program opportunities to customers. Nearly half of all participants and partial participants said they prefer receiving money-saving information through the mail. Nearly one-quarter of participants (18%) and one-quarter of partial participants (27%) reported hearing about the HPwES Program through information received in the mail.	The Company will continue to utilize marketing channels that include bill inserts and direct mailings, in collaboration with communications regarding financing opportunities.
2. Continue to emphasize the money savings and energy cost reduction that results from customers' making improvements to their homes. These were the most frequently cited reasons customers gave for having an audit. Maintaining messaging	The Company will continue to emphasize potential rebate opportunities and overall energy cost savings.

<p>continuity for customers based on these priorities could help boost HPwES participation.</p>	
<p>3. Consider finding ways to help customers understand the payback timelines and how to budget for improvements within the one-year program requirement. Partial participants considered up-front costs a barrier to participating, yet many plan to make more of the recommended improvements in the near future, and may not realize that the window of opportunity for participating ends one year after their audit. This detail could also be included in additional training for auditors and Home Energy Squad Program technicians as an enhanced educational component.</p>	<p>The Company utilizes the SnuggHome software, which can include paybacks and cost estimates of equipment installed. Additionally, financing opportunities are being built into the software for Q2-2014 launch, and will explain monthly costs to the customer.</p> <p>Training will continue with the registered and approved contractor pool, to emphasize the one-year rebate window, paybacks, and the financing tools available in the Home Energy Audit in Q2-2014.</p>
<p>4. Due to recent program changes, consider adding information to both customer-facing and contractor-facing marketing materials that addresses the changes specifically.</p>	<p>The Company will continue to address program changes that effect customers and trade through a variety of channels, including through efforts with our third-party implementer. Additional efforts will be made through the Company's websites (www.xcelenergy.com and http://responsiblebynature.com) and via email to direct customers with this information.</p>
<p>5. Review the program marketing materials and consider adding more customer-facing materials and advertising that contractors could reference when speaking with customers, and that that would also give customers a greater program understanding without relying exclusively on contractors. Contractors market their high-efficiency equipment and said they could benefit</p>	<p>The Company will implement a new customer facing information sheet to guide customers toward key program materials. Additionally, the current Home Energy Audit/Home Performance sign-up brochure will be updated and available to contractors or customers on the Company's website (www.xcelenergy.com).</p>

<p>from additional program promotion by Xcel Energy to their own customers.</p>	
<p>6. Consider reviewing the contractor-specific program information, specifically the benefits to participation. While a lack of awareness does not seem to be a barrier for nonparticipant contractors, they may not have all the correct information on qualification requirements or the paperwork process. Nonparticipating contractors are generally interested to know more about the program and would benefit from receiving information by e-mail or phone. They may also benefit from a deeper understanding of how investing in a certification can increase their business opportunities.</p>	<p>The Company's DSM Program Managers will continue to work closely with the Company's Channel Managers and the HPwES third-party implementer, to communicate with the trade and the contractors. HPwES program information is distributed to all contractors, regardless of their participation status with the program. An email communication will be sent specifically to non-participating contractors about the benefits of being a HPwES contractor, and also highlighting the certification benefits as a benefit to their business model.</p>
<p>7. Consider expanding radio and television advertising. Contractors would benefit from broader advertising from Xcel Energy, such as radio or television ads that increase awareness of the HPwES Program. Continue to provide print advertisements, brochures, and web advertisements as these are key tools contractors' use to educate and market high-efficiency equipment.</p>	<p>The Company will continue to advertise with the most cost-effective marketing channels. Radio, print, onserts, and interactive mediums (web banners, etc.) will be utilized throughout 2014. At this time, television ads are cost-prohibitive for this program, but will continue to be evaluated as a future marketing medium for the HPwES.</p>
<p>8. Maintain the list of approved contractors on the program web page.</p>	<p>Channel Management and Program Management will continue to collaborate in maintaining a list of contractors to be posted on the Company's website, here: http://www.xcelenergy.com/Save Money & Energy/Residential/Su</p>

	pplemental Information/Contractor Legal Disclosure
<p>9. Consider implementing marketing and outreach strategies that build consumer awareness and demand for homes that meet HPwES standards. This could include marketing the program more directly to consumers or implementing public education campaigns about the benefits of homes that meet program standards.</p>	<p>At least one targeted mail campaign about market demand for HPwES certified homes will be conducted in 2014 in coordination with the HPwES third-party implementer.</p>
<p><u>Program Design</u></p> <p>Explore program design options that will help partial participants complete the program and increase savings.</p>	
<p>10. To increase the number of HVAC measures implemented through the program, consider offering an incentive for HVAC contractors. This incentive could be based on the number of whole-home projects the contractor works on through the program, similar to the benchmarked programs.</p>	<p>The Company is evaluating the possibility of offering such an incentive for HVAC contractors, similarly to what is currently offered for Attic Insulation contractors within the HPwES program. This incentive could be aligned with our outreach to non-participating and participating contractors in the program, and drive additional electric savings.</p>
<p>11. Consider subsidizing continuing certification requirement costs or reducing contractor costs by offering online training or a test-out option.</p>	<p>The Company will implement this measure, if budget is determined to be available. The funding would be targeted to those currently without the certification.</p>
<p>12. Consider simplifying the structure of the requirements and the incentives. Most of the benchmarked programs had a simplified structure compared to the Xcel Energy program. Investigate whether the HPwES Program can be simpler while still cost-effective. One option would be to remove</p>	<p>The Company will take these recommendations into account while developing the program incentive structure under the 2015/2016 DSM Plan.</p>

<p>heating and cooling measures from the program, and instead offer a bonus to customers who install a new heating or cooling system at the same time they install HPwES measures, similar to the Austin Energy program.</p>	
<p>13. Consider continuing to provide an energy advisor for all participating customers, even those who are not part of a community program. In 2012, Populus ran a successful pilot program for Xcel Energy, in which students from a local community college trained veterans to serve as energy advisors for customers that were not a part of a community program.</p>	<p>The Company is implementing this as a pilot phase, for the remainder of the 2014 calendar year. As a pilot, a selection of customers (self-selecting), will be targeted and offered energy advisory services, including through support of project completion. The HPwES third-party implementer will be conducting energy advisory services for the Home Energy Audits program, which are available to residential customers across the Company's DSM portfolio (not just HPwES).</p>
<p>14. Explore customer perceptions of the program and identify opportunities to streamline the program participation process.</p>	<p>The Company will continue to perform quarterly customer surveys on perceptions of the Home Energy Audit and HPwES program.</p>
<p>15. Consider highlighting the financing opportunities for energy-efficiency projects on the program website.</p>	<p>The Company will adopt in this recommendation.</p>
<p>16. Consider exploring ways to introduce a direct install component to the HPwES Program that would allow for claiming savings for the installation of free, low-cost, energy-saving measures. One option would be to have contractors who are already implementing the program install additional free measures in customer homes (e.g., CFLs, faucet aerators, low-flow showerheads). The installation of these measures could then be verified during the</p>	<p>The Company will take these recommendations into account while developing the program components for the 2015/2016 DSM Plan.</p>

<p>test-out, and/or post-installation QI inspections. This would enable Xcel Energy to capture additional program savings while reducing contractors' confusion regarding the CFL requirements. It could even specifically increase the energy savings from CFLs if additional bulbs are installed beyond the 20 required by the program.</p>	
<p>17. If the National Program requires changes that would be difficult to accommodate in the Xcel Energy program design, consider evaluating the necessity and value of being aligned with the National Program. Perhaps through focus groups or customer and industry surveys, consider investigating the impact of a localized program model. Xcel Energy may also consider branding the program—similar to what HomeFree Nevada did with EnergyFit Nevada and to Austin Energy's use of Power Saver—to help customers connect Xcel Energy as the source and a starting place for home energy efficiency.</p>	<p>The Company values alignment with the National Program standards, and will continue the partnership under the new standards.</p>
<p><u>Training</u></p> <p>Continue offering the current materials and training to new program contractors, and consider expanding the training opportunities to be more accessible and more applicable.</p>	
<p>1. Consider offering training formats to accommodate contractors in the mountain and western slope regions, such as by offering online webinar re-certification options.</p>	<p>The Company has worked with western slope partners, including CLEER, City of Grand Junction, and High Country Conservation, in an effort to raise awareness of trainings and opportunities to the trade. The Company will continue outreach to these regions and offer webinar opportunities as available.</p>

<p>2. Consider subsidizing continuing certification requirement costs or reducing contractor costs through online training or a test-out option.</p>	<p>The Company will continue to subsidize training costs, or provide CEUs, as available with our planned annual contractor trainings. An effort will be made on training specifically for the HVAC community in 2014.</p>
<p>3. At the beginning of contractor trainings, consider surveying contractors who are new to the HPwES Program. By capturing a better understanding of this baseline, future trainings could be customized to areas where contractors could use more support and information.</p>	<p>The Company will implement this in 2015 training plans.</p>
<p>4. Consider using the success of the door-to-door marketing as a training example that demonstrates how program marketing can be used to acquire new business. Also, consider acknowledging contractors for such acts of program support in the future.</p> <p>Consider offering training topics that emphasize the importance of and successful approaches to conveying program information to customers. Customers reported choosing which measures to install based on the auditor recommendations (participants 27%; partial participants 42%). Partial participants also reported not making recommended improvements because of cost and not having enough information from the auditor or contractor, including a list of measure priorities. These findings reveal the potential to inform and further motivate partial participants by communicating all the rebate information and recommendations more effectively.</p>	<p>The Company strives to demonstrate creative advertising and sales techniques, in particular, using case studies and panels of experts for sales trainings on success examples, and will continue to utilize this method.</p> <p>The Home Energy Audit reports do presently categorize opportunities within the report for ease of prioritizing, however, Program Management will review where enhancements can possibly be made, either by follow-up emails, or providing an information sheet on what to do after a Home Energy Audit is performed. Additional trainings to our trade will be inclusive of these changes.</p>

<p>5. Continue to emphasize the importance of communication and that the high standards contractors meet to participate in HPwES sets them apart from competitors, as satisfied customer referrals and word-of-mouth advertising remain the most effective marketing practice.</p>	<p>The Company will continue to train the trade with best practices and sales/marketing focused sessions to address this recommendation.</p>
<p><u>Impacts</u></p> <p>Continue examining partial participants and spillover for potential program improvement design.</p>	
<p>1. Consider examining the high rate of partial participation. During 2012, half of the customers that began program participation did not complete the program requirements. Xcel Energy may want to re-examine the program design and goals in an attempt to attract participants that will complete the program. This must be considered in light of the high rate of non-completion being consistent with program goals to exclude homes that are not optimal for generating the highest savings.</p>	<p>The Company is implementing this as a pilot, for the remainder of the 2014 year. The HPwES third-party implementer will be offering energy advisory services for the Home Energy Audits program, available to residential customers across the DSM portfolio. Customers who receive a Home Energy Audit will be able to self-select for energy advising assistance.</p> <p>The results of the pilot will inform planning for the 2015/2016 DSM Plan.</p>
<p>2. Cadmus supports the use of 116% NTG for this program. There is evidence of significant spillover from the HPwES Program, 30.0%. As this amount of spillover is not likely to stay constant, this NTG value may be different in future years.</p>	<p>The Company will explore to implement a higher NTG recommendation for the 2015 program year.</p>



COLORADO HOME PERFORMANCE WITH ENERGY STAR® PROGRAM EVALUATION

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Appendix A: Data Collection Instruments

Appendix B: Detailed Survey Results

Appendix C: Benchmarking Bibliography

Appendix D: Market Transformation

Executive Summary

Cadmus evaluated Xcel Energy's 2012 Colorado Home Performance with ENERGY STAR® (HPwES) Program according to the best practices outlined in the *California Evaluation Framework* and in consultation with Xcel Energy. Xcel Energy selects two or three demand-side management (DSM) products within its Colorado portfolio each year that will undergo a comprehensive product evaluation; HPwES was selected for this evaluation in 2013.

Xcel Energy first launched the Colorado HPwES Program in 2009, in an effort to encourage customers to implement multiple energy-efficiency measures at once. Through the program, Xcel Energy provides a cash rebate to their dual electric and natural gas customers who work with a program-registered contractor to purchase and install qualifying program measures that were previously identified through an Xcel Energy audit. Registered contractors are listed on Xcel Energy's program website after they complete a required certification course and commit to following specified quality installation (QI) guidelines. Xcel Energy is a Program Sponsor participating in the U.S. Department of Energy (DOE)/U.S. Environmental Protection Agency (EPA) HPwES Program, and therefore designed its program to adhere to the DOE/EPA Program requirements.

Xcel Energy designed the HPwES Program to encourage customers to take a whole-house approach to energy efficiency by offering higher rebates than what is available for individual measures through Xcel Energy's stand-alone programs, such as the High Efficiency Air Conditioning Product Program. Customers also benefit from the program requirement that contractors conduct a test-out after the job is complete, as well as post-installation QC inspections, which ensures high quality work.

Method

Cadmus relied on both primary and secondary data to evaluate the program. Primary data came from surveys with customers who received a rebate for participating in Xcel Energy's HPwES Program, as well as with customers who received an audit and HPwES Program materials but did not apply for a HPwES Program rebate, and from surveys with participating and nonparticipating installation contractors. Secondary data, presented in the Peer Utility Benchmarking section, came from our review of other HPwES programs.

We based the net-to-gross (NTG) analysis on data gathered through phone surveys with participating and partially participating customers¹ and interviews with participating and nonparticipating trade allies. We structured the survey and interview questions to provide details allowing us to assess the influence the program had on customers' purchasing decisions of the efficient measures, and the influence of the

¹ Program participants are Xcel Energy customer who applied for a HPwES rebate in 2012 for installing measures identified on the qualifying measure list. Program partial participants are Xcel Energy customers who were found to be eligible for the HPwES Program through a qualifying audit, and expressed interest in the program between April 2011 and July 2012, but did not complete the program and receive a HPwES Program rebate.



program in their purchase of additional efficient measures for which they did not receive an incentive. Cadmus created algorithms, using data from the surveys and interviews, to calculate freeridership and spillover. Freeridership is the percentage of savings that would have occurred in the absence of the program, while spillover is the percentage of savings that are attributable to customers purchasing additional energy-efficient measures because of the program but that are beyond those savings tracked in program databases. An outline of how we analyzed the NTG data is included in the Net-To-Gross Ratio section.

Objectives

The objectives of the HPwES Program evaluation are outlined below. The task numbers correspond to specific Xcel Energy objectives across multiple program evaluations, and thus may not be sequential.²

Task 1. Conduct Project Initiation Meeting and Present Evaluation Plan

Objective: *To provide a forum for program staff to discuss the evaluation goals, clarify basic research and analyses methods, identify data required from Xcel Energy, and finalize the project schedule timeframe.*

Task 2. Internal Review/Development of Process Flow and Logic Model

Objective: *To obtain a description of the internal workings of the program and identify any problematic issues or areas that might impact the implementation, data development, or analysis of the program.*

Task 3. Primary Research - Participant and Partial Participant Surveys

Objective: *To gather data regarding program satisfaction, program processes, incentive levels, and marketing from program participants.*

Task 4. Primary Research - Participant and Nonparticipant Trade Ally Interviews

Objective: *To define the process for reaching out to the program actors; to identify the questions for understanding the success of the program operation; and to assess how improvement can be attained.*

Task 5b. Validate and Recommend Net-to-Gross

Objective: *To assess freeriders, free drivers, and spillover for an analysis of the program NTG ratio.*

Task 6. Peer Utility Benchmarking

Objective: *To identify and compare the specifics of HPwES rebate programs offered by peer companies to Xcel Energy's program.*

² Xcel Energy and Cadmus standardized this task numbering across other program evaluations, and it is not intended to be sequential where supplemental tasks were added.

Task 6a. Program Vitality Interviews

Objective: To explore indicators of program vitality by interviewing staff working for peer companies where HPwES programs were either discontinued or moved away from the DOE/EPA HPwES program model in the recent past.

Task 7. Progress Reporting

Objective: To provide monthly/weekly progress reports to Xcel Energy communicating progress and any challenges, including their resolutions.

Task 8. Final Report

Objective: To submit a final report to Xcel Energy that includes program findings and recommendations.

Key Findings

A summary of key findings for the HPwES Program are outlined by task below.

Task 2. Internal Review/Development of Process Flow and Logic Model

With input from Xcel Energy, Cadmus developed an interview guide and interviewed program staff. The program was successful in 2012, exceeding the 2012 participation, electric savings, and natural gas savings goals filed with the State of Colorado. However, it did not meet the 2012 electric demand savings goal. Both Xcel Energy and Populus, the program implementer, indicated that the lower performance in this one area was due to a low number of cooling measures being installed. Since 2012 was the first year the program included cooling measures, it may take time for installations to ramp up. Interviewees discussed the need to recruit more HVAC contractors to the program, which would contribute to achieving this program goal in the future. They also reported that the majority of the program electric savings is from CFLs.

One interviewee said that because Xcel Energy redesigned the program model, as described below in the Program Description section, the program now has the resources needed to be successful. Another interviewee said they expect the program to reach its goals in 2013 as well.

The results of this evaluation revealed program success in many areas, including surpassing energy saving and participation goals, as well as having high satisfaction reported by customers and contractors.

Cadmus created a process flow diagram that documents the program delivery to customers, as well as a logic model that shows the program inputs, outputs, and expected outcomes. The diagrams are presented as Figure 1 and Figure 2 in the Process Flows and Logic Model section of this report.

Task 3. Primary Research - Participant and Partial Participant Surveys

The following outlines the results of our surveys with program participants and partial participants.

Program Awareness

- **The largest majority of participating customers (38%) learned about the HPwES Program from a door-to-door representative, while 27% of partial participants learned about the program**



through the mail or a bill insert. Verbatim responses from customers suggested that the door-to-door advertising was from a registered program contractor, demonstrating how engaged some registered contractors are with the program.

Decision Making

- **Participants and partial participants decided to have an audit completed in order to save money and reduce energy costs (32% and 52%, respectively).** Other reasons frequently mentioned by both participant types included to improve comfort issues in their home (28% and 18%, respectively) and to save energy (22% and 19%, respectively).
- **Participant and partial participants reported choosing the measures they installed based on those that were most highly recommended by the auditor (27% and 42%, respectively),** followed by those that would save the most energy or money (23% and 28%, respectively).

Program Satisfaction

- **The majority of participating customers were satisfied with the HPwES Program overall (98%), as well as with the information they received from their auditor (97%) and with their contractor (90%),** giving a rating between 6 and 10 on a 0 to 10 point scale. In addition, 96% of participating customers indicated they are likely to or already have recommended the HPwES Program to a friend.
- **The majority of partial participating customers indicated being satisfied with the information received from the auditor (94%) and with their contractor (94%).**

Barriers to Participation

- **Over three-quarters (79%) of partial participants reported having performed some (79%) or all (21%) of the recommendations from their auditor.** Of those who only completed some of the recommendations or did not complete any of the recommendations, 49% still plan to do so in the future.
- **Fourteen of 67 partial participants (21%) reported not completing any of the recommended measures,** citing reasons such as cost and not receiving enough information.
- **Larger homes could present a participation barrier for some partial participants,** as partial participants reported living in larger homes in general than participants.

Task 4. Primary Research - Participant and Nonparticipant Trade Ally Interviews

The following outlines the results of our surveys with participating and nonparticipating trade allies, which for this program are contractors who work with customers to install various measures or products that have associate program rebates.

Program Satisfaction

- **All participating contractors reported being satisfied with the HPwES Program in general,** with all 25 reporting they are satisfied (giving a rating between 6 and 10 on a 0 to 10 point scale).

- **Participating contractors consider Building Performance Institute (BPI), Residential Energy Services Network (RESNET), and North American Technical Excellence (NATE) training as valuable.** All but one of the surveyed participating contractors reported that they or someone at their company is certified in BPI, RESNET, or NATE, and all 24 contractors with certifications (100%) reported that the training is important to have.
- **Nonparticipating contractors also consider BPI, RESNET, and NATE training as valuable.** Nine of the 10 nonparticipating contractors (90%) said that they or someone in their company is certified in BPI, RESNET, or NATE. Eight of these nine respondents said that BPI, RESNET, or NATE training is very important.

Program Awareness

- **All but two of 20 nonparticipating contractors (90%) were familiar with Xcel Energy’s HPwES Program.** Nonparticipants heard about the program through a variety of channels: e-mail, direct mailing, Xcel Energy employees, customers, suppliers, and other companies. One nonparticipating contractor had previously participated.

Challenges

- **The main challenge Colorado contractors encountered was homeowner confusion** about the rebate structure or that the rebate structure and qualifying requirements change too frequently.
- **Getting and staying BPI certified is difficult.** The costs for this certification are high and some contractors find that maintaining their BPI certification is an obstacle to participation.
- **Nearly half of nonparticipating contractors (9 of 20; 45%) responded “don’t know” when asked why they are not participating in the program.** One of the “don’t know” responses was from a contractor who sometimes completes furnace installs that are eligible for the Xcel Energy stand-alone rebate program; he expressed confusion about whether that made him part of the HPwES Program. Three other nonparticipating contractors explained they do not know much about the program. Nonparticipating contractors gave other reasons, such as an insufficient knowledge base, the high cost of training, and employee turnover, as reasons for not participating. Twenty percent (4 of 20) said they were unable to complete the classes because of the location or timing.

Marketing Practices

- **All participating contractors said they market the Xcel Energy HPwES Program to their customers.**
- **Marketing practices among participating contractors have stayed the same or increased compared to 2012.** Approximately half of the participating contractors said their marketing practices had increased in 2013 compared to 2012, and the other half said they had stayed the same. None reported decreasing the amount of marketing.



- **The majority of participating contractors (75%) consider word-of-mouth or customer referrals as highly effective for promotion.** Eighteen of 24 respondents said these are two of their three most effective methods of promoting their products. Others mentioned their website, advertising in local papers, brochures, trade shows, social media, a one-on-one meeting with the customer, meetings with realtors, and networking.

Installation Practices

- **While a majority of participating contractors reported that they had always followed the best practices taught in the Xcel Energy trainings,** some said they had improved their installation practices after attending training. The two installation practices for which multiple contractors’ reported a change following training are:
 - Percentage of attic bypass sealing jobs reaching 0.15 natural air changes per hour (NACH) reduction
 - Installing an electronically commutated motor (ECM) during furnace installations

Task 5b. Validate and Recommend Net-to-Gross

Cadmus based our recommended planning NTG on our analysis of freeridership and spillover (participant and nonparticipant), indications of market transformation based on the current program, and benchmarking of these values in similar programs.

- **For the 2012 program, we calculated an overall program NTG of 116%.** The calculated freeridership and spillover came to 14.1% and 30.0%, respectfully. Our benchmarking of NTG values for similar programs in other jurisdictions revealed that the NTG estimate for Xcel Energy’s 2012 program is within the range of NTG values estimated for HPwES programs in other jurisdictions.
- **Contractors’ spillover, together with low freeridership, is the main contributor to a higher than 100% NTG.** This finding demonstrates that the program is transforming contractor installation practices. With the program being relatively new, contractors are still able to recognize and report the impact the program and program trainings have had on their installation practices. Over time, this level of spillover will not be sustainable because contractors will begin to see the current QI standard as a common practice. Eventually, what is considered spillover now could be counted as freeridership or market transformation in future years. For this reason, it is important to consider how to capture market transformation in the future.
- **Cadmus’ initial measurement of market transformation indicates that the program has affected the market adoption of higher-efficiency products and QIs.** Further discussion on the level of this market transformation is available in Appendix D.

Task 6. Peer Utility Benchmarking/Task 6a. Program Vitality Interviews

Cadmus compared elements of the Xcel Energy HPwES Program with other HPwES programs across the country. In addition, we reviewed programs that had been discontinued to document the reasons for their termination.

All of the benchmarked programs apply the DOE/EPA HPwES program framework, and the majority include the components indicated as required in the *Home Performance with ENERGY STAR Sponsor Guide, Version 1.1*.³ In addition, the majority of programs include incentives for insulation and air sealing, similar to those offered through Xcel Energy's HPwES Program, all but the Mass Save program administrators require duct sealing, and the majority also include CFLs. Unlike the Xcel Energy program, most of the benchmarked programs include a direct install component where program staff install CFLs at customers' homes during the audit, instead of requiring customers to install them.

Several of the benchmarked HPwES programs are offered by multiple utilities or other entities. The umbrella programs we reviewed are: HomeFree Nevada, EmPOWER, and Mass Save.

Cadmus conducted program vitality interviews with company staff from the two HPwES programs that had been discontinued to understand their decisions for discontinuing the programs. In interviews, staff from both companies revealed that the decision to either discontinue the program or move away from the DOE/EPA HPwES program model was due to their company's unique needs and priorities; neither revealed any trends or common lessons learned that can be applied to this evaluation.

- **The calculated 116% NTG for Xcel Energy's HPwES Program is consistent with those of comparable programs, which had NTG values ranging from 80% to 113%.**

Recommendations

Process

Marketing and Communication

1. **Continue to communicate program opportunities through a variety of customer marketing channels, emphasizing money savings and energy cost reduction.**
 - a. **Continue to use bill inserts and mailings to communicate program opportunities to customers.** Nearly half of all participants and partial participants said they prefer receiving money-saving information through the mail. Nearly one-quarter of participants (18%) and one-quarter of partial participants (27%) reported hearing about the HPwES Program through information received in the mail.
 - b. **Continue to emphasize the money savings and energy cost reduction that results from customers' making improvements to their homes;** these were the most frequently cited

³ Home Performance with ENERGY STAR Sponsor Guide, Version 1.1. August 2011. Available online: http://www.energystar.gov/ia/home_improvement/HPwES_Sponsor_Guide.pdf.



reasons customers gave for having an audit. Maintaining messaging continuity for customers based on these priorities could help boost HPwES participation.

- c. **Consider finding ways to help customers understand the payback timelines and how to budget for improvements within the one-year program requirement.** Partial participants considered up-front costs as a barrier to participating, yet many plan to make more of the recommended improvements in the near future, and may not realize that the window of opportunity for participating ends one year after their audit. This detail could also be included in additional training for auditors and contractors as an enhanced educational component.
- d. **Due to recent program changes, consider adding information to both customer-facing and contractor-facing marketing materials that addresses the changes specifically.**
2. **Continue to support contractors by sending program information to all contractors and customers, and by maintaining a registered contractor list.**
 - a. **Review the program marketing materials and consider adding more customer-facing materials and advertising that contractors could reference when speaking with customers,** and that that would also give customers a greater program understanding without relying exclusively on contractors. Contractors market their high-efficiency equipment and said they could benefit from additional program promotion by Xcel Energy to their own customers.
 - b. **Continue to provide print advertisements, brochures, and web advertisements,** as these are key tools contractors' use to educate and market high-efficiency equipment.
 - c. **Consider reviewing the contractor-specific program information, specifically the benefits to participation.** While a lack of awareness does not seem to be a barrier for nonparticipant contractors, they may not have all the correct information on qualification requirements or the paperwork process. Nonparticipating contractors are generally interested to know more about the program and would benefit from receiving information by e-mail or phone. They may also benefit from a deeper understanding of how investing in a certification can increase their business opportunities.
 - d. **To increase the number of HVAC measures implemented through the program, consider offering an incentive for HVAC contractors.** This incentive could be based on the number of whole-home projects the contractor works on through the program, similar to the benchmarked programs.
 - e. **Consider expanding radio and television advertising.** Contractors would benefit from broader advertising from Xcel Energy, such as radio or television ads that increase awareness of the HPwES Program.
 - f. **Maintain the list of approved contractors on the program webpage.**
3. **Consider implementing marketing and outreach strategies that build consumer awareness and demand for homes that meet HPwES standards.** This could include marketing the program

more directly to consumers or implementing public education campaigns about the benefits of homes that meet program standards.

Program Design

1. **Consider exploring program design options that will help partial participants complete the program and increase savings.**
 - a. **Consider simplifying the structure of the requirements and the incentives.** Most of the benchmarked programs had a simplified structure compared to the Xcel Energy program. Investigate whether the HPwES Program can be simpler while still cost-effective.
 - b. **Consider continuing to provide an energy advisor for all participating customers, even those who are not part of a community program.** In 2012, Populus ran a successful pilot program for Xcel Energy, in which students from a local community college trained veterans to serve as energy advisors for customers that were not a part of a community program.
 - c. **Explore customer perceptions of the program and identify opportunities to streamline the program participation process.**
 - d. **Consider highlighting the financing opportunities for energy-efficiency projects on the program website.**
 - e. **Consider exploring ways to introduce a direct install component to the HPwES Program that would allow for claiming savings for the installation of free, low-cost, energy-saving measures.** One option would be to have contractors who are already implementing the program install additional free measures in customer homes (e.g., CFLs, faucet aerators, low-flow showerheads). The installation of these measures could then be verified during the test-out, and/or post-installation QC inspection. This would enable Xcel Energy to capture additional program savings while reducing contractors' confusion regarding the CFL requirements.
2. **If the DOE/EPA requires HPwES Program changes that would be difficult to accommodate in the Xcel Energy program design, consider evaluating the necessity and value of being aligned with the DOE/EPA Program, balanced with the value and credibility ENERGY STAR trademark awareness brings to the program.** Perhaps through focus groups or customer and industry stakeholder surveys, consider investigating the impact of a localized program model, similar to some of the benchmarked programs.⁴ Xcel Energy may also consider branding the program—similar to HomeFree Nevada's EnergyFit Nevada and to Austin Energy's Power Saver—to help customers connect Xcel Energy as the source and a starting place for home energy efficiency.

⁴ A Midwest utility and Efficiency Maine are not affiliated with the DOE/EPA Program.



Training

1. **Continue offering the current materials and training to new program contractors, and consider expanding the training opportunities to be more accessible and more applicable.**
 - a. **Consider options for offering training formats to accommodate contractors in the mountain and western slope regions**, such as by offering online webinar re-certification options.
 - b. **Consider subsidizing continuing certification requirement costs** or reducing contractor costs through online training or a test-out option.
 - c. **At the beginning of contractor trainings, consider surveying contractors who are new to the HPwES Program.** By capturing a better understanding of this baseline, future trainings could be customized to areas where contractors could use more support and information.
 - d. **Consider using the success of the door-to-door marketing as a training example** that demonstrates how program marketing can be used to acquire new business. Also, consider acknowledging contractors in the future for such acts of program support.
 - e. **Continue offering training topics that emphasize the importance of and successful approaches to conveying program information to customers.** Customers reported choosing which measures to install based on the auditor recommendations (participants 27%; partial participants 42%). Partial participants also reported not making recommended improvements because of cost and not having enough information from the auditor or contractor, including a list of measure priorities. These findings reveal the potential to inform and further motivate partial participants by communicating all the rebate information and recommendations more effectively.
 - i. **Continue to emphasize the importance of communication and that the high standards contractors meet to participate in HPwES sets them apart from competitors**, as satisfied customer referrals and word-of-mouth advertising remain the most effective marketing practice.

Impact

1. **Consider examining the high rate of partial participation.** During 2012, half of the customers that began program participation did not complete the program requirements. Xcel Energy may want to re-examine the program design and goals in an attempt to attract participants that will complete the program. This must be considered in light of the high rate of non-completion being consistent with program goals to exclude homes that are not optimal for generating the highest savings.
2. **Cadmus supports the use of 116% NTG for this program.** There is evidence of significant spillover from the HPwES Program: 30.0%. As this amount of spillover is not likely to stay constant, this NTG value may be different in future years.

Introduction

Research Method

Cadmus collected program data from May 5, 2013 through November 1, 2013 to inform the process and impact evaluations. The research approach we used to evaluate the program consisted of the following activities:

- Reviewed Xcel Energy’s program participant tracking database
- Conducted primary data collection via surveys and interviews with the following market actor groups:
 - Program staff (Xcel Energy and Populus)
 - Participant (n=91) and partial participant customers(n=71)
 - Participating (n=25) and nonparticipating (n=20) trade allies
- Benchmarked similar HPwES programs (n=10)
- Researched discontinued programs to document reasons for termination (n=2)

Report Overview

This report is organized into the following sections:

- The **Program Description section** presents the program description, history, and design, as well as the results of program staff interviews
- The **Participant and Partial Participant Customer Surveys section** presents results from the participant and partial participant customer surveys
- The **Trade Ally Survey Findings section** presents results from the trade ally surveys
- The **Net-To-Gross Ratio section** describes our NTG ratio analysis and findings
- The **Peer Utility Benchmarking section** provides overall benchmarking for the program
- The **Appendices** include all data collection instruments, detailed survey results, a benchmarking bibliography, and market transformation details



Program Description

Through its Colorado HPwES Program, which began in 2009, Xcel Energy provides rebates for customers that implement multiple energy-efficiency measures within one year. Xcel Energy is a Program Sponsor participating in the DOE/EPA HPwES Program, and therefore designed its program to adhere to the DOE/EPA Program requirements.

Method

To evaluate the Colorado HPwES Program, Cadmus interviewed the following program-associated staff (current and former program managers and other Xcel Energy staff in associated departments, including engineering and rebate processing, as well as staff from the program implementer, Populus):

- Program Staff
 - Current program manager: Christmas Ramirez
- Other Xcel Energy Staff
 - Former program manager: Jackie Ducharme
 - Energy-efficiency engineer: Mike Papula
 - Rebate operations staff member: Jamie Stethem
- Populus Staff
 - Program manager: Dave Penzkover
 - Chief executive officer: Laura Hutchings

These stakeholders described the internal workings of the program, clearly described all the processes involved, and identified any areas that might inform data collection efforts for other evaluation tasks.

Program Measures and Eligibility

Xcel Energy designed the HPwES Program to encourage customers to take a whole-house approach to energy efficiency by offering higher rebates than what is available for individual measures in their associated stand-alone programs. Through its HPwES Program, Xcel Energy provides rebates for customers who implement multiple energy-efficiency measures within one year. Customers also benefit from the program-required test-out and post-installation QC inspection, which ensure high quality work.

To be eligible, customers must:

- Receive both natural gas and electric service from Xcel Energy, or be an all-electric customer with electric heat,
- Have an energy audit through the Home Energy Audit (HEA) Program,
- Submit a postcard to Xcel Energy indicating their interest in the HPwES Program,
- Install a minimum of three of the measures recommended during the audit, and
- Have the contractor perform a test-out after the work is complete.

If the auditor identifies that the customer needs attic insulation, CFLs, or air sealing, then the customer must include that measure or measures in the three measures that make them eligible for HPwES rebates. Customers can then choose from a list of optional eligible measures. Customers have one year to complete all three measure installs after Xcel Energy receives their postcard. Because HPwES Program participation must begin with a HEA Program audit, the HPwES and HEA programs are closely aligned.

The eligible program measures and their rebates amounts are listed in Table 1.

Table 1. 2012 HPwES Rebates

Measure	2012 HPwES Rebate
Attic Insulation and Bypass Sealing	\$350
Air Sealing and Weather Stripping	\$160
CFLs	\$40
Wall Insulation (above grade)	\$800
Evaporative Cooling – First Time Standard System Install	\$275
Evaporative Cooling – Replacement of Standard System	\$125
Evaporative Cooling – First Time Premium System Install	\$625
Evaporative Cooling – Replacement of Premium System	\$525
Evaporative Cooling – Whole-House System	\$1,000
Central Air Conditioning – 14.5 SEER, EER 12	\$300
Central Air Conditioning – 15 SEER, EER 12.5	\$400
Central Air Conditioning – 16 SEER, EER 13	\$550
Central Air Conditioning – Trade-In	\$550
Ground Source Heat Pump	\$300 per ton, up to \$1,500
Electric Heat Pump Water Heater	\$550
Setback Thermostat	\$25
92% AFUE High-Efficiency Furnace	\$170
94% AFUE High-Efficiency Furnace	\$200
85% AFUE High-Efficiency Boiler	\$160
Electrically Efficient Furnace (for qualifying furnaces, this rebate is additional to the rebate for an optional high-efficiency furnace)	\$200
0.82 EF Tankless Water Heater	\$200
0.65 EF Power-Vented Water Heater	\$100
ENERGY STAR Refrigerator – Primary	\$15
ENERGY STAR Dishwasher	\$15
ENERGY STAR Clothes Washer	\$70

DOE/EPA Home Performance with ENERGY STAR Program

The DOE/EPA HPwES Program is administered by the DOE in collaboration with the EPA, and was designed to support regional HPwES programs. DOE and EPA partner with sponsoring organizations, like Xcel Energy, to deliver the program locally.



As a Program Sponsor, Xcel Energy can align their program with the ENERGY STAR brand by using the HPwES name, and by using the ENERGY STAR Partner and DOE/EPA HPwES logos in program materials. In addition, the program is listed on EPA's website⁵ and can receive recognition in the national newsletter. The DOE and EPA also offer a variety of free tools to Program Sponsors that support their program development and design, contractor recruitment, and marketing and training efforts.

To participate in the DOE/EPA Program, Program Sponsors must sign a *Program Sponsor Partnership Agreement for Home Performance with ENERGY STAR*, which commits them to meeting all the Program Sponsor partnership requirements, including:

- Develop and submit a HPwES Program plan using the official *Program Plan Guidance* document provided by the DOE/EPA.
- Administer a QA/QC program component that includes on-site inspections of at least 5% of the work performed by each participating contractor (one of every 20 jobs).
- Require customers to have a home performance assessment or test-in audit to be eligible to participate.
- Review the home performance assessment findings with customers or give them a summary audit report that includes the recommended measures, a cost estimate for each recommended improvement, and an estimate of the energy savings that can be realized if the measures are implemented.
- Perform a post-installation test-out and document the improvements and diagnostic testing showing the performance of installed measures and that health and safety standards were met.

Xcel Energy noted that being able to use the ENERGY STAR brand improved customer recognition and understanding of the program.

Program History

Xcel Energy started the HPwES Program in 2009 in Colorado, using Lightly Treading as the program implementer for both the HPwES and HEA programs. Lightly Treading ran both programs under a closed model, with in-house (or subcontracted) auditors and contractors performing all of the services (audits for HEA and measure installations for HPwES).

At the beginning of 2012, Xcel Energy took over implementation for both programs and managed them internally until the fall of 2012, when they hired Populus to implement both programs.

Interviewees reported that based on input from contractors and industry interveners, Xcel Energy changed the HEA and HPwES programs from closed to open models, enabling any qualified auditor or contractor to provide program services if they meet the contractor agreement requirements. Because many contractors are qualified to perform audits as well as make recommended home improvements,

⁵ http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showfindaprogram

this change resulted in the programs becoming contractor driven. With this open model, the contractor guides the customer experience, instead of the customer having to drive the process as with the closed model approach. Staff reported that this change resulted in a higher customer conversion rate from HEA to HPwES.

Program Goals and Objectives

The primary objective of the HPwES Program is to increase the energy efficiency of residential homes by encouraging homeowners to take a whole-house approach to energy-efficiency improvements. The program surpassed its goals, achieving 131% of the electric savings goal, 180% of the natural gas savings goal, and 263% of the participation goal. However, it did not meet its electric demand savings goal, achieving only 39%.

Xcel Energy staff indicated that they had based the program electric demand savings goal on forecasted savings from cooling system installations. However, because this was the first year cooling measures were included in the program; they did not have actual historical data for calculating the forecast. They also reported that the majority of the program’s electric savings is from CFLs.

Table 2 lists the 2012 HPwES Program goals and achievements.

Table 2. 2012 HPwES Program Goals and Achievements

	Electric Savings (Net Generator kWh)	Electric Demand (Net Gen kW)	Gas Savings (dth)	Participants
2012 Goal	307,243	295	7,770	200
2012 Achieved	401,427	115	13,986	526
Percent of Goal	131%	39%	180%	263%

One interviewee said that because Xcel Energy redesigned the program model, the program now has the resources needed to be successful. Another interviewee expects the program to reach its goals in 2013.

Program Management

The program is managed by Xcel Energy Colorado staff and is implemented by Populus.

Xcel Energy Program Management

Xcel Energy is responsible for the overall success of the program, which includes meeting regulatory requirements, fulfilling rebates, marketing, and ultimately ensuring customer satisfaction.



The Xcel Energy staff roles are outlined below.

- The program manager is responsible for the program from beginning to end. They oversee the budget, marketing, regulatory filings, forecasting, and coordinating with other departments to deliver the program. In addition, they manage the third-party implementer and the relationship with the DOE/EPA Program. The program manager also runs several other programs, including the HEA Program that is a pre-requisite to the HPwES Program.
- The residential channel manager works with the contractors in the stand-alone programs, many of whom are also HPwES participating contractors. For this reason, the residential channel manager occasionally works with Populus and Xcel Energy HPwES staff.
- The Corporate Communications group works with the program manager to develop the marketing message and strategy, manage the production of all marketing materials, and implement the marketing strategy.
- The engineering staff develop program calculators, provide equipment savings calculations, give technical support for filings, and respond to technical inquiries.
- The Rebate Operations group tracks participant information and processes rebate applications.
- The DSM Regulatory group manages the program filings and modifications.

Program Implementer

Populus works with Xcel Energy to implement the HPwES and HEA programs, in addition to programs for other utilities. Populus implements community programs for the cities and counties around Denver and Boulder. These community programs give customers access to an energy advisor who provides resources and guidance for increasing home energy efficiency. If a community program customer is eligible for the HPwES Program, the energy advisor can support them through the program process.

Populus is responsible for the day-to-day operations of the HPwES Program, including delivering the program to customers, training and supporting contractors, performing post-installation QC inspections, and submitting the customer rebate applications. In addition, Populus works with the Xcel Energy program manager on budgets and forecasting.

Populus has staff in four roles that work extensively with the program: a project manager, technicians who perform post-installation QC inspections, community program energy advisors, and call center employees. Populus has scheduled weekly calls with the Xcel Energy program manager, in addition to communicating daily, if needed.

Populus uses the same software program as Xcel Energy, Salesforce,⁶ to track a variety of program data such as participants, measures, and savings, then uses that data to ensure that the program is meeting its participation and savings goals. Populus started monitoring program participation-to-savings goals, which allows them to determine whether they are getting the necessary savings per participant, and to

⁶ Xcel Energy transitioned to Salesforce, a customer relationship management system, in the spring of 2012.

adjust the program strategies as needed. Populus also manages the HEA and HPwES call center, a number that is provided on both programs' marketing materials.

Interviewees from both Xcel Energy and Populus noted that they work closely together and have a collaborative relationship. Xcel Energy said they are very happy with the program implementation and appreciate Populus' ability to support the HPwES Program in achieving its goals.

Program Implementation

While Populus and the Xcel Energy program manager are responsible for both the HPwES and HEA programs, one interviewee noted that the two are really implemented as a single program, due to the extensive overlap between the programs' stakeholders and activities. However, Xcel Energy files the programs separately in its overall demand-side management program portfolio, and the programs have separate budgets and goals.

Populus is responsible for supporting the program contractors. Populus trains the contractors and meets with new contractors one-on-one to review the program requirements and details. Populus provides a contractor support line, which allows the Populus program manager to be available to answer contractors' questions, and to meet with them whenever necessary.

In addition, Populus invites contractors to attend the post-installation QC inspections of their projects. Populus noted that they use the post-installation QC inspections as an opportunity to work with the contractors and provide one-on-one feedback to improve the overall program delivery. In addition, two of their goals are for contractors to be comfortable delivering the program and to consistently provide quality work for the customers.

Xcel Energy is closely involved with program implementation. As noted earlier, staff from Xcel Energy and Populus speak at least weekly and often more frequently to discuss the program delivery. In addition, Xcel Energy helps implement contractor training and works with contractors and community groups to increase program awareness and receive direct program feedback.

Program Delivery

Customers participate in the HPwES Program through one of three channels.

1. Most customers are directed to Populus through a community program, where an energy advisor introduces them to the HEA and HPwES programs.
2. Some customers hear about the program from a contractor they already work with.
3. Some customers contact the program call center listed on the marketing materials.

Introduced Through Community Programs

The community program customers who call Populus and either ask about a community program they are currently in or about the HPwES Program are connected to an energy advisor. The energy advisor determines which programs the customer is eligible for, then tells those customers who are eligible



about the HPwES Program and e-mails them program information and a link to lists of participating auditors and contractors. In addition, the energy auditor has customers that are eligible sign the HPwES postcard and send it to Xcel Energy. These customers continue to work with the energy advisor throughout the program delivery process, and the energy advisor contacts the customers periodically to check on their progress. The energy advisor can help the customer by scheduling contractors, answering questions, reviewing contractor bids, and managing the customer rebate applications.

Introduced by a Contractor

Contractors sometimes encourage their customers to use the community program services by contacting Populus. Community program customers are assigned an energy advisor and follow the same path outlined above, except they are not sent the link to the lists of auditors and contractors unless requested (out of consideration for the contractor already working with the customer). The energy advisor also verifies that the contractor is participating in HPwES; otherwise they inform the customer that work performed by this contractor is not eligible for program rebates. The energy advisor then notifies the Populus program manager, who follows up with the contractor to sign them up for the program if they are eligible and interested.

Introduced Through Marketing Materials

Customers who call the phone number on the program materials are routed to the Populus call center. Call center staff explain the HEA and HPwES programs and e-mail the customer program details and information about auditors and contractors. In addition, the call center staff encourage customers to sign and submit the HPwES postcard, and instruct customers to follow up with the Populus program manager for further assistance. These customers are not assigned an energy advisor, but are assisted by the program manager as needed. This process is more customer-driven, and the implementer noted that the completion rate for customers without an energy advisor is lower.

Next Program Steps

The next step for customers from any of the three participation channels is to hire either an HEA auditor or qualified HPwES Program contractor to perform the energy audit. To help avoid a conflict of interest, HPwES contractors who perform audits are required to have the customer sign a disclosure form explaining that they have been informed that any participating contractor can perform the work, and that they do not necessarily have to hire the contractor who performed the audit. In addition, the audit reports include a link to the contractor list on the program website.

Customers are responsible for obtaining bids, hiring a participating contractor, and having the work completed. After the work is completed, the contractor is responsible for conducting the test-out, in which they ensure that all of the work was completed and conduct blower door and combustion appliance zone tests. Once the test-out is complete, the contractor or energy advisor submits the customer's rebate paperwork to Xcel Energy. If the customer had been working with an energy advisor, the paperwork can be handled electronically using information in Populus' computer system. If the customer had not been working with an energy advisor, the customer or their contractor fills out and

submits a paper rebate application. Populus noted that they are developing a doc-u-sign system to automate the rebate application process.

Several interviewees said Xcel Energy plans to revise the rebate application to be less confusing and provide more explanation.

Contractors

To participate in the HPwES Program, contractors must be either BPI or NATE certified. Once a contractor signs up for the program and submits their paperwork, the Populus program manager provides one-on-one training on the program requirements and paperwork. If the contractor will be performing audits, Populus also trains them on the audit software. Contractors who will be installing air conditioners also need to attend Xcel Energy's *AC Quality Install* training.

After a contractor has completed the training and signed the *Home Performance with ENERGY STAR Program Agreement*, they may use the ENERGY STAR Partner logo and Populus provides them with program marketing materials. Contractors are eligible to receive a \$100 incentive from Xcel Energy for performing air sealing, which offsets the cost for a blower door certification.

The interviewees noted that the contractors have difficulty keeping up with all the program changes. Two interviewees indicated that some contractors try to only do the minimum or do not follow the program procedures. However, they also reported that many of the contractors participate in HPwES because it supports them in doing what they love and allows them to apply a whole-house, building science approach to projects.

According to the interviewees, the contractors are sometimes confused and make errors related to the CFL installation requirements. The program requires that customers have at least 20 CFLs installed in their home (including existing bulbs and newly installed bulbs). If the customer already has one or more CFLs installed, the contractor should install the quantity needed to total 20. However, post-installation QC inspections revealed that some contractors are *providing* 20 CFLs but only *installing* a few, or are claiming that they installed the bulbs listed on the rebate application but had not even delivered them. The interviewees attributed part of this confusion to the unclear way the requirement is written on the rebate form. Some also expressed concern that some contractors may conveniently overlook the CFL requirement. Several interviewees reported that Xcel Energy revised the rebate applications in 2013 to be clearer and provide greater detail about the CFL requirement.

The interviewees also noted that there are few HVAC contractors participating in the program, which impacts the program's potential for reaching its electric demand savings goal. According to the interviewees, HVAC contractors choose not to participate because they find the HPwES Program confusing and think it is easier to work with the stand-alone program. Another barrier for the HVAC contractors is that they would likely need to work with additional contractors to complete the HPwES requirements, which further complicates the process for both contractors and customers. To address

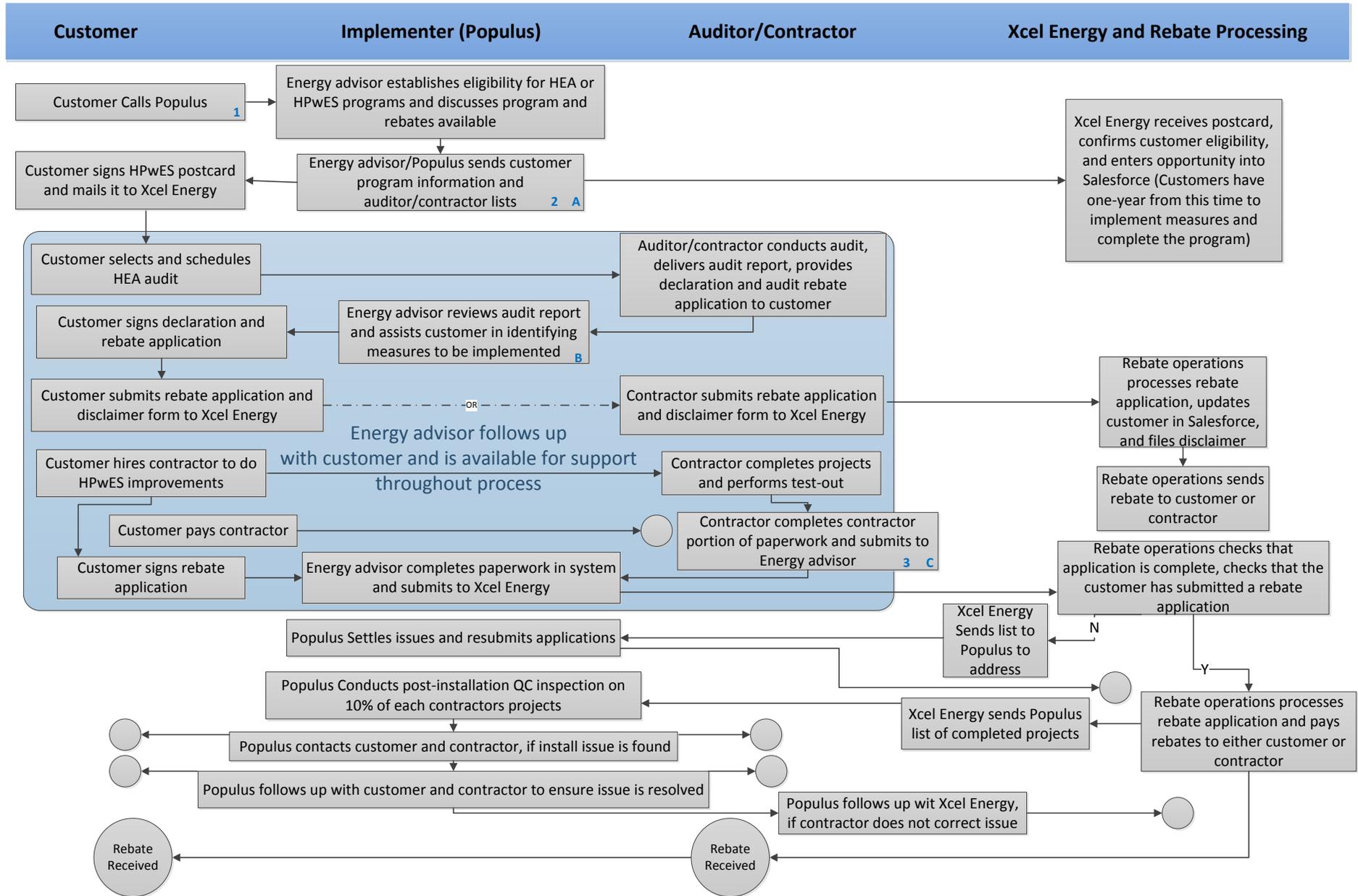


this challenge, interviewees suggested that Xcel Energy offer an incentive for contractors with different specialties to partner on projects.

Process Flows and Logic Model

Figure 1 illustrates the HPwES Program processes (i.e., program delivery) and the contractor registration and training process. The program logic model is shown in Figure 2.

Figure 1. Colorado HPwES Program Process Flow*





*Alternative Processes

A small percentage of customers experience diverges from the process illustrated in the flow diagram. These customers either do not live in an area covered by a community program, or are introduced to the program through a contractor. The letters and numbers on the process flow diagram indicate where these customers' experiences may differ in the ways described below.

Customers introduced by a contractor:

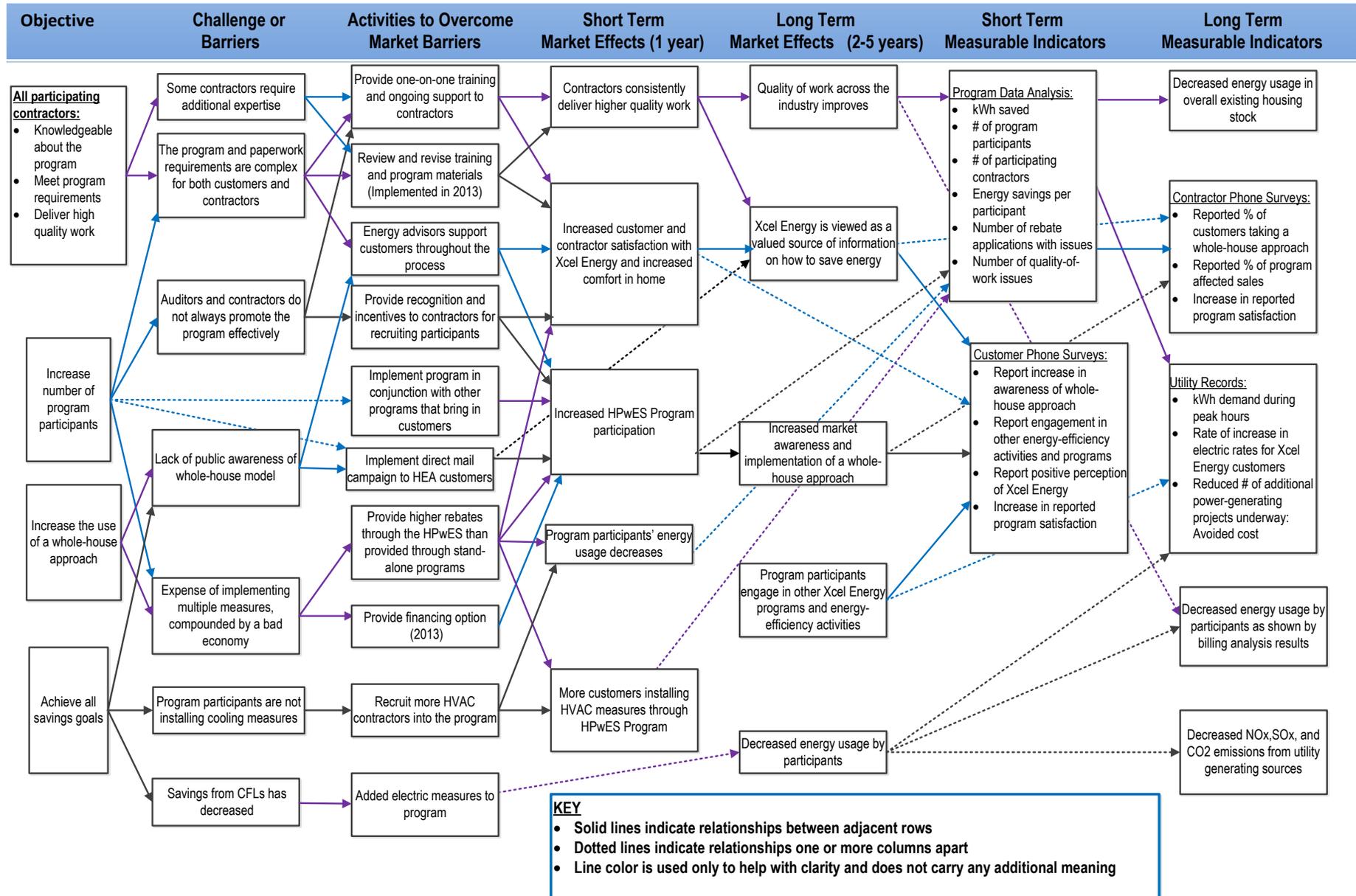
1. A contractor may introduce a customer to the program (#1) and manage their experience through the submission of their HPwES rebate application (#3)
2. If a customer is already working with a contractor, the energy advisor does not send them the link to the contractor list.
3. The contractor or customer submits the HPwES rebate application to Xcel Energy.

Customers not in a community program:

- A. Xcel Energy or Populus instructs customer to follow up with the Populus program manager if they need assistance.
- B. Customer does not work with an energy advisor.
- C. The customer or their contractor submits the HPwES rebate application to Xcel Energy.



Figure 2. Colorado HPwES Program Logic Model



Quality Control

The DOE/EPA HPwES Program requires that 5% of every contractor's jobs receive a QA/QC on-site inspection. In the Colorado HPwES Program, contractors perform a test-out on each of their jobs, and Populus conducts a post-installation QC inspection of every contractor's first HPwES job and then on 10% of their successive jobs. If Populus identifies a problem, they contact the homeowner and the contractor, and then follow up to ensure the problem is corrected. Populus said they developed a standardized QC checklist for the contractors, so they will know exactly what is covered in the post-installation QC inspection.

Program Promotion and Marketing

While Xcel Energy is responsible for the program marketing, both Populus and Xcel Energy promote the program.

Success of Direct Mailers

The majority of HPwES Program marketing is accomplished in conjunction with HEA Program marketing. However, Xcel Energy did send direct mailers to customers who completed the HEA Program, encouraging them to participate in HPwES. These direct mailers were very successful: according to the interviewees, they produced a 17% response rate, and 35% of those who responded completed their participation. In addition, there is a boost in HEA program participation after Xcel Energy sends bill inserts or direct mailers about the program. This directly increases the pool of potential HPwES Program participants.

The interviewees said that the least effective marketing channels in the past have been events and e-mail campaigns.

Energy Advisors

All of the Populus energy advisors are trained about the program and promote it to the customers they work with through the community programs. Xcel Energy sponsors some of these community programs, and the overlap in marketing and promotion has been very effective in increasing customer participation in the HPwES Program. Populus indicated that 70% of HPwES Program customers had learned about it after being directed to Populus through a community program.

In 2012, Xcel Energy began offering a scholarship to an annual conference for contractors who promote the program. At a program reception for this conference, Xcel Energy publically recognizes the most successful contractors. Regardless of this incentive, not very many contractors promoted the program in 2012, and those that did usually only told customers about the audit process for the HEA Program.



Market Barriers

The interviewees identified two market barriers for the program:

1. The cost of implementing three measures, and
2. The complexity of the program, which makes the program difficult for customers and contractors to understand.

Xcel Energy is working to address the cost barrier by partnering with financial institutions that will make loans available to Xcel Energy customers for implementing energy-efficiency measures. Populus noted that the average cost of HPwES projects with financing support is \$11,000, compared to \$3,500 for those without financing support.

To help address the program complexity barrier, Populus is developing a contractor manual and a quick reference guide, which was scheduled to be presented in training during the summer of 2013.

Program Interveners

Two groups are active interveners in the HPwES Program: 1) the Southwestern Energy Efficiency Program and 2) the Energy Efficiency Business Coalition (EEBC). These groups both influenced the program design, and both have been vocal during the program filings. In addition, the EEBC worked with Populus to offer program trainings to contractors.

Data Tracking and Reporting

Application Processing and Home Performance with ENERGY STAR Postcards

Xcel Energy's Rebate Operations group processes all the HPwES Program participation applications. Staff members manually review each application to verify that the project meets the program requirements and that the customer had the required energy audit, then they enter the data into Salesforce. The Rebate Operations group sends Populus a list of the rebate applications that do not meet the requirements, so that Populus can resolve the issues.

The Rebate Operations group also receives the HPwES postcards, confirms that the project is eligible for the program, and enters the data into Salesforce.

Salesforce

The interviewees indicated that Salesforce, the new automated system, has made data processing faster and includes a QI component requiring that the entered data be verified before continuing. Internally, Xcel Energy uses the data in Salesforce for program management and forecasting.

Rebate Processing and Delayed Payments

The interviewees reported that rebate processing for the HPwES Program was behind during 2012. They attributed this to several reasons: HPwES Program changes, the introduction of Salesforce, and the

complexity of the program. Xcel Energy added several new staff to the Rebate Operations group to help process the program rebates more quickly.

However, interviewees reported other issues that are still causing delayed rebate payments. The majority of the delayed rebates are reportedly due to the rebate applications missing required information, which is easily resolved. However, an estimated 20% of the delayed HPwES Program rebates are due to Salesforce not showing the customer as having been paid a HEA Program rebate for their energy audit, which is how the system indicates that the customer had an energy audit.

These delays are problematic for the program in several ways:

- Delayed rebate payments are frustrating for customers.
- Salesforce is not recording all customers' participation and subsequent savings.
- The project is not being reported to Populus as ready for a post-installation QC inspection.

External Reporting

In addition to the internal reporting requirements for Xcel Energy programs, the HPwES staff submit quarterly reports and an annual report to the DOE/EPA.

Program Changes

Xcel Energy made the following changes to the HPwES Program structure in 2012:

- Reduced the number of required program measures from five to three.
- Revised the QA/QC inspection requirement from 100% of jobs having a third party post-installation QC inspection, to requiring that the contractor perform the test-out and the implementer conduct a post-installation QC inspection of 10% of each contractor's projects.
- Required that contractors be BPI or NATE certified (depending on the measures they implement), which resulted in a shorter list of qualified contractors.
- Added cooling measures to the program.
- Allowed customers who had already installed the three required measures (attic insulation, air sealing and weather stripping, and CFLs) to participate in the program.
- Ceased requiring that customer homes achieve a 0.15 NACH improvement in air leakage to be eligible for a program rebate. Instead, customers can select an alternative measure.



Interviewee Suggestions for Further Investigation

The interviewees had the following ideas for making the program administration more efficient and increasing the program's success:

- Investigate strategies for recruiting more HVAC contractors from the stand-alone program to the HPwES Program. Customers who are having an HVAC system installed may be interested in a whole-house approach to energy efficiency.
- Explore ways to promote the installation of energy-efficient cooling measures to increase the program's electric demand savings.
- Consider providing Populus with additional data that would allow them to more closely monitor the rebates and customer completion rates.
- Consider developing a process to ensure that customers who are pursuing a HPwES rebate are not accidentally paid a rebate for the stand-alone program.
- Investigate methods for identifying HPwES Program customers who have not had their HEA audit rebate application processed to avoid a later delay in the payment of their HPwES rebate.

Recommendations

Cadmus has the following suggestions for Xcel Energy:

- Consider providing customers who are not part of a community program with an energy advisor. In 2012, Populus ran a successful pilot program for Xcel Energy, in which students from a local community college trained veterans to serve as energy advisors for customers that were not a part of a community program.
- Explore customer perceptions of the program and identify opportunities to streamline the program participation process.

Participant and Partial Participant Customer Surveys

Cadmus surveyed 91 participating customers and 71 partially participating customers in the Xcel Energy HPwES Program in Colorado. These surveys took place from September through November 2013.

Program participants are Xcel Energy customer who applied for a HPwES rebate in 2012 for installing measures identified on the qualifying measure list. Program partial participants are Xcel Energy customers who were found to be eligible for the HPwES Program through a qualifying audit, and expressed interest in the program between April 2011 and July 2012, but did not complete the program and receive a HPwES Program rebate.

With input from Xcel Energy, Cadmus designed a survey protocol to address the following research objectives:

- Is there a clear marketing plan targeted at appropriate customer segments?
- Do marketing materials align with program goals and barriers?
- Is program information reaching the intended target market?
- Is the program implemented as designed? What is working and what is not working?
- Is demand for program services consistent with program plans?
- Are customers satisfied with their participation experience?
- What is the level of program freeridership?
- How much spillover can be attributed to the program?
- How engaged are customers and contractors with energy efficiency?

Through the customer surveys, Cadmus explored the following topics:

- Program Awareness
- Decision Making
- Satisfaction
- Freeridership and Spillover
- Program Influence on Behavior and Additional Energy-Saving Actions
- Participation Barriers
- Residential Customer Profile

Key Findings

Program Awareness

- **The largest majority of participating customers (38%) learned about the HPwES Program from a door-to-door representative**, while 27% of partial participants learned about the program through the mail or a bill insert. Verbatim responses from customers suggested that the door-



to-door advertising was from a registered program contractor, demonstrating how engaged some registered contractors are with the program.

Decision Making

- **Participants and partial participants decided to have an audit completed in order to save money and reduce energy costs (32% and 52%, respectively).** Other reasons frequently mentioned by both participant types included to improve comfort issues in their home (28% and 18%, respectively) and to save energy (22% and 19%, respectively).
- **Participant and partial participants reported choosing the measures they installed based on those that were most highly recommended by the auditor (27% and 42%, respectively),** followed by those that would save the most energy or money (23% and 28%, respectively).

Program Satisfaction

- **The majority of participating customers were satisfied with the HPwES Program overall (98%), as well as with the information they received from their auditor (97%) and with their contractor (90%),** giving a rating between 6 and 10 on a 0 to 10 point scale. In addition, 96% of participating customers indicated they are likely to or already have recommended the HPwES Program to a friend.
- **The majority of partial participating customers indicated being satisfied with the information received from the auditor (94%) and with their contractor (94%).**

Barriers to Participation

- **Over three-quarters (79%) of partial participants reported having performed some (79%) or all (21%) of the recommendations from their auditor.** Of those who only completed some of the recommendations or did not complete any of the recommendations, 49% still plan to do so in the future.
- **Fourteen of 67 partial participants (21%) reported not completing any of the recommended measures,** citing reasons such as cost and not receiving enough information.
- **Larger homes could present a participation barrier for some partial participants,** as partial participants reported living in larger homes in general than participants. More participants reported living in homes that are 1,500 square feet or smaller (39%) than partial participants (16%), and more partial participants reported living in homes that are 4,000 square feet or larger (13% compared to 0% of participants). Presumably, improvements to larger homes have higher up-front costs.

Program Awareness

Over one-third of participants (38%) learned about the HPwES Program from a door-to-door representative, while 27% of partial participants learned about the program through the mail or a bill insert. However, nearly half of each respondent group prefers to receive money-saving information

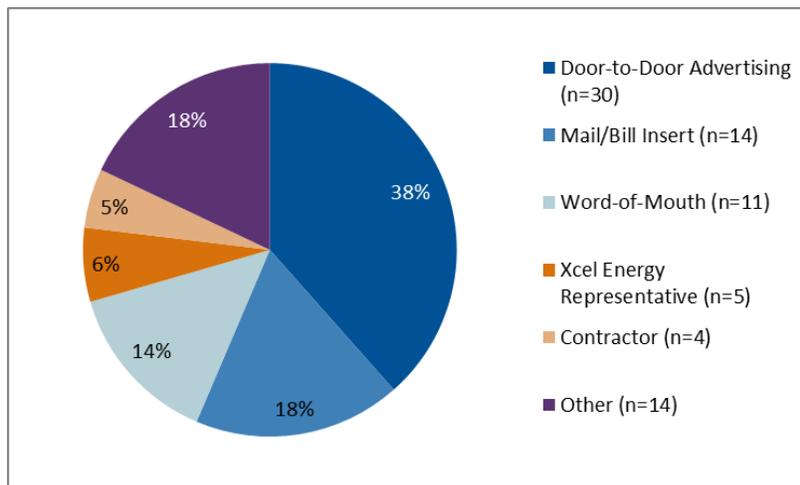
through e-mail. This reveals a possible opportunity for Xcel Energy to increase program awareness and marketing efforts through electronic media channels.

Participating Customers

Over one-third (38%) of participating customers first heard about the program through door-to-door advertising, and 18% learned of the program through the mail, including bill inserts. Other respondents learned of the program through word-of-mouth (14%), an Xcel Energy representative (6%), or their contractor (5%; Figure 3). The Other responses listed in the figure include Xcel Energy’s website, advertisement, and another website or web search.

The customers’ verbatim responses revealed that program contractors were conducting door-to-door advertising as a way to increase their business. This example of independent marketing demonstrates how engaged some registered contractors are with the program, and also reveals that contractors recognize the ways the program benefits their business.

Figure 3. How Participants First Heard of the HPwES Program



Source: Participant survey question B1; n=78.

Note: Sum may not equal 100% due to rounding.

Most respondents prefer to receive additional information about ways to save money on their bill through e-mail (46%) or a bill insert (39%), while very few prefer a newsletter (5%) or a phone call (5%).

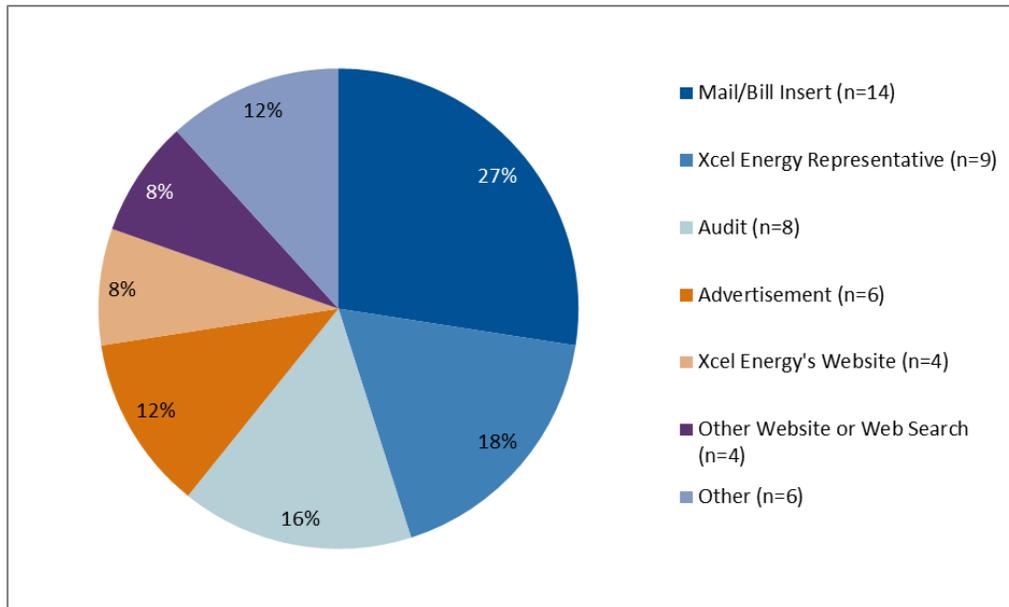
Despite the low number of participants who reported learning of the program through Xcel Energy’s website, or who prefer websites as the primary delivery mechanism of additional energy-savings information, 57% of participants reported having visited Xcel Energy’s website for program information. This is a further indication that customers are looking to electronic media channels as a source for program and energy-savings information, and could be considered one location to expand marketing and customer education efforts.



Partial Participating Customers

Similar to 18% of participants, 27% of partial participants learned about the program through the mail or a bill insert. However, while 38% of participating customers learned of the program through door-to-door advertising, only 2% of partial participating customers reported this source. Three times as many partial participants as participants first heard of the program through an Xcel Energy representative (18% vs. 6%, respectively; Figure 4).

Figure 4. How Partial Participants First Learned of the HPwES Program



Source: Partial participant survey question B1; n=51.

Note: Sum may not equal 100% due to rounding.

Similar to 46% of participants, 55% of partial participants prefer to receive additional money-saving information through e-mail, while 34% prefer regular mail. Few prefer receiving the information through a newsletter or print ad (3%) or a phone call (1%).

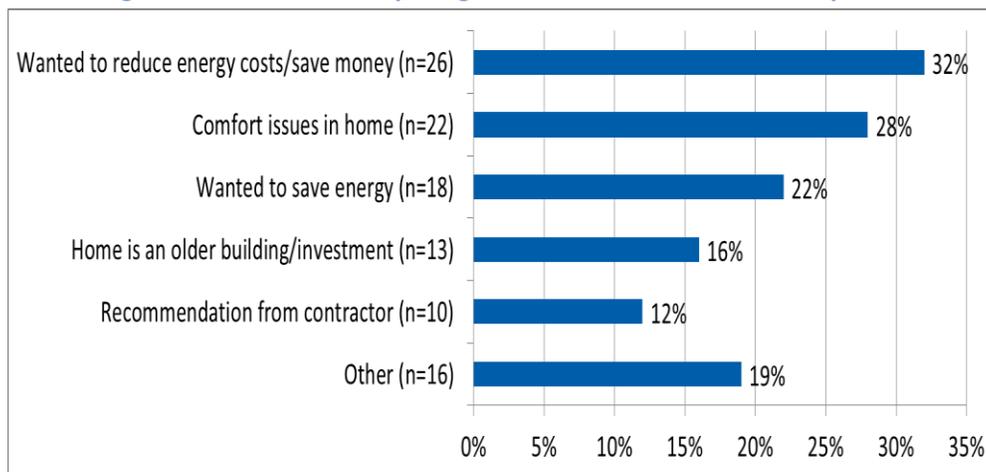
Decision Making

When Cadmus asked about the main reason they had an audit completed, both participants and partial participants cited saving money, reducing energy cost, improving comfort issues in the home, and savings energy as their top reasons. All of the program participants and 99% of the partial participants received a report from their auditor recommending which energy-efficient home improvements to make, and the majority of both participation groups said their auditor recommended they participate in the HPwES Program. Further, 27% of participants and 42% of partial participants cited the auditor recommendations as a factor in their decision of which improvements to make. This reveals that auditors are consistently providing customers with audit results and program information, and also that customers consider auditors as a key resource for their improvement decisions.

Participating Customers' Audit Motivations

Nearly one-third (32%) of participating customers reported that saving money and reducing energy costs prompted their decision to have an audit completed. Comfort issues in the home (28%) and saving energy (22%) were also frequently reported. Other responses included that the home was an older building or investment property (16%) and following a contractor recommendation (12%; Figure 5). The Other responses listed in the figure include: to learn how the home uses energy, environmental concerns, recommendation from friend or neighbor, bought a new home, and because of the information or technical assistance from the contractor.

Figure 5. Reasons Participating Customers had an Audit Completed



Source: Participant survey question C1; n=80.

Note: Sum exceeds 100%, as multiple responses were accepted.

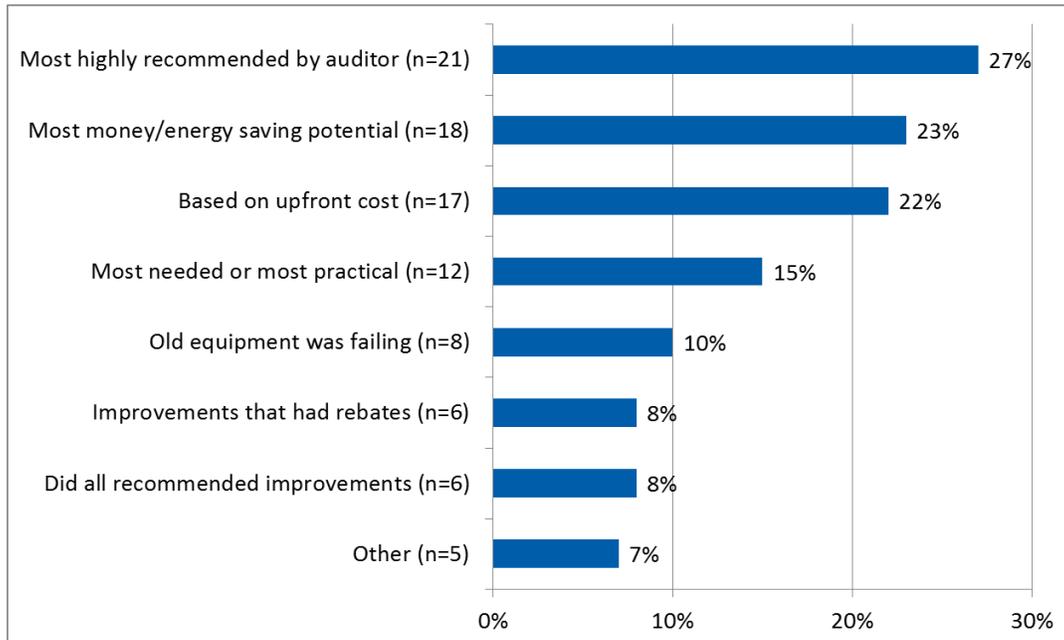
Participating Customers' Improvement Motivations

Every participating customer received a report from their auditor recommending which energy-efficient home improvements to make, and 95% considered the audit results as an important influence in their decision to make home improvements. Almost all program participants (95%) said their auditor recommended they participate in the HPwES Program.

Over one-quarter of participants (27%) chose which improvements to make based on what was most highly recommended by the auditor. Nearly one-quarter (23%) chose improvements that would save the most energy or money, and 22% prioritized their decision based on the upfront cost. Other respondents chose improvements based on which equipment they needed or was most practical (15%), or based on old equipment failing (10%; Figure 6).



Figure 6. How Participants Chose Which Improvements to Make



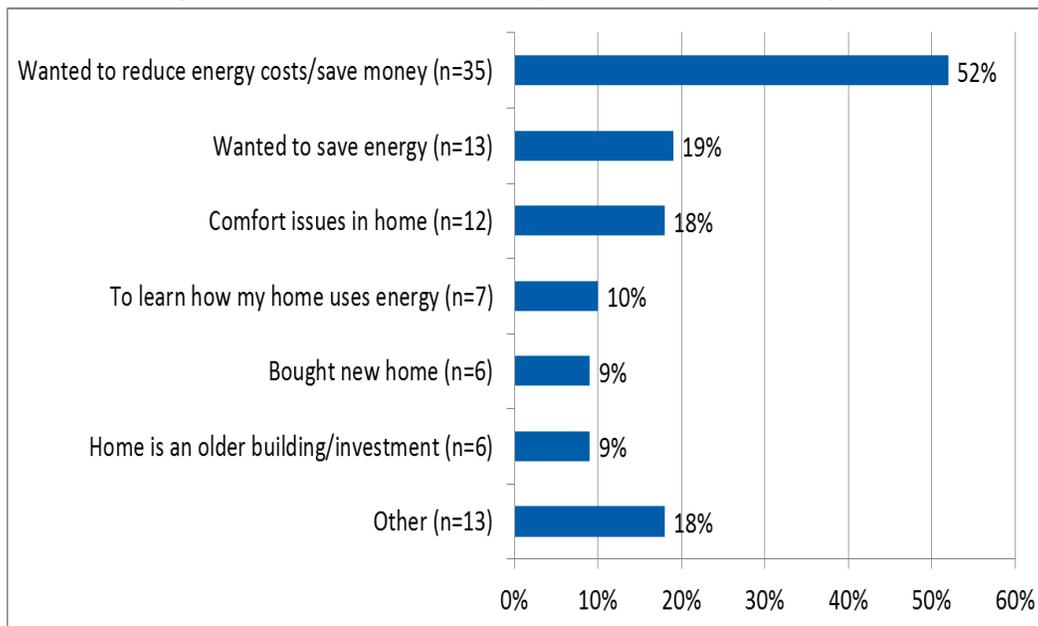
Source: Participant survey question C8; n=79.

Note: Sum exceeds 100%, as multiple responses were accepted.

Partial Participating Customers' Audit Motivations

Similar to participants, partial participants chose to have an audit in order to save money and reduce energy costs (52%), to save energy (19%), or to deal with comfort issues in their home (18%). A minority (10%) had an audit to learn how their home uses energy, while 9% had an audit because they just bought the house, and another 9% had an audit because the home is an older building or investment property (Figure 7).

Figure 7. Reasons Partial Participants had an Audit Completed



Source: Partial participant survey question C1; n=71.

Note: Sum exceeds 100%, as multiple responses were accepted.

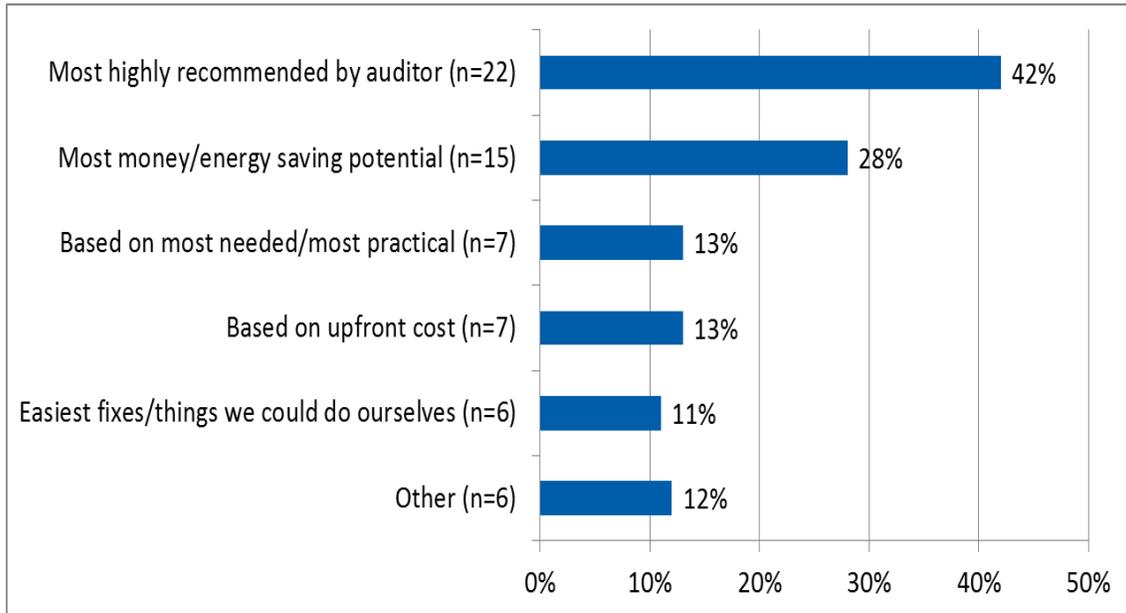
Partial Participating Customers' Improvement Motivations

Nearly all partial participants (99%) received a report from their auditor recommending a set of energy-efficient home improvements. The majority (93%) reported that the auditor discussed rebates or other incentives they could receive for installing recommended equipment or performing other home improvements, and 85% said their auditor recommended they participate in the HPwES Program.

Nearly half of the partial participants (42%) chose which improvements to make based on those most highly recommended by the auditor, while 28% chose improvements that would save the most energy or money, and 13% prioritized based on upfront cost. Other respondents chose improvements based on the equipment they needed the most or was the most practical (13%; Figure 8). The Other responses included in the figure are choosing improvements where old equipment was failing and having already performed all the recommendations.



Figure 8. How Partial Participants Prioritized Improvements to Implement



Source: Partial participant survey question B13; n=53.
Note: Sum exceeds 100%, as multiple responses were accepted.

Satisfaction

Both participants and partial participants gave high ratings regarding their experience with Xcel Energy and the HPwES Program overall. Nearly all participating customers (98%) reported being satisfied with the HPwES Program (giving a rating from 6 to 10 on a 0 to 10 point scale). Similarly, 91% of partial participants and 95% of participants reported being satisfied with Xcel Energy as a service provider.

Participating Customers

Participants expressed high satisfaction with the HPwES Program, with Xcel Energy as a service provider, with the information they received from the auditor, and with their contractors overall. The following levels of satisfaction were reported:

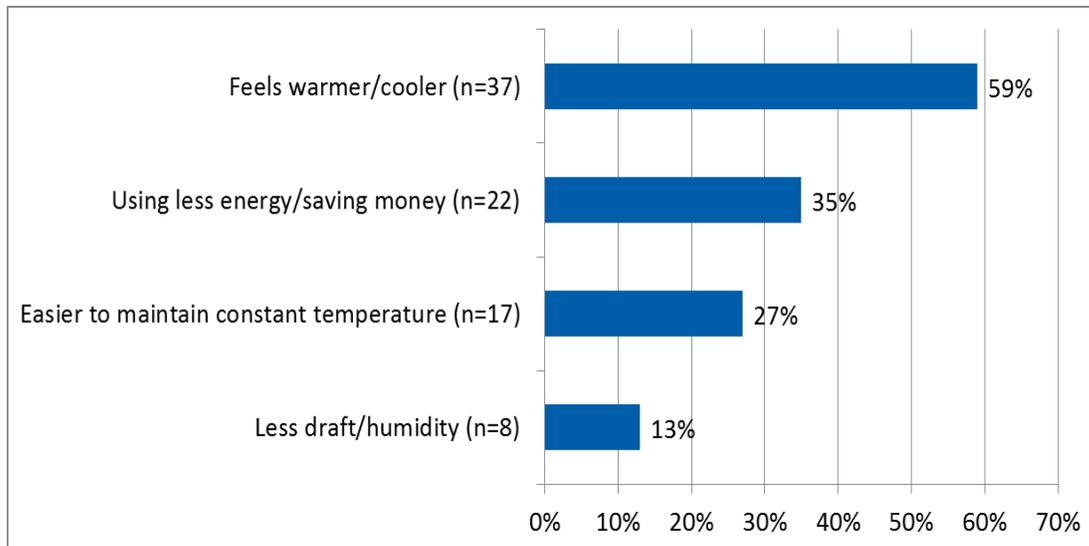
- Satisfied with the information they received from the **auditor**: 97%
- Satisfied with their **contractor**, overall: 90%
- Satisfied with **Xcel Energy** as a service provider: 95%
- Satisfied with the **HPwES Program**, overall: 98%

The majority of program participants (96%) reported being likely to or having already recommended the HPwES Program to a friend.

A large majority of program participants (83%) noticed changes in the comfort of their home after making the program-recommended home improvements. Over half of participants (59%) reported their

home feeling warmer in the winter or cooler in the summer, and 35% reported they are using less energy and saving money (Figure 9).

Figure 9. Participants' Home Comfort Changes Resulting From Program Improvements



Source: Participant survey question F8; n=63.

Note: Sum exceeds 100%, as multiple responses were accepted.

Partial Participating Customers

Partial participants expressed strong satisfaction with Xcel Energy as a service provider, with the information they received from the auditor, and with their contractors overall. The following levels of satisfaction were reported:

- Satisfied with the information they received from the **auditor**: 94%
- Satisfied with their **contractor**, overall: 94%
- Satisfied with **Xcel Energy** as a service provider: 91%

Freeridership and Spillover

Some of the participating customers reported they would have completed improvements on their own in absence of the program, which indicates freeridership. Both participant groups reported making additional improvements as a direct result of the program, which is considered spillover. Cadmus quantified the total reported freeridership and spillover, which is covered in more depth in the Net-To-Gross Ratio section; however, a high-level summary of the survey results is included below.

Participating Customer Freeridership

Over half of program participants (54%) reported they would have installed some of the energy-efficient equipment or made some of the upgrades on their own without a rebate from Xcel Energy. A minority (21%) would have made all the upgrades, while 25% would not have installed any equipment without



receiving a rebate. The Net-To-Gross Ratio section outlines the additional filters we used to assess the partial freeridership levels among those reporting they would have installed some or all of the measures on their own.

Participating Customer Spillover

Since participating in the HPwES Program, 31% of program participants reported having installed additional energy-efficient equipment or making other changes to improve the energy efficiency of their home without receiving a rebate. Over three-quarters of participants (76%) considered the HPwES Program important in their decision to install or upgrade additional equipment.

Partial Participating Customer Spillover

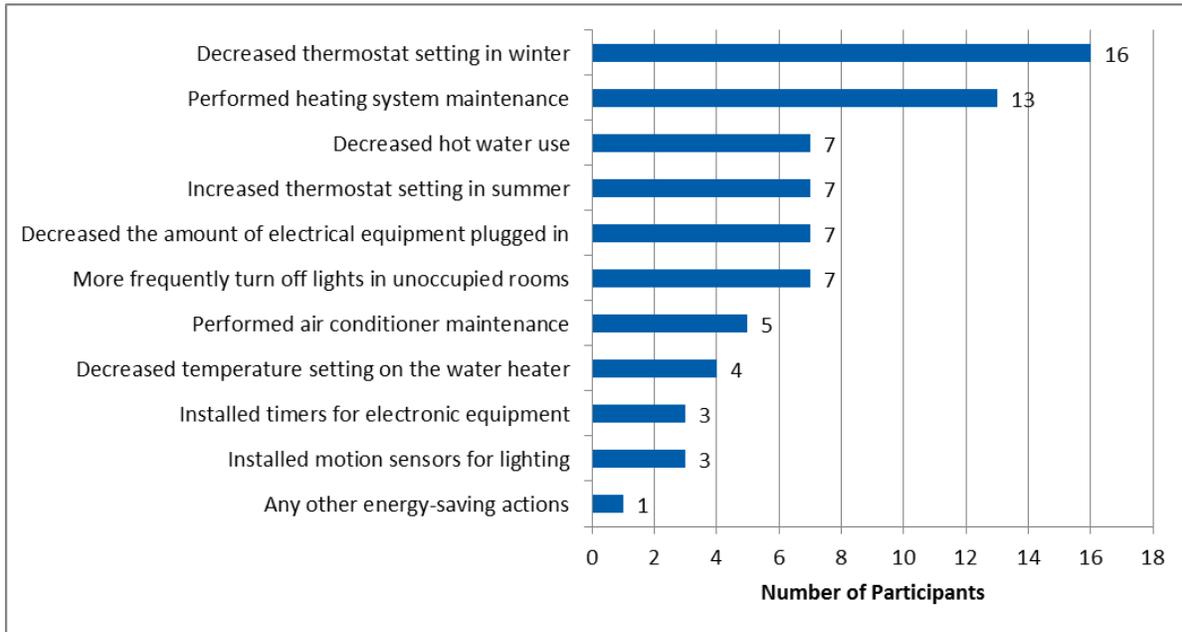
Since receiving the audit, 79% of partial participants installed energy-efficient equipment or made other changes to improve the energy efficiency of their home, without receiving a rebate. Over three-quarters of partial participants (83%) considered the HPwES Program as an important influence in their decision to install or upgrade additional equipment.

Program Influence on Behavior and Additional Energy-Savings Actions

Cadmus asked participants and partial participants about additional energy-savings actions they have adopted since participating in the program, or since receiving program information. Both groups reported having made several energy-savings actions since participating in the program or since receiving the audit, respectively.

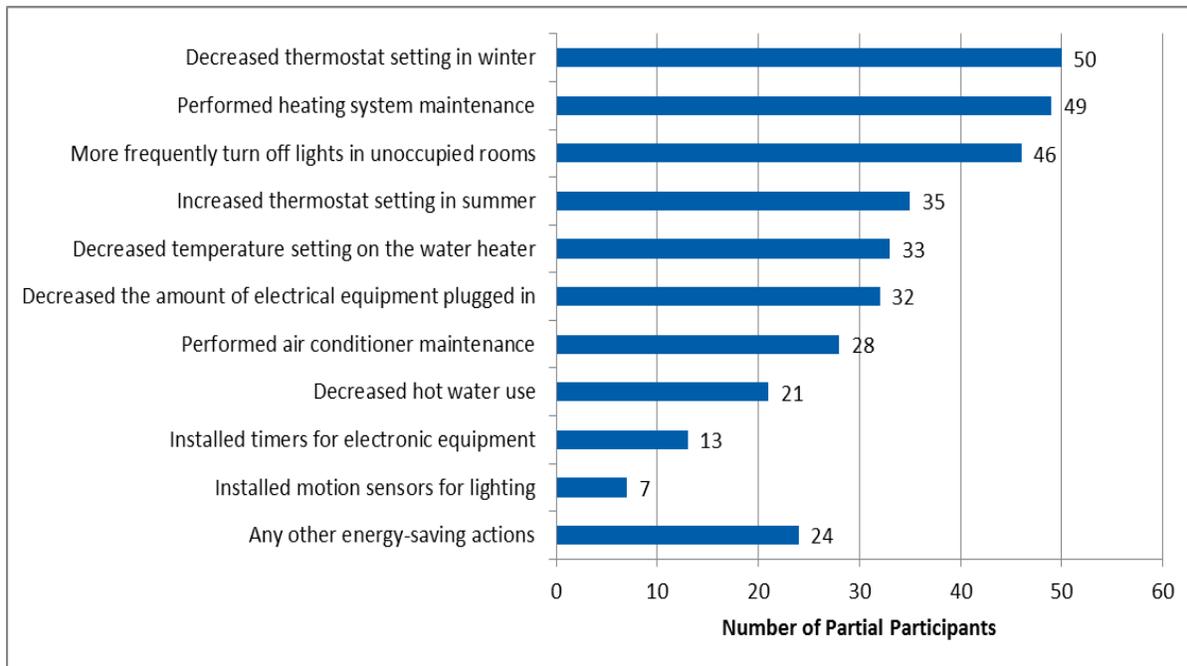
Both groups most often reported decreasing thermostat settings in the winter and performing heating system maintenance, while a majority of partial participants also reported more frequently turning off lights in unoccupied rooms and increasing thermostat settings in the summer. This slight difference between the participant groups could be due to participants' gaining additional information when having program measures installed beyond their initial audit. Figure 10 and Figure 11 show the full distribution of additional actions participants and partial participants have taken, respectively, since installing equipment through the HPwES Program or since the audit.

Figure 10. Additional Participant Actions After the HPwES Program



Source: Participant survey question H3.
Multiple responses allowed.

Figure 11. Additional Partial Participant Actions Since Audit

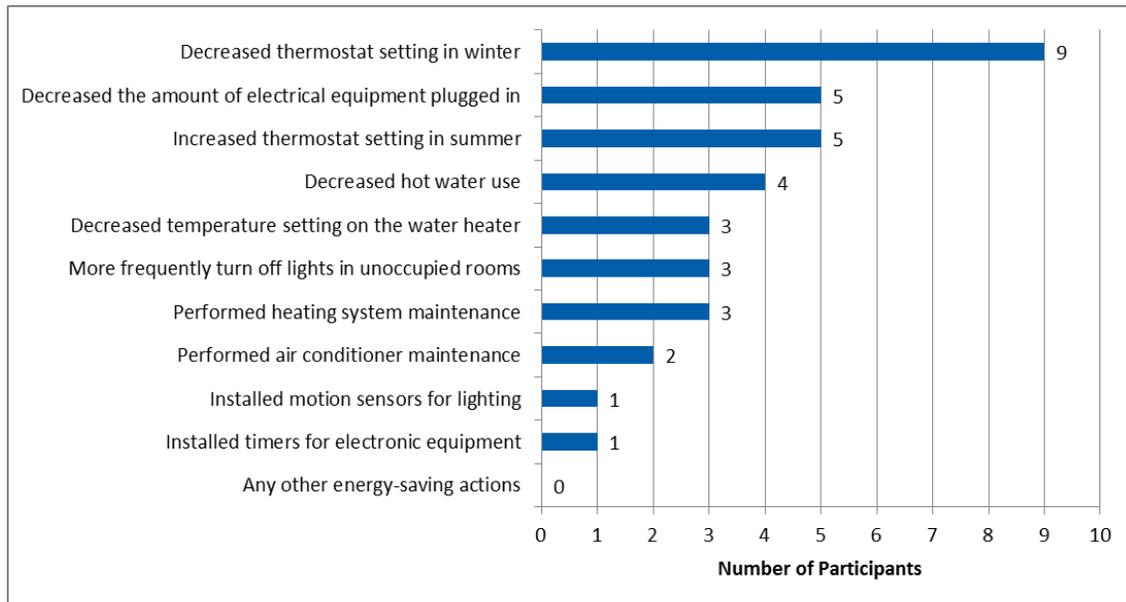


Source: Partial participant survey question F7.
Multiple responses allowed.



Cadmus asked participants to rate how important their HPwES Program participation was in their decision to take additional energy-saving actions. Figure 12 shows the full distribution of respondents who reported the program was either very important or somewhat important in their decision to take additional energy-saving actions.

Figure 12. Importance of the HPwES Program for Participants to Take Additional Energy-Saving Actions



Source: Participant survey question H4.

Participation Barriers

Cadmus asked partial participants several questions to determine their reasons for not making recommended improvements and for not participating in the HPwES Program. Their responses helped us understand the existing participation barriers. Of those who installed upgrades, 21% reported performing all the recommendations from their auditor, while the remaining 79% performed at least some of the recommendations. Many partial participants (49%) who made some improvements plan to make additional upgrades in the future, such as installing or upgrading insulation, air sealing, and windows.

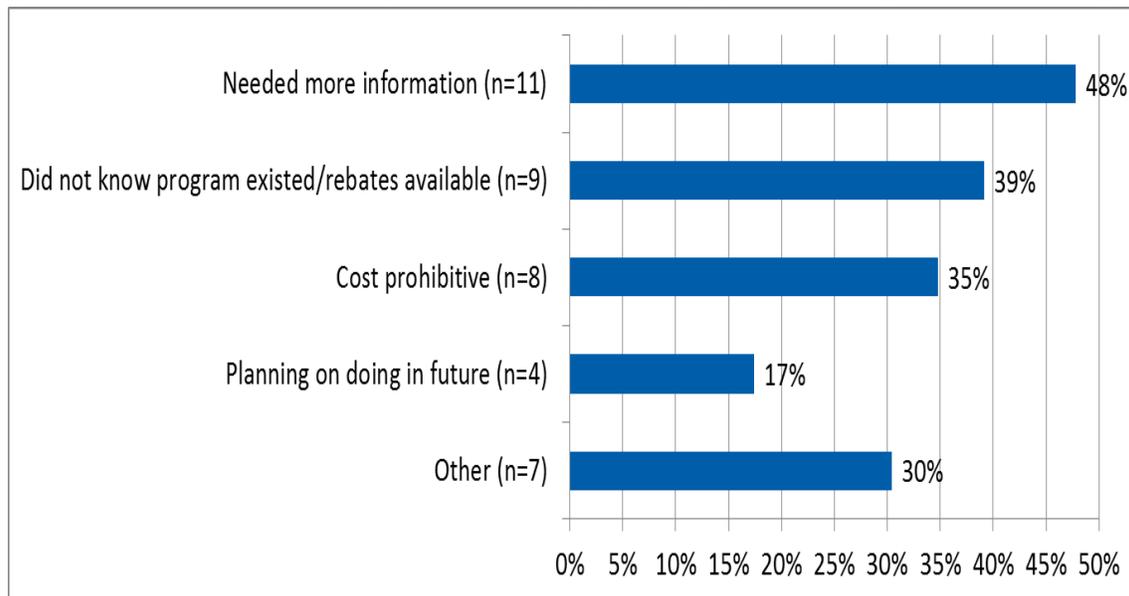
Only 14 partial participants (20%) reported not having made any of the recommended improvements. When we asked what barriers exist to making those recommended improvements, nine said the recommended improvements are cost prohibitive. Three reported not receiving enough information, one reported the upgrades as a low priority, and one considered their home as already efficient.

Some partial participants made improvements that would have been eligible for the HPwES Program, and Cadmus asked why they did not upgrade or improve their equipment through the program. Nearly

half (48%) cited needing more information, 39% did not know the program existed or that rebates were available, and 35% reported the upgrades as too cost prohibitive (Figure 13).

Of those 11 (21%) who reported making all the auditor’s recommendations, more than half (n=6) reported not participating in the program due to lack of program information or lack of program awareness, while four expressed confusion as to whether they participated or not, and one reported doing all the improvements themselves and not wanting to hire a contractor.

Figure 13. Reasons Partial Participants Did Not Upgrade Equipment Through the HPwES Program



Source: Partial participant survey questions F6A and F6B; n=23.

Note: Sum exceeds 100%, as multiple responses were accepted.

Residential Customer Profile

The surveyed participants and partial participants typically live in a single-family detached home (96% and 85%, respectively) that has between two and four members in the household (72% and 78%, respectively). Additionally, 64% of participants and 67% of partial participants are between the ages of 30 and 59 (Table 3).

Although the majority of surveyed customers live in a home that is between 1,000 and 2,500 square feet (71% of participants and 62% of partial participants), in general partial participants reported living in larger homes than participants. More participants live in a home that is 1,500 square feet or smaller than partial participants (39% and 16%, respectively) and more partial participants live in homes that is 4,000 square feet or larger than participants (13% and 0%, respectively). This could indicate that the size of the home and corresponding up-front improvement cost is a participation barrier for some partial participants.



Table 3. Participant and Partial Participant Demographics

Household Characteristics	Participants	Partial Participants
Type of home:		
Single-family detached	96%	85%
Single-family attached	4%	9%
Condo or apartment	0%	4%
Mobile or manufactured	0%	1%
Home square footage:		
Under 1,000 square feet	7%	3%
1,000 – 1,499 square feet	32%	13%
1,500 – 1,999 square feet	17%	22%
2,000 – 2,499 square feet	22%	27%
2,500 – 2,999 square feet	15%	9%
3,000 – 3,999 square feet	7%	12%
4,000 or more square feet	0%	13%
Number of people living in household:		
1	22%	12%
2	39%	42%
3	16%	15%
4	17%	21%
5+	6%	9%
Age:		
18 – 29	2%	4%
30 – 39	24%	22%
40 – 49	18%	21%
50 – 59	22%	24%
60 – 69	19%	24%
70 – 79	12%	1%
80 or older	2%	3%

Note: Sum may not equal 100% due to rounding.

Recommendations

1. **Continue to use bill inserts and mailings to communicate program opportunities to customers.**
 Nearly half of all participants and partial participants reported they prefer receiving money-saving information through the mail. Nearly one-quarter of participants (18%) and 27% of partial participants reported hearing about the HPwES Program through information received in the mail.
2. **Consider using the success of the door-to-door marketing as a training example** to demonstrate how marketing the program can be used to acquire new business. Over one-third of program participants (38%) reported first learning about the HPwES Program through door-to-door advertising.

3. **Continue to emphasize the money savings and energy cost reduction that results from customers' making improvements to their homes;** these were the most frequently cited reasons customers gave for having an audit. Maintaining continuity for customers based on these priorities could help boost HPwES participation.
4. **Consider finding ways to help customers understand payback timelines and how to budget for improvements within the one-year program requirement.** Partial participants considered up-front costs as a program barrier to participating, yet many plan to make more of the recommended improvements in the near future, and may not realize the window of opportunity for participating ends one year after their audit. This could also entail some additional training for auditors as an enhanced educational component.
5. **Continue offering training topics that emphasize the importance of and successful approaches to conveying program information to customers.** Customers reported choosing the measures they installed based on those that were most highly recommended by the auditor (participants 27%; partial participants 42%). Yet, partial participants reported not making the recommended improvements due to cost and not having enough information from the auditor or contractors, including a list of measure priorities. These findings suggest the potential for Xcel Energy to inform and motivate partial participants by communicating all the rebate information and recommendations more effectively.



Trade Ally Survey Findings

Cadmus interviewed 45 Colorado contractors—25 HPwES Program participating contractors and 20 nonparticipating contractors—during August through November 2013, to assess the program from their perspectives. For the purposes of this report, trade allies are contractors who install equipment or products that potentially qualify for the Colorado HPwES Program.

With input from Xcel Energy, Cadmus designed an interview protocol to address the following research objectives:

- Is the program implemented as designed? What is working and what is not working?
- Are contractors satisfied with their participation experience?
- Are market barriers identified and addressed in the program design?
- Do marketing materials align with program goals and barriers?
- Is program information reaching the intended target market?
- How much spillover can be attributed to the program? (This is addressed in the Net-To-Gross Ratio section)
- Is market transformation occurring? (This is addressed in the Net-To-Gross Ratio section)

Through the trade ally surveys, Cadmus explored the following topics:

- Program Satisfaction (participants only)
- Program Awareness (nonparticipants only)
- Challenges
- Marketing Practices
- Installation Practices (participants only)

Key Findings

Program Satisfaction

- **All of the participating contractors are satisfied with the HPwES Program in general**, with all 25 surveyed reporting they are satisfied (giving a rating between 6 and 10 on a 0 to 10 point scale).
- **Participating contractors consider BPI, RESNET, and NATE training as valuable.** All but one of the surveyed participating contractors reported that they or someone at their company is certified in BPI, RESNET, or NATE, and all 24 contractors with certifications reported that the training is important.
- **Nonparticipating contractors also consider BPI, RESNET, and NATE training as valuable.** Nine of the 10 nonparticipating contractors (90%) said that they or someone in their company is certified in BPI, RESNET, or NATE. Eight of these nine respondents said that BPI, RESNET, or NATE training is very important.

Program Awareness

- **All but two of 20 nonparticipating contractors (90%) were familiar with Xcel Energy's HPwES Program.** Nonparticipants heard about the program through a variety of channels: e-mail, direct mailing, Xcel Energy employees, customers, suppliers, and other companies. One nonparticipating contractor had previously participated.

Challenges

- **The main challenge Colorado contractors encountered was homeowner confusion** about the rebate structure or that the rebate structure and qualifying requirements change too frequently.
- **Getting and staying BPI certified is difficult.** The costs for this certification are high and some contractors find that maintaining their BPI certification is an obstacle to participation.
- **Nearly half of nonparticipating contractors (9 of 20; 45%) responded "don't know" when asked why they are not participating in the program.** One of the "don't know" responses was from a contractor who sometimes completes furnace installs that are eligible for the Xcel Energy stand-alone rebate program; he expressed confusion about whether that made him part of the HPwES Program. Three other nonparticipating contractors explained they do not know much about the program. Nonparticipating contractors gave other reasons, such as an insufficient knowledge base, the high cost of training, and employee turnover, as reasons for not participating. Twenty percent (4 of 20) said they were unable to complete the classes because of the location or timing.

Marketing Practices

- **All participating contractors said they market the Xcel Energy HPwES Program to their customers.**
- **Marketing practices among participating contractors have stayed the same or increased compared to 2012.** Approximately half of the participating contractors said their marketing practices had increased in 2013 compared to 2012, and the other half said they had stayed the same. None reported decreasing the amount of marketing.
- **The majority of participating contractors (75%) consider word-of-mouth or customer referrals as highly effective for promotion.** Eighteen of 24 respondents said these are two of their three most effective methods of promoting their products. Others mentioned their website, advertising in local papers, brochures, trade shows, social media, a one-on-one meeting with the customer, meetings with realtors, and networking.



Installation Practices

- **While a majority of participating contractors reported that they had always followed the best practices taught in the Xcel Energy trainings**, some said they had improved their installation practices after attending training. The two installation practices for which multiple contractors’ reported a change following training are:
 - Percentage of attic bypass sealing jobs reaching 0.15 NACH reduction
 - Installing an ECM during furnace installations

Participating Trade Ally Findings

Program Satisfaction

All of the surveyed participating contractors reported being satisfied with the HPwES Program in general, giving a rating between 6 and 10 on a 0 to 10 point scale. The mean score from participating contractors was a 7.5. Seventy-six percent reported being very satisfied, scoring the program as a 7 or higher.

Over one-third of participating contractors (36%) said that being able to offer rebates to customers or to save customers’ money is what they like most about working with the program. Other responses were that the program increases their business, helps with marketing, educates customers about energy efficiency, provides a level of quality assurance, and promotes health and safety.

All but one of the surveyed participating contractors reported that they or someone at their company is certified in BPI, RESNET, or NATE. All 24 contractors with BPI, RESNET, or NATE certification reported that the training is important to have. Eleven of these contractors said the training is important for having the knowledge and information to do their jobs correctly, while six contractors said the certification provides a level of quality assurance or standard of work, and four said the certification gives them an edge over competitors. One respondent said the training is important for energy auditors, but not necessary for contractors.

When Cadmus asked, “Do you feel this type of certification is important?” respondents said:

- “This type of work is very technical, and without the certification you have a bunch of untrained people, so the certification ensures air sealing quality.”
- “Without the training it’s hard to relate to the HPwES Program because it’s more of a whole-house program.”
- “It gives you a skill level above other technicians.”
- “It singles people out who are willing to go the extra step to do the best job; it’s an investment in education and quality assurance.”

Challenges

Nine contractors (36%) said the main program challenge they encountered in 2012 was confusion about the rebate structure. This confusion came from both customers and from contractors who found the frequent requirement changes difficult to keep up with.

Some specific comments were:

- “A couple of years ago the website was real easy to navigate for customers going through the energy audit, now it’s changed and is harder for them to navigate.”
- “Paperwork is very time-consuming.”
- “I had to call in to get answers to many questions, I wish the whole process was faster and easier, it is very time-consuming right now.”

Another challenge mentioned by three participating contractors is the difficulty of getting and staying BPI-certified. Two contractors mentioned the high cost: “BPI training charges too much money to recertify us,” and “BPI is expensive and hard to do, it should be online.” A third said the BPI-certification requirement limits the amount of insulation work he can take on because, though he is certified, not all his employees are.

A contractor in Silverthorne commented that the program is very specific to the Front Range area, and that for mountainous portions of Xcel Energy’s territory, the rebates for air conditioners (ACs) and evaporative coolers are not needed. He would like Xcel Energy to offer rebates for de-icing cable and conditioning crawlspaces.

Marketing Practices

All the participating contractors said they do some form of marketing the Xcel Energy HPwES Program to their customers. Two specifically mentioned using the HEA Program to recruit customers to the HPwES Program. Five said they tailor the program information to appropriate homeowners and tell these customers (but not all their customers) more about the program. One said he advertises the program on his company website as a way to bring in more customers.

Six of the 11 participating contractors who do active marketing, such as advertising online or in local papers, said their marketing practices increased in 2013 compared to 2012, and five said their marketing practices had stayed the same. None had decreased their amount of marketing. Those who increased their marketing did so because: “Every year you have to increase marketing if you want your company to grow,” “Business is slower,” “Wanted to make more money,” and “Doing more internet marketing now [compared to last year].”

Most participating contractors (18 of 24; 75%) listed word-of-mouth and customer referrals as two of their top three most effective methods of promoting their products. Others mentioned their website, advertising in local papers, brochures, trade shows, social media, one-on-one meetings with each customer to outline their options, speaking to realtors, and networking within their church. One



contractor said his best method for promoting his products was “putting the infrared camera in front of customers and explaining what it shows to them.”

The majority of participating contractors said that the best way for them to learn about the energy-saving opportunities to offer their customers is through webinars, trainings, or continuing education (10 of 32; multiple responses), followed by the Xcel Energy website or online (nine of 32 responses). Contractors also listed program e-mails (eight of 32 responses), meetings or through other contractors (four of 32 responses), and social media (one of 32 responses) as good ways for them to learn about energy-saving opportunities.

Installation Practices

Cadmus asked contractors whether attending Xcel Energy training inspired them to change their installation practices in any way, and they reported two changes: (1) several reported that they changed the percentage of attic bypass sealing jobs that reach 0.15 NACH reduction, and (2) some reported they install ECMs with furnaces more often.

We then asked what percentage of their yearly attic bypass sealing jobs would have achieved 0.15 NACH reduction before attending Xcel Energy training, compared to jobs done after attending the training. The 10 contractors who changed their practices cited information they learned in the BPI training as their motivation, with most reporting an increase in the percentage of jobs that reach 0.15 NACH reduction; however, two learned that not all houses can be safely sealed to that level and reported decreases of 5% to 15%. Two contractors specifically said that before they took the training they did not check NACH levels, and one reported, “We didn’t do blower door pre-tests at all until they became required.”

The second practice Colorado participating contractors changed is installing an ECM during furnace installations. Cadmus asked respondents what percentage of yearly furnace installations would have included an ECM before attending Xcel Energy training, compared to installations after attending training. Two respondents indicated that their installations of an ECM increased since the training, with one contractor reporting that he promotes the ECM more now.

Contractors did not report changing any other practices. Cadmus asked several specific questions, such as: “Today, what percentage of your yearly attic insulation jobs reach R38?” and no change was reported. It should be noted that pre-existing standards may have affected the attic insulation practice specifically, as one respondent told Cadmus, “Xcel [Energy] wanted R40, actually, but R49 was the Governor’s Energy Office standard, so yes I [have] always reached R38 even before the Xcel [Energy] rebates [were available].”

Nonparticipating Trade Ally Findings

To supplement what we learned from participating contractors, Cadmus interviewed 20 nonparticipating contractors. Through these interviews, we explored their promotion of high-efficiency measures and installations outside of the program, and we sought to understand why some contractors are not currently participating in the program.

Program Awareness

Nonparticipants heard about the program through a variety of channels:

- One received an e-mail
- One received a mailing
- Two heard about it through an Xcel Energy employee (one from Ann Kirkpatrick, the trade ally channel manager, who contacted his business; one from “someone named Kim”)
- Three learned of the program when helping customers submit rebate forms
- One heard about the program through their supplier (Owens Corning)
- One had worked for a different company that was a program participant
- One had previously participated

All 20 nonparticipating contactors said they would be interested in learning more about the program and that the best way to give them information is by e-mail or phone.

Nine of the 20 nonparticipating contractors said they did not know why they were not in the program. Of those nine, one contractor expressed confusion about whether filling out Xcel Energy furnace rebates made him a HPwES Program participant, and three explained they do not know much about the program. Other nonparticipating contractors gave reasons for not participating that included having an insufficient knowledge base, the high cost of training, and employee turnover. Four said they were not able to complete the classes because of the location or timing.

- “We weren’t able to get to the training session, there is not much training offered on the Western Slope.”
- “We’re a small company, and are not able to afford all the training with such high [internal employee] turnover.”

In follow-up questions, Cadmus asked nonparticipating contractors whether they would have participated if requirements had been different. Four of the six who responded said they would have participated. Two responses were:

- “If locations were more accessible.”
- “If it were cheaper; \$3,000 in classes is expensive. A test-out option from some of the classes would be nice.”

Nine of the 10 nonparticipating contractors who were asked about certifications said that they, or someone in their company, are certified in BPI, RESNET, or NATE. Eight of these nine respondents said the training is very important.

Marketing Practices

Most nonparticipating contractors (90%; 18 of 20) reported promoting energy-efficient equipment and options to their customers. We asked how they promote this, and half said they explain it saves money



and is a return-on-investment, and half emphasize efficiency and reducing energy use. Some use marketing materials from manufacturers or their own materials (about topics such as energy-efficient shingles or attic insulation). One uses a checklist when discussing options with customers; another uses the audit results as a discussion tool.

Some nonparticipant contractors participate in other Xcel Energy programs, with six specifically stating they participated in either the High Efficiency Air Conditioning Product Program or the Evaporative Cooler Rebate Program. These contractors' knowledge of long-term payback and energy savings, which they impart to their customers, could be a bi-product of their participation in other Xcel Energy programs.

Recommendations

1. **Review the program marketing materials and consider adding more customer-facing materials and advertising that contractors could reference when speaking with customers**, and that that would also give customers a greater program understanding without relying exclusively on contractors. Contractors market their high-efficiency equipment and said they could benefit from additional program promotion by Xcel Energy to their own customers.
2. **Consider adding further information to both customer-facing and contractor-specific marketing materials to specifically address recent changes**, as well as to add more detailed program information. While participating contractors' are generally satisfied with the program, this could be improved by making the rebate process easier for homeowners to understand, perhaps through website information or program materials.
3. **Continue to provide print advertisements, brochures, and web advertisements**, as these are key tools contractors' use to educate and market high-efficiency equipment.
4. **Consider expanding radio and television advertising**. Contractors would benefit from broader advertising from Xcel Energy, such as radio or television ads that make customers aware of the HPwES Program.
5. **Consider reviewing the contractor-specific program information, specifically the benefits to participation**. While a lack of awareness does not seem to be a barrier for nonparticipant contractors, they may not have all the correct information on qualification requirements or the paperwork process. Nonparticipating contractors are generally interested to know more about the program and would benefit from receiving information by e-mail or phone. They may also benefit from a deeper understanding of how investing in a certification can increase their business opportunities.
6. **Maintain the list of approved contractors on the program webpage**.
7. **Consider subsidizing continuing certification requirement costs** or reducing contractor costs by offering online training or a test-out option.

8. **Consider options for offering training formats that accommodate contractors in the mountain and western slope regions**, such as online webinar recertification options for those further from the Denver Metro area and/or who previously took the training.
9. **Continue to emphasize the importance of communication and that the high standards contractors must meet to participate in HPwES sets them apart from competitors**, as satisfied customer referrals and word-of-mouth advertising remain the most effective marketing practices.
10. **At the beginning of contractor trainings, consider surveying those who are new to the HPwES Program**. By capturing a better understanding of this baseline, future trainings could be customized to highlight areas where contractors need more support and information.



Net-To-Gross Ratio

This section outlines Cadmus’ methodology, analysis, and findings for determining NTG for the 2012 Xcel Energy Colorado HPwES Program. We used the following formula to calculate the program NTG:

$$\text{NTG} = (1 - \text{Freeridership}) + \text{Customer Spillover} + \text{Contractor Spillover}$$

At Xcel Energy’s request, we calculated freeridership and spillover from four different perspectives: participating customers, partial participating customers, participating contractors, and nonparticipating contractors.

Freeridership

Method

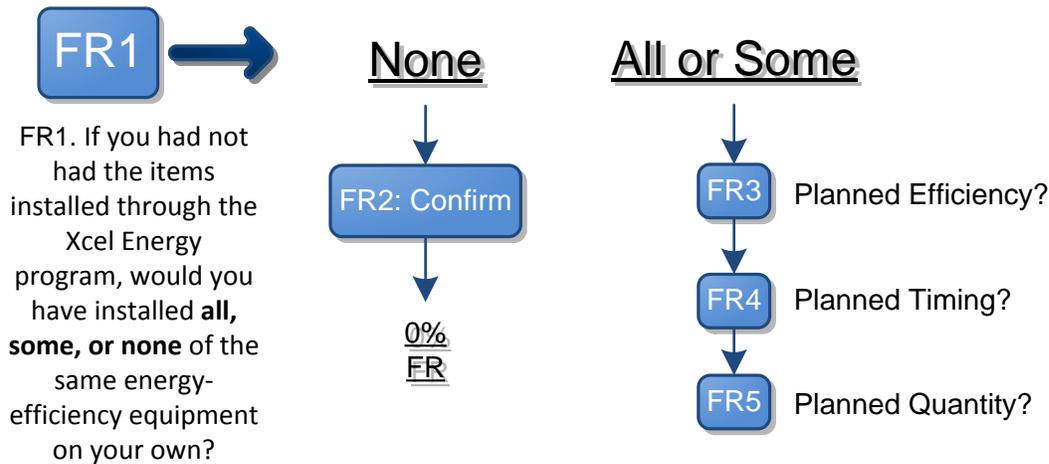
Cadmus determined freeridership, or the percentage of savings that would have occurred in absence of the program, using the results of telephone surveys with customers who participated during the 2012 program year. During the participating customer surveys, we first verified the measures listed in the program records for each respondent. Because a major program element is the whole-home bundled approach, we also assessed freeridership with this bundled approach. Some participants may view the program and their decision-making process as requiring a bundle of measures, so we asked the following initial freeridership survey question: “If you had not had the items installed through the Xcel Energy program, would you have installed all, some, or none of the same energy-efficiency equipment on your own?”

If customers asserted that they would not have installed anything (0% freerider), we asked clarifying questions to confirm their response, and then did not ask them the remaining freeridership portion of the survey. Cadmus asked those customers who said they would have installed some or all of the equipment on their own a series of follow-up questions to ascertain *which* measures they would have completed on their own, and to what degree of efficiency, timing, and quantity. We asked each customer about a maximum of three measures (ranked by savings).

Xcel Energy requires a minimum of three measures to be installed for participation in the Colorado HPwES Program. To avoid overstating freeridership, we asked additional questions about *when* customers made the decision to install equipment. We asked customers who were planning to install the measure at what point in the process they made that decision: before they inquired about the home audit, before they received the home audit, after they received the audit, or when they signed up for the HPwES Program.

For all measures that were not initially screened out as 0% freeriders, we determined partial, full, or no freeridership by asking customers detailed questions about the timing, efficiency, and quantity of the planned measure (see Figure 14).

Figure 14. Participating Customer Freeridership Method



Cadmus’ approach ensured that all freeridership is accounted for, and enabled us to provide Xcel Energy with a detailed freeridership breakdown at the measure level, while minimizing the number of questions we asked each customer. We asked about higher savings measures more frequently, in order to obtain information about the majority of the savings for each customer.

Results

Cadmus calculated the savings-weighted freeridership score for each measure, as shown in Table 4, based on surveys with 91 customer participants. The measures we asked about most frequently, which are the highest saving measures, were air sealing, attic insulation, and CFLs. There were eight total measures included, for a total of 246 individual measures.

Table 4. Average Freeridership Score by Measure

Measure	Measure Count	Average Freeridership Score
Air Sealing	78	5%
Attic Insulation	82	15%
CFL	71	13%
Dishwasher	2	16%
ECM Motor	1	0%
Furnace	1	0%
Programmable Thermostat	5	20%
Wall Insulation	6	20%

As shown in the table, the freeridership for most measures is fairly low.

Program Savings-Weighted Freeridership

The overall program freeridership is best understood based on the savings-weighting freeridership for each measure. This is because there is generally greater expense and commitment to higher savings



measures, and it is important to give more weight to those measures as opposed to low-cost, low-savings measures that likely carried less weight during the decision-making process.

Table 5 shows the savings weight for each measure and the resulting overall freeridership value. The overall freeridership rate of 14.1% indicates that approximately one-seventh of the program savings would have occurred in absence of the program.

Table 5. Savings-Weighted Freeridership by Measure and Overall

Measure	Freeridership Score	Savings Weight
Air Sealing	5%	22%
Attic Insulation	15%	44%
CFL	13%	5%
Dishwasher	16%	1%
ECM Motor	0%	0%
Furnace	0%	1%
Programmable Thermostat	20%	0%
Wall Insulation	20%	26%
Overall		14.1%

Spillover

Cadmus estimated spillover, defined as the additional savings generated because of the program but not otherwise captured by program records, through surveys with participating and partially participating customers and participating and nonparticipating contractors. Table 6 shows the spillover components and types of data we analyzed, which are then outlined in the following sections.

Table 6. Spillover Components and Types

Spillover Component	Spillover Type
Participating Customer Spillover	Additional equipment installed in the home due to participation in the program
Partial Participating Customer Spillover	Additional equipment installed in the home due to information received about the program
Participating Contractor Spillover	QI and high-efficiency sales practices adopted by contractors as a result of attending program training
Nonparticipating Contractor Spillover	Actions by nonparticipating contractors attributable to the existence of the program

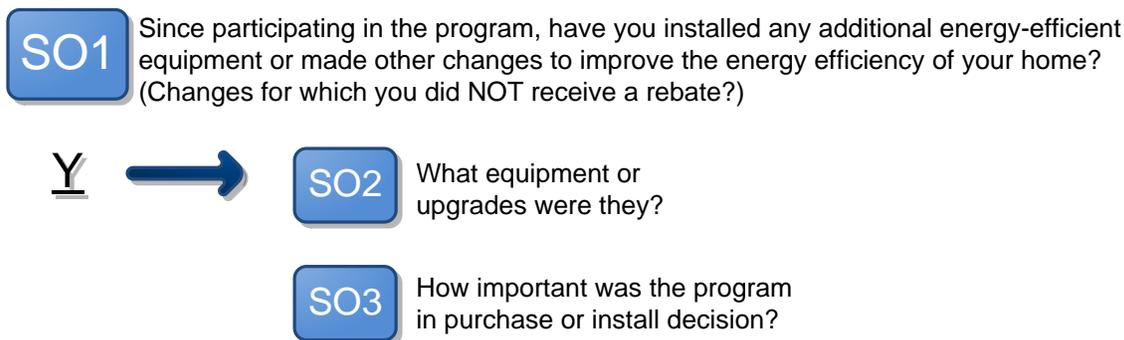
Customer Spillover

Method

Cadmus estimated participating customer spillover by analyzing survey responses from customers who applied for a HPwES rebate for installing qualifying measures. We estimated partial participating

customer spillover by analyzing survey responses from customers who were found to be eligible for the HPwES Program through a qualifying audit and who received HPwES Program materials, but did not complete the program within the prescribed one-year timeframe. See Figure 15 for Cadmus’ spillover methodology.

Figure 15. Customer Spillover Methodology



Participating Customer Spillover

A single participant may have installed one or many spillover measures. Cadmus screened the reported spillover measures and removed those for which the customer received a rebate through another channel, either from one of Xcel Energy’s stand-alone programs or from a non-Xcel Energy source. For participants who purchased energy-efficient measures but did not receive a rebate, we used a four-point scale to determine the degree of influence the program had on that purchase. Cadmus assigned 100% of the measure savings to those that received the highest program influence rating. We assigned 50% of the savings to those with the second highest program influence rating, and we assigned 0% savings to those measures with the lowest two rating levels. The sum of the resulting savings represents the total spillover for the participating customer survey population. Cadmus calculated the spillover percentage by dividing the sum of the spillover savings extrapolated to the full population by the total gross program savings. We then converted the program savings to Btus to accurately reflect both natural gas and electric savings.

Partial Participating Customer Spillover

Cadmus followed a similar methodology to assessing partial participating customer spillover to that we used to determine participating customer spillover. As stated above, partial participants began the HPwES Program but did not complete it within the required year (for a variety of possible reasons). The spillover measures for this group included those that were *going to be* a part of the program but for which the customer never received a rebate. Other qualifying measures are those for which the customer did not receive a rebate from any channel, or were additional actions they took independent of the program and attributed to their limited participation in the program.

Results

Participating Customer Results

Of the 526 participating customers, Cadmus surveyed 91. These participants reported 22 measures that passed the two qualifying screens: the measures were not rebated by any channel, and they attributed their actions to program influence (as one of the top two influence ratings).

Table 7 details the qualifying spillover measures, measure counts, and savings per unit. Some of the listed measures were not assigned savings; there are a variety of reasons for this, ranging from the fact that some measures are not necessarily energy efficient (i.e., a door, a bathroom fan) to the fact that the program should have exhausted the savings potential for that measure (i.e. air sealing). The savings values we used are consistent with average program gross savings per unit, as available and confirmed by Xcel Energy.

Table 7. Participating Customer Spillover Counts and Savings per Unit

Equipment Type	Very Influenced by Program	Somewhat Influenced by Program	Unit Savings (Therms)	Unit Savings (kWh)
Clothes Washer	1	1	77.0	26
Furnace	2	1	143.0	0
Wall Insulation*	1	1	110.8	97
Lighting	0	1	0	28
Refrigerator	1	1	0	93
Water Heater	2	0	30.0	0
Window**	0	2	0	0
Water Heater Blanket	1	0	0	0
LED Fixture**	0	1	0	0
Bathroom Fan**	1	0	0	0
Air Sealing***	3	0	0	0
Doors**	1	1	0	0

* Cadmus used one-fourth of the average wall insulation savings to calculate savings for the HPwES Program, as we assumed that the entire structure was not insulated.

** These measures are not energy efficient, or insufficient information exists to verify the efficiency level.

*** The program likely exhausted the savings potential from air sealing.

Table 8 shows the steps we followed to quantify the participating customer spillover. We calculated the total savings for the survey population, and then extrapolated the results to the program population. The total savings projected for the participating customers is 313.9 MMBtus, which is 2.0% of the total reported gross program savings.

Table 8. Participating Customer Spillover Quantification

	Step	Value
Survey Population (n=91)	Spillover Savings From Sample	54.3 MMBtu
Total Program Population (n=526)	Extrapolation Multiplier (total population/survey population)	5.78
	Spillover Population Savings (sample savings x multiplier)	313.9 MMBtu
	Total Program Reported Gross Savings*	15,352 MMBtu
	Spillover Percentage	2.0%

* May not sum due to rounding.

Partial Participating Customer Results

Of the 525 partial participants, we surveyed 71. These participants reported 43 measures that passed the two qualifying screens: the measures were not rebated by any channel, and the customer attributed their actions to program influence (as one of the top two influence ratings).

Table 9 details the qualifying spillover measures, measure counts, and savings per unit, consistent with Xcel Energy’s deemed savings values. Some of the listed measures were not assigned savings because we do not have sufficient information to confirm any efficiency gain, such as for a new door or window. The savings values we used are consistent with average program gross savings per unit, except where we reduced the savings to a fraction of the total. For example, for air sealing and wall insulation, we assumed that the entire structure was not insulated or sealed. However, we did assign the full savings amount to attic insulation.

Table 9. Partial Participating Customer Spillover Counts and Savings per Unit

Equipment Type	Very Influenced by Program	Somewhat Influenced by Program	Unit Savings (Therms)	Unit Savings (kWh)
Furnace	2	2	143.0	0
Attic Insulation	4	3	131.0	134
Wall Insulation*	4	3	110.8	97
Window**	2	2	0	0
Faucet	1	0	0	0
Circulation Fan	1	0	0	0
Solar**	0	1	0	0
Air Sealing***	6	11	24.0	11
Doors**	0	1	0	0

* Cadmus used one-fourth of the average wall insulation savings to calculate savings for the HPwES Program.

** These measures are not energy efficient, or insufficient information exists to verify the efficiency level.

*** Cadmus used one-third of the average air sealing savings to calculate savings for the HPwES Program.

Table 10 shows the steps we followed to quantify the partial participating customer spillover. We calculated the total savings for the survey population, and then extrapolated the results to the program



population. The total savings projected for the partial participating customers is 1,539 MMBtus, which is 10.0% of the total reported gross program savings.

The high rate of partial participating customer spillover has many possible explanations. The population of this group was nearly equal to the participant population (at 525 and 526, respectively).

Partial participating customers gave many reasons for not participating, citing too much paperwork, wanting to use their own contractor, and that installing the measures is less expensive without going through the program.

Table 10. Partial Participating Customer Spillover Quantification

	Step	Value
Survey Population (n=71)	Spillover Savings From Sample	208.2 MMBtu
Total Program Population (n=525)	Extrapolation Multiplier (total population/survey population)	7.39
	Spillover Population Savings (sample savings x multiplier)	1,539 MMBtu
	Total Program Reported Gross Savings*	15,352 MMBtu
	Spillover Percentage	10.0%

* May not sum due to rounding.

Qualitative Customer Behavior

Given Xcel Energy’s program design emphasis on a whole-house approach, it is important to capture information about customers’ energy-savings behavior changes that are a direct result of the program. Cadmus asked participating customers behavior change spillover questions, including questions about HVAC system controls, lighting behavior, thermostat control use, and water usage patterns. Figure 16 shows the full list of behaviors we asked about.

Figure 16. Customer Behavior Changes Asked About in Survey

Program-Influenced Energy-Savings Behaviors

Since installing your equipment, have you undertaken any of the following energy-savings actions?

- A Increased thermostat setting in summer
- B Decreased thermostat setting in winter
- C Decreased temperature setting on the water heater
- D Decreased hot water use
- E More frequently turn off lights in unoccupied rooms
- F Decreased the amount of electrical equipment plugged in
- G Installed timers for electronic equipment
- H Performed air conditioner maintenance
- I Performed heating system maintenance
- J Installed motion sensors for lighting
- K Any other energy-savings actions (SPECIFY:)

Cadmus aggregated these data into qualitative results; please see the Participant and Partial Participant Customer Surveys section for full details.

Contractor Spillover

Method

Cadmus determined spillover that can be attributed to the actions of participating and nonparticipating contractors by measuring their increase of certain QI actions conducted with nonparticipating customers. Installations only qualify as spillover if contractors can directly attribute it to information they learned while attending an Xcel Energy training or that happened because of the program affecting the market. The survey included questions about the following topics:

- Reprogrammed thermostats
- Recycled refrigerators or freezers
- QI practices on AC units⁷
- Insulating to R-44, or adding at least R-25
- Sealing attics such that air leakage would not be detected by an infrared scan with the house depressurized to 50 Pascal
- Including an ECM with furnace installations
- Persuading a customer to install equipment to a higher level of efficiency

We determined the savings from these non-rebated energy-efficient practices using program savings assumptions from the participating customer database.

Participating Contractor Spillover

Cadmus asked participating contractors spillover questions pertaining to their projects within Xcel Energy's service territory that did not receive any rebates.

Nonparticipating Contractor Spillover

Cadmus interviewed contractors that did not participate in the HPwES Program to ask spillover questions pertaining to their projects within Xcel Energy's service territory. We asked whether and how the Xcel Energy programs have affected their installation practices. For a measure installation to qualify as HPwES Program spillover, the contractor must have indicated Xcel Energy's program on their own.

⁷ To determine whether each contractor is using QI practices compatible with the program, we asked about four components of the installation process: (1) whether the contractor conducted a load calculation to gauge if the unit was sized properly; (2) whether the contractor recorded wet and dry bulb temperatures to determine proper airflow; (3) whether the contractor recorded the subcool temperature to ensure the system is charged properly; and (4) whether the contractor sealed all ducts. Cadmus evaluated each of these components and assigned spillover values separately, as most contractors reported different actions for different components. Xcel Energy Colorado staff provided the technical assumptions, citing an average total QI savings of 485 kWh per year for all four components combined.



Cadmus filtered out attribution to other Xcel Energy programs to avoid double-counting between programs.

Results

To determine the spillover from participating contractors on their nonparticipating customers, we evaluated their responses about whether the HPwES Program training influenced their promotion of higher efficiency measures, coupled with the percentage change before and after the training on how often they performed each particular QI practice.

To be counted towards spillover, nonparticipating contractors must have indicated a recent change in QI practice or sales and directly attributed Xcel Energy as the reason for that change.

Table 11 shows the responses from surveyed contractors and the corresponding savings values we derived from the participating customer savings database.

Table 11. Participating and Nonparticipating Contractor Self-Reported Counts and Savings

Measure/QI Practice	Participating Count	Nonparticipating Count	Savings (Therms)	Savings (kWh)
Thermostat Setback	0	0	N/A	N/A
Appliance Recycling	0	0	N/A	N/A
Load Calculation/Sizing	0	0	N/A	N/A
Wet Bulb/Dry Bulb/Airflow	0	0	N/A	N/A
Subcool Temp/Refrigerant Charge	3	0	0	236
Duct Sealing	28	6	0	68
Attic Insulation	35	0	131.0	134
Air Sealing*	57	0	24.0	11
ECM	42	0	0	618
Condensing Boiler	2	0	30.0	0
Water Heater	3	0	30.0	0
Wall Insulation**	13	0	110.8	97

* Cadmus used one-third of the average air sealing savings to calculate savings for the HPwES Program.

** Cadmus used one-fourth of the average wall insulation savings to calculate savings for the HPwES Program.

Table 12 and Table 13 show the analysis steps Cadmus followed to derive the participating contractor spillover of 17.9% and nonparticipating contractor spillover of 0.03%.

Table 12. Participating Contractor Spillover Quantification

	Step	Value
Survey Population (n=25)	Spillover Savings From Sample	858.8 MMBtu
Total Program Population (n=80)	Extrapolation Multiplier (total population/survey population)	3.2
	Spillover Population Savings (sample savings x multiplier)	2,748 MMBtu
	Total Program Reported Gross Savings*	15,352 MMBtu
	Spillover Percentage	17.9%

* May not sum due to rounding.

Table 13. Nonparticipating Contractor Spillover Quantification

	Step	Value
Survey Population (n=20)	Spillover Savings From Sample	1.4 MMBtu
Total Program Population (n=60)	Extrapolation Multiplier (total population/survey population)	3.0
	Spillover Population Savings (sample savings x multiplier)	4.2 MMBtu
	Total Program Reported Gross Savings*	15,352 MMBtu
	Spillover Percentage	0.03 %

* May not sum due to rounding.

Total Program Spillover

The four spillover components each represent a different aspect of spillover and can be added together to form a final program-level spillover value. The total program spillover is 30.0% (Table 14).

Table 14. Total Program Spillover Percentages by Component and Overall

Spillover Component	Spillover %
Participating Customer Spillover	2.0%
Partial Participating Customer Spillover	10.0%
Participating Contractor Spillover	17.9%
Nonparticipating Contractor Spillover	0.0%
Total Combined Spillover	30.0%

* May not sum due to rounding.

Calculated Net-To-Gross

Table 15 shows the freeridership and spillover percentages and the resulting NTG percentage for the HPwES Program. We calculated the NTG percentage by subtracting freeridership from 100% and adding spillover.

As outlined above, the savings-weighted freeridership is 14.1%. Also outlined above, we determined that the program can attribute approximately 30.0% to program spillover. The HPwES Program had an overall NTG of 115.9% in 2012.



Table 15. Calculated NTG for 2012 HPwES Program

NTG Component	Value
Freeridership	14.1%
Spillover	30.0%
Total*	115.9%

* Total may not sum due to rounding.

Benchmarking

As part of Cadmus' benchmarking research, we compiled and compared NTG values from six similar programs. The EmPOWER materials we reviewed included NTG information for all five of the programs it serves. The programs' NTG values ranged from 80% for Baltimore Gas & Electric to 113% for Mass Save (see Table 16).

Table 16. Net-to-Gross Benchmarking Results

Program	Evaluated Year	Net-to-Gross
Xcel Energy Colorado	2013	116%
Xcel Energy Minnesota	2013	108%
Southwest Utility	2012	Varies by measure; see Table 18
EmPOWER Maryland Utilities:*		
Baltimore Gas & Electric	2011	80%
Pepco	2011	90%
Dayton Power & Light	2011	90%
Southern Maryland Electric Company	2011	80%
Potomac Edison	2011	90%
Mass Save**	2011	113%
New York State Energy Research and Development Authority (NYSERDA)	2010	112%***
Midwest Utility	2010	100%

* These NTG ratios were reported in: The Cadmus Group, Inc. *Empower Maryland 2011 Evaluation Report, Chapter 7*. 2011.

** The 2011 Mass Save program targeted low-income customers, and included direct install measures, air sealing, insulation, and refrigerators.

*** This NTG includes low-income components, and was calculated using a realization rate along with freeridership and spillover.

The evaluators of the programs we benchmarked used different formats for sharing the program freeridership and spillover values. A Midwest utility and NYSERDA evaluators calculated these values for their HPwES programs as a whole, shown in Table 17.

Table 17. Freeridership and Spillover for a Midwest Utility and NYSERDA Programs*

Program	Freeridership	Spillover
Midwest Utility	0%	0%
NYSERDA	26%	41%

* NTG values may not sum due to the inclusion of factors beyond freeridership and spillover in the calculation.

Mass Save reported freeridership and spillover on a per-measure basis, while the Southwest Utility reported NTG and freeridership on a per-measure basis, summarized in Table 18.

Table 18. Net-to-Gross, Freeridership, and Spillover for the Southwest Utility and Mass Save Programs

Program	Measure	NTG*	Freeridership	Participant Spillover	Nonparticipant Spillover
Southwest Utility	Audit	89%	11%	Not Assessed	Not Assessed
	Air Sealing	95%	5%	Not Assessed	Not Assessed
	Insulation	87%	13%	Not Assessed	Not Assessed
Mass Save	CFL (direct install)	73%	29%	2.5%	Not Assessed
	Air Leak Sealing (direct install)	129%	8%	8%	28%
	Insulation	123%	25%	20%	28%
	Refrigerator	86%	14%	Not Assessed	Not Assessed

* NTG values may not sum due to the inclusion of factors beyond freeridership and spillover in the calculation.

Neither of the programs reporting a NTG of over 100% (Mass Save and NYSERDA) offer stand-alone rebates that compete with the program, unlike the programs with a NTG less than 100% (the Southwest Utility and EmPOWER). In addition, NYSERDA and Mass Save reported low incidences of freeridership, and customers for both can only receive rebates for certain measures. Unlike the Colorado Xcel Energy program, all of the benchmarked programs are marketed directly to customers, creating an opportunity for spillover.

NTG and Market Transformation

The high calculated NTG for the HPwES Program of 116% is potentially due to several factors, including the tendency for customers in this type of program to report low freeridership and high spillover and, more importantly in this case, the high spillover reported by participating contractors. This finding demonstrates that the program is transforming contractor installation practices. With the program being relatively new, contractors are still able to recognize and report the impact of the program and program trainings on their installation practices. Over time, this level of spillover will not be sustainable because contractors will begin to think of the current QI standard as a common practice. Eventually, what is considered spillover now could be counted as freeridership or market transformation in future years. For this reason, it is important to consider how to capture market transformation in the future.



Program outreach, training, and support can influence market transformation in several ways. For example, the majority of nonparticipating contractors reported that they are discussing energy efficiency and energy savings with their customers, and participating contractors mentioned that the information provided through the training helped them change some of their practices with both participating and nonparticipating customers. A more in-depth discussion of market transformation and program indicators is provided in Appendix D.

Recommendations

Cadmus has the following recommendations regarding the Colorado HPwES Program:

1. **Consider examining the high rate of partial participation without program completion.** During 2012, half of the customers that began program participation did not complete the program requirements. Xcel Energy may want to re-examine the program design and goals in an attempt to attract participants that will complete the program. This must be considered in light of the high rate of non-completion being consistent with program goals to exclude those homes that are not optimal for generating the highest savings.
2. **Cadmus supports the use of 116% NTG for this program.** There is evidence of significant spillover due to the HPwES Program. However, as this amount of spillover is not likely to continue, this NTG value may be different in future years.

Peer Utility Benchmarking

Cadmus conducted a benchmarking study comparing elements of the Xcel Energy Colorado HPwES Program with other HPwES programs across the country. In addition, Cadmus reviewed programs that had been discontinued to document the reasons for their termination. The programs we reviewed are listed in Table 19.

Table 19. Programs Included in Benchmarking Study

Program Sponsor	Program Name	State/Region
Arizona Public Service	Home Performance with ENERGY STAR	Arizona
Southwest Utility	Home Performance with ENERGY STAR	Arizona
Baltimore Gas and Electric	Home Performance with ENERGY STAR	Maryland
EmPOWER	Home Performance with ENERGY STAR	Maryland
Mass Save	Home Energy Assessment	Massachusetts
HomeFree Nevada	EnergyFit Nevada	Nevada
NYSERDA	Home Performance with ENERGY STAR	New York
Midwest Utility	Home Performance	Midwest
Austin Energy	Power Save; Home Performance with ENERGY STAR	Texas
Puget Sound Energy	Home Performance with ENERGY STAR	Washington
Discontinued Programs		
Efficiency Maine	Home Performance with ENERGY STAR	Maine
Oncor	Home Performance with ENERGY STAR	Texas

Cadmus reviewed the programs’ materials and designs for the following key elements:

- Required measures and rebate types
- Incentive structure
- Program implementation
- Quality assurance
- Contractor certifications
- Marketing and outreach activities
- Net-to-gross (if available)
- Reasons for discontinuing (if applicable)

Methodology

Cadmus reviewed programs similar in design to Xcel Energy’s HPwES Program, as well as programs identified by program staff during the Task 2 interviews, comparing them with relevant and available program design and performance information. Many of the programs do not have information available about all of the key components we reviewed. To ensure that we had several programs to benchmark for each topic, Cadmus expanded our research and included one non-ENERGY STAR home performance



program (offered by a Midwest utility). All of the other programs in the study are HPwES programs. We also reviewed the DOE/EPA Program Sponsor requirements.

To investigate programs that had been discontinued, Cadmus contacted the former program managers and conducted brief phone interviews to investigate reasons the programs might have been unsuccessful.

Findings

Almost all of the programs in the benchmarking study apply the DOE/EPA HPwES program framework, and the majority include the components indicated as required in the *Home Performance with ENERGY STAR Sponsor Guide, Version 1.1*.⁸ In addition, the majority include incentives for insulation and air sealing, similar to the Xcel Energy program. All but Mass Save require duct sealing,⁹ and the majority include CFLs. In contrast to Xcel Energy's program, most of the benchmarked programs include a direct install component in which program staff install CFLs at customers' homes during the audit, instead of requiring customers to install them.

Several of the benchmarked programs are offered through multiple utilities or other entities. These umbrella programs are: HomeFree Nevada, EmPOWER, and Mass Save.

Each program is described briefly below, highlighting some of their key differences.

Xcel Energy Colorado requires customers to implement three measures to be eligible for the rebates. The measures must include attic insulation, air sealing, and CFLs for homes that require any or all of these components. Rebates are prescriptive and are generally higher than those offered by the stand-alone programs. Customers are first required to have an energy audit conducted through a different Xcel Energy program.

Xcel Energy Minnesota requires customers to install three specific measures (attic insulation, air-sealing, and CFLs), plus a minimum of two additional measures, to be eligible for program rebates. Program rebates are prescriptive and are close in value to rebates offered through Xcel Energy's stand-alone programs. Like Xcel Energy, Colorado customers are required to have an energy audit, which is implemented through a different Xcel Energy program (HEA Program or Home Energy Squad Program).

Arizona Public Service offers customer rebates for air sealing and insulation through the HPwES Program that are not available through the utility's stand-alone programs. To be eligible for the insulation rebate, customers must have sealed air leaks prior to installation. Arizona Public Service coordinated its program with the Southwest Utility to create consistency across the region.

⁸ Many of the programs' materials did not provide information regarding one or more of the components required by the DOE/EPA Program.

⁹ Duct sealing may be required by the individual program administrators under Mass Save.

Austin Energy allows customers to choose between a low-cost loan and prescriptive rebates for implementing energy-efficiency measures identified during their home energy audit.¹⁰ HPwES participants are also eligible for bonus rebates for making all the recommended energy-efficiency improvements at the same time and having a new central AC and heating system installed. In addition, Austin Energy offers a Maximum Energy Returns Program that they market as part of the HPwES Program but is actually part of a separate program funded through the Better Buildings Program. This program is similar to the HPwES Program, but requires a 15% increase in a home's modeled energy efficiency to be eligible for additional rebates.

Baltimore Gas & Electric works with EmPOWER to offer the HPwES Program. Baltimore Gas & Electric supplements the EmPOWER offerings with additional rebates marketed as part of the HPwES; these rebates have equal value to the stand-alone rebates.

EmPOWER is an umbrella under which five Maryland utilities offer the HPwES Program. The program is the same across all five utilities and includes prescriptive rebates. Customers can receive up to 50% of the project cost, up to a maximum dollar amount.

HomeFree Nevada is a non-profit organization that partners with utilities to offer the HPwES Program in Nevada. The rebate amounts are based on the percentage of energy savings, established through modeling.

Mass Save represents eight electric and natural gas program administrators in Massachusetts. Customers in Massachusetts have access to Mass Save's services, including the HPwES Program, and the trade allies have access to program trainings and support.

Midwest Utility Home Performance Program is not affiliated with the DOE/EPA HPwES Program. However, similar to the HPwES programs, customers are required to begin with a home energy audit. In addition, customers must agree to implement the full package of recommended energy-efficiency improvements to receive the program rebates.

NYSERDA offers customers rebates up to 10% of the cost of the project, up to a maximum dollar amount, and their HPwES Program includes a large range of measures. NYSERDA does not offer any other residential rebate programs for existing homes.

Puget Sound Energy offers customer rebates to implement three qualified energy-efficiency measures through the HPwES Program. Customers receive standard stand-alone rebates as well as additional rebates for the measures installed through the HPwES Program.

¹⁰ At the time of our study, Energy Austin was offering a special promotion allowing customers to combine rebates with a loan by completing a list of recommended and approved energy-efficiency measures. This offer was made possible through a federal grant from the U.S. DOE. More information is available online: <http://www.austinenergy.com/Energy%20Efficiency/Programs/homePerfCertificate.htm> (Cadmus viewed on August 6, 2013).



Southwest Utility, like Arizona Public Service, offers customer rebates for air sealing and insulation through the HPwES Program that are not available through their stand-alone programs. The Southwest Utility coordinated its program with Arizona Public Service to create consistency across the region.

Required Measures and Rebate Types

As noted above, the DOE/EPA HPwES Program does not require specific measures, and the programs we reviewed illustrate the variety of measure requirements and rebate types that can be included.

Only two of the benchmarked programs require customers to install multiple measures to be eligible for the rebate: Puget Sound Energy requires customers to install at least three rebated energy-efficiency measures, and a Midwest utility requires customers to install the entire package of measures recommended during their home energy audit. None of the programs require customers to install specific measures, unlike Xcel Energy’s program. However, customers of a Midwest utility must have vents in their bathrooms or must install vents prior to being eligible to participate, and Arizona Public Service customers must seal air leaks in their home before installing insulation to be eligible. The program requirements for installing measures are summarized in Table 20.

Table 20. Required Measures

Program	Measures Required			Notes
	Specific Measures	Multiple Measures	All Measures Optional	
Xcel Energy, Colorado	X	X		Requires three total measures, which must be implemented before optional measures can be considered
Xcel Energy, Minnesota	X	X		Requires five total measures, three of which are specified
Arizona Public Service			X	Customer must have air sealing done prior to insulation to be eligible for insulation rebate
Southwest Utility			X	
Baltimore Gas & Electric (EmPOWER)			X	
EmPOWER Maryland			X	
Mass Save				Requirements are dependent on the individual utility
HomeFree Nevada			X	
NYSERDA			X	

Program	Measures Required			Notes
	Specific Measures	Multiple Measures	All Measures Optional	
Midwest Utility		X		Customers must implement all recommended energy-efficiency improvements
Austin Energy			X	
Puget Sound Energy		X	X	Customer must install at least three measures

Incentive Structure

The DOE/EPA Program does not include any requirements regarding the structure of program incentives. More than half of the benchmarked non-umbrella programs offer stand-alone rebates, similar to Xcel Energy.¹¹ However, in all cases there are additional incentives or benefits to the customer for participating in the HPwES program. Unlike Xcel Energy’s HPwES Program, many also include a direct install component in which the auditor installs free energy-efficiency measures that contribute to program savings. These measures often include CFLs, faucet aerators, and other low-cost measures that can easily be installed. Table 21 shows which HPwES programs offered stand-alone rebates and direct installations.

Table 21. Stand-Alone Rebates and Direct Installations

Program	Measures Overlap with Stand-Alone	HPwES Includes Direct Install	Overview of the HPwES Rebates versus Stand-Alone Rebates
Xcel Energy, Colorado	X		HPwES rebates are higher than stand-alone rebates
Xcel Energy, Minnesota	X		HPwES rebates are equal to or only slightly higher than stand-alone rebates Maximum rebate for insulation is higher through HPwES
Arizona Public Service	X	X	Stand-alone rebates are not available for two of three HPwES Program measures A stand-alone rebate of the same value as the HPwES rebate is available for the third measure
Southwest Utility	X	X	Stand-alone rebates are not available for two of three HPwES Program measures A stand-alone rebate of the same value as the HPwES

¹¹ The individual utilities under the umbrella programs may offer stand-alone rebates that are not reflected in the materials that were available for our review.



Program	Measures Overlap with Stand-Alone	HPwES Includes Direct Install	Overview of the HPwES Rebates versus Stand-Alone Rebates
			rebate is available for the third measure
Baltimore Gas & Electric (EmPOWER)	X	X	Stand-alone rebates are capped at \$900 HPwES rebates are capped at \$3,150 There are no stand-alone rebates for insulation or air sealing. Rebate values for other measures are the same between stand-alone and HPwES
EmPOWER			Stand-alone rebates are not available but may be offered by participating utilities
Mass Save		X	Stand-alone rebates are not available but may be offered by participating utilities
HomeFree Nevada			Stand-alone rebates are not available but may be offered by participating utilities
NYSERDA			Stand-alone rebates are not available
Midwest Utility			Information not available*
Austin Energy			Stand-alone rebates are not offered
Puget Sound Energy	X		HPwES incentive offered for implementing three stand-alone measures and having an audit and test-out implemented Rebates for measures are all stand-alone

* The Midwest utility materials we reviewed did not include information regarding other stand-alone programs.

All but one of the benchmarked programs offers prescriptive rebates like Xcel Energy Colorado. However, the majority of the rebates are based on actual measure costs, rather than being based on the specific measure like in the Xcel Energy Colorado program. Rebates ranged from 10% to 75% of the project cost, with 50% being the most common. Several of the programs included additional incentives or have different incentive structures. Table 22 provides an overview of the various rebate structures.

Table 22. Rebate Structures and Values

Program	Prescriptive or Performance	Rebate Values	Rebate Maximum	Notes
Xcel Energy, Colorado	Prescriptive	Range \$15 - \$1,000	No Maximum	Rebate varies by measure and efficiency level
Xcel Energy, Minnesota	Prescriptive	Range \$60 - \$400	No Maximum	Rebate varies by measure and efficiency level
Arizona Public Service	Prescriptive	\$250/measure	\$1,000	Rebate is the same for all measures
Southwest Utility	Prescriptive	Up to \$250 or 75% of the cost	No Maximum	Rebate is the same for all measures

Program	Prescriptive or Performance	Rebate Values	Rebate Maximum	Notes
Baltimore Gas & Electric (EmPOWER)	Prescriptive	50% of cost for some measures Prescriptive rebates range \$150 - \$500	\$3,150	Up to 50% of the project cost, up to a maximum of \$2,000, for air sealing, insulation, and tankless gas water heaters Prescriptive rebates up to \$1,150 for heating and AC measures
EmPOWER Maryland	Prescriptive	Up to 50% of project cost	\$2,000	Up to 50% of the project cost, up to a maximum of \$2,000, for air sealing, insulation, and tankless gas water heaters
Mass Save	Prescriptive	Up to 75% of cost for insulation	\$2,000	75% of the project cost, up to a maximum of \$2,000, for insulation Other rebates and maximums depend on customer area or utility
HomeFree Nevada	Performance	15% - 19% savings = \$500, 20% savings or higher = \$1,000	\$1,000	Rebate is based on modeled level of energy efficiency
NYSERDA	Prescriptive	10% of cost for approved measures	\$3,000	
Midwest Utility	Prescriptive	Up to 50% of cost	No Maximum	
Austin Energy	Prescriptive	Standard rebates up to 20% of project cost Bonus rebate of \$250 - \$500 depending on standard rebate total	No Maximum	Many of the standard incentives are on a per-unit basis (e.g., duct sealing rebate = \$.12 per square foot, and external combustion air rebate = \$20 each)
Puget Sound Energy	Prescriptive	HPwES incentive = \$400 Stand-alone rebates range \$4 - \$1,500	No Maximum	

Program Implementation

All of the benchmarked programs require that an energy audit is administered through the HPwES Program as a prerequisite to measure installation. This is different from the Xcel Energy HPwES Program,



in which the audit is conducted as part of a separate program. The majority of the programs have a set cost for the home energy audit, ranging from begin free to \$199 (paid by the customer).

Most of the programs allow, and in some cases encourage, the use of the same contractor for both the audit and to implement the energy upgrades, similar to HPwES in Colorado. Like the Xcel Energy programs, the majority of the benchmarked programs have an open model in which the customer hires a participating contractor independently. Table 23 summarizes implementation differences between the programs. Only one Program Sponsor, Austin Energy, requires contractors to submit audit results and bid estimates, then get approval before proceeding. All of the programs require that participating contractors perform the work, similar to the Xcel Energy programs.

Table 23. Program Implementation

Program	Audit Cost	One-Stop Shop: Contractor Provides Audit	Customer Hires Independent Auditor and Contractor	Notes
Xcel Energy, Colorado	40% of cost after rebate		X	Customer can use contractor to conduct audit and install measures or customers can have components done separately
Xcel Energy, Minnesota	\$60 - \$100		X	Auditor works for implementer, contractors are independent
Arizona Public Service	\$99		X	
Southwest Utility	\$99	X	X	
Baltimore Gas & Electric (EmPOWER)	\$100	X	X	
EmPOWER Maryland	\$100	X	X	
Mass Save	Free		X	The program assigns the auditor, the customer hires the contractor
HomeFree Nevada	\$199	X		
NYSERDA	Free	X	X	
Midwest Utility	\$50			Auditors and contractors are assigned by program

Program	Audit Cost	One-Stop Shop: Contractor Provides Audit	Customer Hires Independent Auditor and Contractor	Notes
Austin Energy	Generally Free	X	X	Cost of audit is not set, but most contractors provide them for free*
Puget Sound Energy	Based on bid	X	X	

* This is detailed on the Austin Energy website:

<http://www.austinenenergy.com/Energy%20Efficiency/Programs/Rebates/Residential/Home%20Performance%20with%20Energy%20Star/participation.htm> (Cadmus viewed on August 3, 2013).

Four of the benchmarked programs require that all projects have a test-out, similar to the test-outs required by the Xcel Energy HPwES Program. Three programs do not appear to require projects to undergo a test-out, although this is indicated in the *Home Performance with ENERGY STAR Sponsor Guide, Version 1.1* as a requirement of the DOE/EPA Program. Austin Energy only requires a visual inspection to ensure that all of the rebated measures have been installed; this is less rigorous than the test-outs required by the other programs. Information regarding test-out requirements was not available for two of the programs.

Quality Assurance

Cadmus found information about QA/QC procedures for four of the benchmarked programs. Similar to Xcel Energy’s HPwES Program, all four indicate that a party other than the contractor implements QA/QC inspections. HomeFree Nevada implements a tiered QA/QC program similar to Xcel Energy Colorado’s program, which includes a review of each contractor’s first three jobs, then 20% of each contractor’s next 20 projects, and 5% of jobs after that. Austin Energy and the Southwest Utility require contractors to provide a one-year warranty of their materials, parts, and workmanship.

Contractor Certifications

The majority of the benchmarked programs require that participating contractors are certified by the BPI, similar to the Xcel Energy Colorado program. Mass Save gives customers the option of using a home performance contractor who is required to have BPI certification, or using a participating independent installation contractor who is not required to be BPI certified.

Marketing and Outreach Activities

Materials for five of the benchmarked programs include descriptions of their marketing strategies. Unlike Xcel Energy’s HPwES Program, most of the programs are marketed directly to customers instead of through the audit process. This could be due to the structure of the other programs, in which the audit is part of the HPwES Program and not a separate program as it is for Xcel Energy. Most of the benchmarked programs encourage trade allies to market the program, and some provide co-branding



opportunities. All five of the EmPOWER utilities offer co-branding. NYSERDA reimburses contractors for 25% up to 50% of the cost of their co-branded marketing, based on the number of retrofits each contractor completes.

The majority of the benchmarked HPwES Program Sponsors market the program at community events and through other community partners. They also use bill inserts, direct mail, and various media channels, and publish program information on their website. In addition, all of the HPwES programs are linked to the EPA's website. Several of the programs receive marketing support from third parties. Community outreach for HomeFree Nevada is conducted through a network of employers and local governments. Arizona Home Performance¹² serves as a program website for the HPwES programs at both the Southwest Utility and Arizona Public Service. Mass Save, while linked to the EPA's website, does not indicate being associated with the DOE/EPA Program on its website.

Xcel Energy's program is primarily marketed through the HEA Program. Xcel Energy Colorado sends a direct mailing to customers who have completed an energy audit, and both of the Xcel Energy programs include information on their websites, which are linked to the EPA's website, similar to the benchmarked HPwES programs.

Our benchmarking review revealed the following less-common marketing and outreach strategies:

- Arizona Public Service conducted event-based marketing through local professional sports teams.
- Arizona Public Service implemented a call center campaign to promote the program.
- NYSERDA offered contractor incentives to encourage them to offer energy-efficient options.
- NYSERDA conducted extensive consumer outreach and education to build consumer awareness, create demand for all NYSERDA programs, and promote the use of BPI-accredited contractors to perform work.

Net-to-Gross

Cadmus was able to find NTG analyses available for six programs. The EmPOWER materials included the NTG information for all five of its programs. The program's NTG values ranged from 80% for Baltimore Gas & Electric to 113% for Mass Save. The NTG values for the programs are presented in Table 24.

¹² <http://www.azhomeperformance.com>. Accessed August 1, 2013.

Table 24. Net-to-Gross Benchmarking Results

Program	Evaluated Year	Net-to-Gross
Xcel Energy Colorado	2013	116%
Xcel Energy Minnesota	2013	108%
Southwest Utility	2012	Varies by measure; see Table 26
EmPOWER Maryland Utilities:*		
Baltimore Gas & Electric	2011	80%
Pepco	2011	90%
Dayton Power & Light	2011	90%
Southern Maryland Electric Company	2011	80%
Potomac Edison	2011	90%
Mass Save**	2011	113%
NYSERDA	2010	112%***
Midwest Utility	2010	100%

* These NTG ratios were reported in: The Cadmus Group, Inc. *Empower Maryland 2011 Evaluation Report, Chapter 7. 2011.*

** The 2011 Mass Save program targeted low-income customers, and included direct install measures, air sealing, insulation, and refrigerators.

*** This NTG includes low-income components, and was calculated using a realization rate along with freeridership and spillover.

The evaluators of the programs we benchmarked used different formats for sharing the program freeridership and spillover values. A Midwest utility and NYSERDA evaluators calculated these values for their HPwES programs as a whole, shown in Table 25.

Table 25. Freeridership and Spillover for a Midwest Utility and NYSERDA Programs*

Program	Freeridership	Spillover
Midwest Utility	0%	0%
NYSERDA	26%	41%

* NTG values may not sum due to the inclusion of factors beyond freeridership and spillover in the calculation.

Mass Save reported freeridership and spillover on a per measure basis, while the Southwest Utility reported NTG and freeridership on a per measure basis, summarized in Table 26.



Table 26. Net-to-Gross, Freeridership and Spillover for the Southwest Utility and Mass Save Programs

Measure	NTG*	Freeridership	Participant Spillover	Nonparticipant Spillover
Southwest Utility				
Audit	89%	11%	Not Assessed	Not Assessed
Air Sealing	95%	5%	Not Assessed	Not Assessed
Insulation	87%	13%	Not Assessed	Not Assessed
Mass Save				
CFL (Direct Install)	73%	29%	2.5%	Not Assessed
Air Leaks Sealing (Direct Install)	129%	8%	8%	28%
Insulation	123%	25%	20%	28%
Refrigerator	86%	14%	Not Assessed	Not Assessed

* NTG values may not sum due to the inclusion of factors beyond freeridership and spillover in the calculation.

Neither of the programs reporting a NTG of over 100% (Mass Save and NYSERDA) offer stand-alone rebates that compete with the program, unlike the programs with a NTG less than 100% (the Southwest Utility and EmPOWER). In addition, NYSERDA and Mass Save reported low incidences of freeridership, and customers for both can only receive rebates for certain measures. Unlike the Colorado and Minnesota Xcel Energy programs, all of the benchmarked programs are marketed directly to customers, creating an opportunity for spillover.

Discontinued Programs

Cadmus spoke to staff involved in one HPwES program that had been discontinued (Oncor, in Texas) and another that had transitioned from a HPwES program to an independent home performance program (Efficiency Maine).

Oncor implemented its HPwES Program as part of a five-year commitment to spend \$100 million on energy efficiency. The staff member we spoke to indicated that Oncor discontinued the HPwES Program after they had spent the energy-efficiency budget. In addition to the end of the program’s financial support, several other factors contributed to discontinuing the program: Oncor offered residential energy-efficiency incentives through other programs and was already meeting the portfolio goals; HPwES contractors failed to meet the quality standards of the HPwES Program; and there were challenges with the HPwES Program implementer.¹³

Cadmus also spoke with Efficiency Maine staff, who originally implemented its HPwES Program in 2007. Efficiency Maine provided few, if any, customer rebates or incentives through the program, but instead focused on increasing the number of BIP-certified contractors in the market by supporting contractor training and offering minimal incentives to contractors who conducted whole-home projects. In 2009, Efficiency Maine received American Recovery and Reinvestment Act (ARRA) funding that allowed them

¹³ The staff we interviewed was not at liberty to share their specific challenges with the implementer.

to develop a more comprehensive program. At that point, the staff developed a whole-home program that included the same components as the HPwES Program, but was no longer affiliated with the DOE/EPA Program. The reasoning for this was:

- Efficiency Maine was focused on building the Efficiency Maine brand and did not want the ENERGY STAR brand to distract from it.
- Based on customer focus groups, the term “home performance” did not resonate with customers.
- The time required for DOE/EPA program reporting was not thought to be a good use of ratepayer funds.

The staff we interviewed indicated that this decision and having their own program has proved to be effective for Efficiency Maine.

Recommendations

1. **Consider exploring ways to introduce a direct install component to the HPwES Program that would allow for claiming savings for the installation of free, low-cost, energy-saving measures.** One option would be to have contractors who are already implementing the program install additional free measures in customer homes (e.g., CFLs, faucet aerators, low-flow showerheads). The installation of these measures could then be verified during the post-installation QC inspection. This would enable Xcel Energy to capture additional program savings while reducing contractors’ confusion regarding the CFL requirements.
2. **To increase the number of HVAC measures implemented through the program, consider offering an incentive to HVAC contractors.** Consider basing this incentive on the number of whole-home projects the contractors work on through the program, similar to the way NYSERDA spends a higher percentage of their advertising costs on contractors who complete the most whole-home projects.
3. **Consider highlighting the financing opportunities for energy-efficiency projects on the program website.**
4. **Consider simplifying the structure of the requirements and the incentives.** Most of the benchmarked programs had a simplified structure compared to the Xcel Energy program. Investigate whether the HPwES Program can be simpler while still cost-effective.
5. **Consider implementing marketing and outreach strategies that build consumer awareness and demand for homes that meet HPwES standards.** This could include marketing the program more directly to consumers or implementing public education campaigns about the benefits of homes that meet program standards.
6. **If the DOE/EPA requires changes that would be difficult to accommodate through the Xcel Energy programs as currently designed, consider evaluating the necessity and value of being aligned with the DOE/EPA Program, balanced with the value and credibility ENERGY STAR trademark awareness brings to the program.** Perhaps through focus groups or customer and



industry stakeholder surveys, consider investigating the impact of a localized program model, similar to some of the benchmarked programs.¹⁴ Xcel Energy may also consider branding the program—similar to HomeFree Nevada’s EnergyFit Nevada and to Austin Energy’s Power Saver—to help customers connect Xcel Energy as the source and a starting place for home energy efficiency.

¹⁴ A Midwest utility and Efficiency Maine are not affiliated with the DOE/EPA Program.