Process Evaluation of Vermont Thermal Efficiency Programs

Final Report

November 14, 2018



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Table of Contents

Executive Summary

This report presents findings from a process evaluation of two programs seeking to improve the thermal efficiency of homes in Vermont: Efficiency Vermont's Home Performance with ENERGY STAR® (HPwES) program and Vermont Gas' Home Retrofit Program. The Vermont Department of Public Service contracted with West Hill Energy and its partner, Research Into Action, to complete this evaluation. This process evaluation complements an impact evaluation, to be provided in a separate report, which validates the energy savings the programs have achieved.

Evaluation Objectives

As summarized in Table 1, the process evaluation sought to provide insights to inform four broad program goals, each of which was associated with a more detailed set of research objectives.

Table 1: Process Evaluation Goals and Research Objectives

Process Evaluation Goal: Provide insights for how to. . .	Research Objectives
Increase participation rates	Assess motivations for participation
	Identify effective outreach approaches and compelling messages
	Assess awareness and uptake of financing options
	Understand reasons for low project volume and contractor inactivity
Increase average savings per participant	Identify barriers to participation and measure installation
	Identify opportunities to increase rate of project completion
	Assess whether major measures are installed outside the program
Reduce administrative cost	Assess program experience and identify opportunities to improve program processes
Improve installed measure quality and longevity	Understand the role of program participation in contractor's businesses
	Understand contractor approaches to HPwES assessments
	Understand approaches to identifying efficiency opportunities and estimating savings
	Assess participant satisfaction with measure quality and energy savings

Research Approach

The findings presented in this report draw from three key data sources:

- **Program staff interviews, data, and document review:** The evaluation team conducted interviews with program administrator staff and a detailed review of program documents to develop an understanding of Vermont's thermal efficiency programs. The evaluation team also reviewed program tracking data for the programs.
- **Contractor Interviews:** The evaluation team conducted phone interviews with contractors completing projects through the HPwES and Home Retrofit programs. In total, the evaluation team completed interviews with 17 contractors, including active, high-volume HPwES contractors (10 interviews), active, low-volume HPwES contractors (3 interviews), inactive HPwES contractors (1 interview), and Home Retrofit contractors (3 interviews).
- **Participant survey:** The evaluation team conducted an online survey of Vermont homeowners who received an energy audit through either the HPwES or Home Retrofit program between January 1, 2016 and October 10, 2017. A total of 189 respondents (159 HPwES participants and 30 Home Retrofit participants) completed the survey.

Key Findings

The evaluation team identified the following key findings related to each area in which the evaluation sought to provide insight for program improvement.

Increase Participation Rates

Energy cost savings are important motivator for participants to pursue an energy audit. A desire to reduce energy bills was the most common reason participants reported they sought an energy audit and was the benefit participants most often recalled discussing with their auditor or contractor. Energy cost savings was also the factor participants most often reported as influential in their decision to make energy efficiency upgrades. Contractors described comfort as the most important selling point, but most nonetheless reported presenting energy efficiency upgrades to potential participants as investments that would pay for themselves over time through energy bill savings.

The value placed on comfort and other non-energy benefits differentiates participants who made auditor-recommended improvements (completed participants) from those who did not (stalled participants). Completed participants were more likely than stalled participants to cite increasing the comfort of their homes as a motivation for seeking an energy audit. Completed participants were also more likely than stalled participants to recall discussing comfort and other non-energy benefits with their contractors, and were more likely to report that those benefits were influential as they considered the value of the recommended energy efficiency improvements. Contractors reported improved comfort was the most effective selling point for energy efficiency improvements.

The cost of energy efficiency improvements and participant reluctance to take on financing are the greatest challenges limiting completion of energy efficiency improvements. Participant survey respondents reported that an inability to afford the cost of the recommended improvements was a key

factor preventing them from making recommended energy efficiency improvements or making additional improvements. However, awareness of energy efficiency financing options was high, and few participants indicated they did not believe they would be able to access the available financing offerings. The interviewed contractors also reported that cost and reluctance to take on financing were the most common reasons participants decide not to go forward with recommended improvements.

Differences in project volume between contractors reflect differences in business strategy more than their organizational capacity. Inactive and low-volume contractors reported they had not completed more HPwES projects because residential energy efficiency improvements were not their business' primary focus. High volume HPwES contractors varied in the extent to which their businesses focused on the program. Some large contractors completed a high volume of HPwES projects, but these projects still made up only a small portion of their overall workload. Other contractors completed a similarly high volume of HPwES projects, and reported those projects made up a majority of their business. Home Retrofit contractors showed similar variation.

HPwES contractors' views on the strength of the market for energy efficiency retrofits were mixed, but few had seen growth in the volume of HPwES projects they completed in recent years. Contractors reported that few homes remained with low-cost, high savings opportunities, and low fuel prices reduced the economic benefit of energy efficiency improvements. Low-volume HPwES contractors further elaborated that, while they saw market demand for small projects ($5,000 or less) or single-measure improvements, there was less demand for larger, more comprehensive retrofits.

Increase Savings Per Participant

Completed participants reported more positively on their audit experience and perceived greater value from their audits than stalled participants. Completed participants were more likely to report the value of the information they gained from their audits exceeded the cost of the audits and to give positive ratings to elements related to their interactions with the auditor and the audit experience.

A relatively high proportion of participants appear to install measures outside the program that could impact the thermal efficiency of their homes, although it is unclear if these improvements would meet the programs' efficiency standards. Approximately 40% of HPwES participants reported making one or more energy efficiency improvements for which they did not seek a rebate. The most common reasons participants said they did not seek a rebate were that they believed the improvement would not qualify, or they were unsure if it qualified, for a rebate.

Non-energy benefits may drive thermal improvements installed outside the program. The improvement most often installed without a rebate was high efficiency windows or doors. Windows and doors can be a relatively high-cost measure relative to the energy savings they provide, and do not currently qualify for rebates under the HPwES program. Nonetheless, windows and doors can be appealing to participants due to the non-energy benefits they provide. The next most frequent measure participants installed without a rebate was air sealing. While the participant survey did not collect data on the scope of air sealing projects completed without program incentives, air sealing improvements can range from installing weather stripping to comprehensive, blower-door directed efforts to reduce air leakage.

Reduce Administrative Costs

Most HPwES contractors seek to reduce their own administrative costs associated with the program by waiting to take measurements with diagnostic equipment and prepare a formal audit report until a participant has committed to making improvements. Contractors identify energy efficiency opportunities during their initial visit to a potential participant's home through what they described as a "walk-through" audit, which may take between 45 and 90 minutes. Contractors reported that this approach allows them to avoid taking on the most time-intensive elements of an audit – diagnostic testing and preparing a report – if a participant is unlikely to move forward with energy efficiency retrofits.

For most contractors, Efficiency Vermont's decision to discontinue the $100 audit review incentive at the end of 2016 appears to have had little impact on audit or data submission practices. Neighborworks of Western Vermont, which completes a high volume of HPwES audits through its H.E.A.T. Squad program, reported that, without the incentive, they could no longer afford to report audits that do not move forward. Most of the interviewed contractors, however, reported that their reporting practices had not changed. While they complete comprehensive audits only for customers they believe are likely to move forward with recommended upgrades, they report all the comprehensive audits they complete to Efficiency Vermont. These contractors are unlikely to report the walk-through audits they complete that do not move forward with improvements, however.

Contractors did not identify major inefficiencies or challenges with participation in either program. HPwES contractors reported high satisfaction with their experience with the HPwES program and interactions with Efficiency Vermont. Most contractors reported relatively little difficulty with the program's data tracking and quality assurance and control requirements. Contractors also generally rated the program-provided resources they had used as valuable. Home Retrofit contractors also expressed high satisfaction with the program and their interactions with Vermont Gas.

Improve Installed Measure Quality and Longevity

Participants perceive their energy efficiency improvements to be of high quality and to provide the expected energy savings. Participants were generally satisfied with the quality of their contractors' work, with 82% reporting they were satisfied and 6% reporting they were dissatisfied (the remainder gave neutral ratings). Large majorities of participants reported their energy usage had decreased (83%) and their energy bills were lower (76%) as a result of their energy efficiency improvements.[1] Most of these participants (88%) reported achieving as much or more energy savings than they expected.

Contractors did not indicate that they frequently encounter challenges in installing measures to the program's quality standards. As noted above, most contractors reported that it was not difficult to meet the program's quality assurance and control standards. In open-ended responses, the interviewed contractors did not suggest that they frequently encounter challenges in completing quality installation of program measures.

[1] The difference in proportions between participants reporting their energy usage had decreased and those reporting their energy bills were lower is not statistically significant.

Conclusions and Recommendations

Conclusion 1: Both the HPwES and Home Retrofit programs are mature with well-established and clear, if somewhat different, participation processes. Contractors that work frequently with the programs understand these processes, and both contractors and participants are highly satisfied with them.

Neither participants nor contractors identified any areas of difficulty or confusion in the participation process. The HPwES program has developed a very flexible participation process that allows contractors freedom to customize their approach to key program delivery elements like conducting audits. The Home Retrofit program, in contrast, takes on much of the work of recruiting customers and identifying opportunities, leaving contractors to focus on installing measures.

Conclusion 2: The HPwES program allows contractors a great deal of flexibility in their program delivery approach to foster the creation of an independent market for home efficiency retrofits, but that flexibility comes at the expense of some market intelligence.

To allow contractors to most effectively build a business model around HPwES projects, and as a result to build a market for Home Performance retrofits in Vermont, the HPwES program provides contractors with a great deal of flexibility around the approach they take to conducting energy audits. While this flexibility allows contractors to deliver the program in a way that is most efficient for their business, it limits the program's visibility into customer interactions that do not become program retrofits, which in turn limits the program's ability to target its outreach and adjust program offerings.

> **Recommendation: Efficiency Vermont staff should consider opportunities to motivate contractors to submit data on potential HPwES projects they encounter but which do not move forward with rebates**. Most contractors do not complete full, diagnostic audits for projects they do not anticipate will move forward, and it would be impractical for the program to require them to do so. However, there may be an opportunity for Efficiency Vermont to capture less detailed, but nonetheless useful, information from the less formal, walk-through assessments contractors typically conduct. For example, Efficiency Vermont could encourage contractors to provide this information by ensuring that audit tools are easy-to-use and that contractors can complete them as they move through a home. Reinstating an audit reporting incentive or incorporating reported audits into the assessment of a contractor's annual production bonus may also encourage participants to report these data, assuming the reporting process was easy.

Conclusion 3: The programs may be better able to attract the remaining customers in the market with refreshed value propositions that extend beyond savings and comfort.

Energy cost savings was an important motivator for both stalled and completed participants to have an energy audit, and a benefit that auditors frequently discuss with participants. Nonetheless, energy cost savings may not be enough to drive many participants to make the improvements those audits recommend, particularly with fuel prices relatively low. Increasing comfort was also a common motivator, particularly for complete participants. Comfort was a less common motivator among stalled participants, some of whom may not perceive their homes to be uncomfortable. As a result, the programs may need to develop additional value propositions that appeal to these participants.

Recommendation: Efficiency Vermont and Vermont Gas should work to refresh contractors' current selling points around energy cost savings and comfort and develop messaging and value propositions around a broader array of benefits. While contractors bear the primary responsibility for recruiting projects in the HPwES program, they have found the program's training opportunities to be very valuable. As a result, the program could develop new and renewed selling points and value propositions around energy cost savings, comfort, and other benefits and disseminate those selling points to contractors through program-provided training. One area that may provide an opportunity as a selling point is the potential for energy efficiency improvements to increase home values. While this did not arise as a notable consideration in retrofit decisions, it was one of the most frequent benefits participants reported experiencing from their efficiency retrofits. Other frequently-cited motivations and considerations included environmental and community benefits.

Conclusion 4: Process evaluation findings provide context for further investigation into causes of low realization rates.

The impact evaluation that accompanies this process evaluation found a lower-than-expected realization rate for the HPwES program. The evaluation team has identified three factors that may contribute to low realization rates. The impact team is developing approaches to investigate the degree to which each of these factors affected the impact findings. This process evaluation can support these efforts by providing useful context for understanding each one, as we discuss in the following sections.

Inaccurate Model Inputs

If key characteristics of a home or the equipment being replaced are entered into an energy savings model inaccurately, it could result in inaccurate estimates of the energy savings likely to result from a retrofit project. This process evaluation does not assess the accuracy with which HPwES contractors report these data. Findings suggest the accuracy is sufficient to meet contractors' needs, and to satisfy customer expectations, but further investigation is necessary to determine whether more accurate data would lead to a higher realization rate.

Two factors motivate contractors to accurately report data: the need to meet the program's reporting requirements and a desire to manage their customers' expectations about energy savings so their customers are satisfied. Most of the interviewed contractors reported little difficulty gathering the needed information, including fuel usage data, or entering it into the HPwES program's HERO modeling and reporting tool. Participant survey findings suggest that participants are satisfied with their savings estimates from contractors, with most (88%) reporting they had at least the level of energy savings they expected.

If further investigation determines more precise reporting requirements would lead to higher realization rates, then the program may need to consider how to impose more stringent requirements in a way that would prevent contractors from dropping out of the program. For example, the program could restructure the annual bonus incentives it offers contractors to reward realized energy savings rather than project volume alone, as the current incentive does.

Inaccurate Energy Savings Models

Inaccuracies in the algorithms and assumptions that generate energy savings estimates could lead to an over-estimation of energy savings. While a review of the calculations and assumptions that inform these

estimates was outside the scope of this evaluation, the research team did assess contractors' use of the HERO tool. As noted above, most contractors reported little difficulty using the HERO tool, and most (8 of 10 high volume contractors) provided specific energy savings estimates to their customers. Finally, contractors did not indicate dissatisfaction with the energy savings estimates the HERO tool provides.

Improper Measure Installation

Improperly installed or commissioned measures may not provide the level of energy savings that models predict, since they assume proper installation. Efficiency Vermont conducts quality assurance field inspections on a sample of projects to ensure installed measures meet program standards. A large majority of high-volume contractors (8 of 9) reported that meeting these requirements was not difficult. However, since this evaluation did not include a detailed review of the inspection process or inspection findings, the evaluation team cannot draw conclusions about the effectiveness of this process.

> **Recommendation: Investigate reasons for low realization rate for unregulated fossil fuel heating measures.** This recommendation parallels one included in the impact evaluation. From a process perspective, it is it is important to understand the key causes of low realization rates and target any interventions to increase realization rates accordingly. It is particularly important for the program to carefully target any solutions that impact program processes or requirements for contractors. Given the central role that contractors play in delivering the HPwES program, their input and buy-in will be critical to the success of such changes. Overall, the program should avoid placing greater burdens on contractors, without compensating them in some way for their additional efforts.

1. Introduction

This report presents findings from a process evaluation of energy efficiency programs seeking to reduce energy use and increase thermal comfort in residential structures in Vermont. The evaluated programs include Efficiency Vermont's Home Performance with ENERGY STAR® program and Vermont Gas' (VGS) Home Retrofit Program. The Vermont Department of Public Service contracted with West Hill Energy and its partner, Research Into Action, to complete this evaluation. This process evaluation assesses participants' and contractors' experience with the program and opportunities for program improvement. It complements an impact evaluation, which validates the energy savings the programs have achieved.

1.1. Program Descriptions

This section provides brief descriptions of the programs included in this evaluation.

Home Performance with ENERGY STAR (HPwES)

Efficiency Vermont's HPwES program supports improvements to the insulation and heating, ventilation, and cooling systems of residential properties in Vermont with less than five units.[2] The program offers participants incentives ranging from $500 to $2,500 based on the measures they install and the reduction in air leakage they achieve Table 2 lists the incentives currently available through the HPwES program. At a minimum, to qualify for incentives, participants must install all the health and safety improvements (e.g. carbon monoxide detectors, mechanical ventilation) their contractor recommends and reduce their home's air leakage by at least 10%. Participation is open to Vermont residents who use any heating fuel. Participating homeowners designate who will receive the participant incentive; they can choose to receive it directly or allocate it to a contractor who would deduct the incentive amount from the final invoice.

Table 2: Current HPwES Participant Incentives

Measure	Criteria	Customer Incentive
Minimum Overall Requirement	• Install all recommended health and safety improvements • Reduce air leakage by at least 10%	$500
Air Sealing	• Reduce air leakage by 20-35%	$250
	• Reduce air leakage by more than 35%	$500
Insulation	• Install insulation meeting or exceeding specified R-values for the location the insulation is installed • Locations include: attic flat ceilings, vaulted ceilings and floors, walls, and foundation and rim joists	$0.40 per sq. ft. of new insulation

[2] Incentives for cooling equipment only apply to heat pumps.

Measure	Criteria	Customer Incentive
Heat Distribution Improvement	• Seal ducts, repair leaks, insulate boiler pipes, or address similar measures at a cost of at least $200	$75
Comprehensive Retrofit Bonus Package	• Install qualified insulation in areas equivalent to at least 75% of the home's finished floor area	$250

A participating contractor network delivers the HPwES program. Participating contractors must maintain a current certification through the Building Performance Institute (BPI), demonstrate technical ability and customer service skills, and complete a minimum number of HPwES projects each year. In addition to participant incentives, the HPwES program offers contractors incentives of $50 for each qualified project they submit that meets the program's reporting requirements, and contractors can qualify for an annual bonus incentive ranging from $500 to $3,000 based on the number of projects they complete.

While Efficiency Vermont markets the program through its website, mailings, advertisements, and participation in events, participating contractors are also responsible for recruiting participants to the program. Once a participating contractor recruits a participant into the program, that contractor acts as the participant's primary point of contact throughout the participation process. The contractor:

- Works with participants to identify energy efficiency opportunities and gather pre-retrofit measurements to estimate the energy savings likely to result from efficiency improvements
- Addresses participant questions and concerns as necessary to make the sale of the recommended efficiency improvements
- Installs the energy efficiency improvements
- Completes the HPwES program's incentive tool to report pre- and post-retrofit conditions.

To facilitate contractors' ability to build a business model around HPwES projects, Efficiency Vermont leaves the specific approach contractors use to complete these tasks to the contractors' discretion. For example, contractors may choose to complete a comprehensive energy audit, or they may identify efficiency opportunities through a walk-through of the home and wait to take more detailed measurements until the participant has expressed interest in moving forward with the recommended improvements.

Efficiency Vermont conducts quality assurance reviews of HPwES projects to ensure the projects meet the program's standards. These reviews include both review of project documentation and field inspections of measure installation. Efficiency Vermont conducts field inspections on at least 5% of each participating contractor's projects each year, with all contractors receiving an inspection on at least one project each year.

Home Retrofit

Like HPwES, Vermont Gas' Home Retrofit program supports improvements to a home's insulation and air sealing, heating system, and domestic hot water system. The program offers an incentive of one-third of the project cost for eligible retrofits to homeowners who pay the gas bill directly, with higher incentives (half of project costs) available for owners of rental properties where the tenant pays the gas

bill. Vermont Gas also supports a loan offering to allow participants to finance the remaining project cost at a reduced interest rate. To participate in the Home Retrofit program, homeowners must be Vermont Gas customers and must meet a minimum energy usage threshold (at least 50,000 BTUs per square foot per year).[3]

Vermont Gas markets the Home Retrofit program to participants. Vermont Gas staff screen participants for eligibility and conduct energy audits for eligible participants at no cost. Home Retrofit program energy audits include a comprehensive review of the building shell and heating equipment, including a blower door test and infrared imaging, and gather inputs to model an energy profile of the home, which the auditor uses to recommend the most cost-effective efficiency improvements. Auditors follow-up with participants to answer any questions and provide any support needed after the audit.

Vermont Gas maintains a list of FastTrack contractors that provide standard pricing for insulation and air sealing services. Using this standard pricing, auditors can provide participants with accurate cost estimates for the recommended upgrades. If a participant chooses to make upgrades using a FastTrack contractor, the auditor will select a contractor from the list that is best suited to the project's needs. Participants also have the option of selecting a contractor on their own or installing the recommended measures themselves. VGS conducts quality assurance inspections of complete projects. In addition, it is common for VGS auditors to be present during measure installation, providing an opportunity to give informal feedback to contractors.

1.2. Evaluation Objectives

The Department of Public Service articulated four areas of program improvement for the process evaluation to investigate: to identify ways to increase participation rates, increase average savings per participant, to reduce administrative costs, and to improve installed measure quality and longevity. We operationalized these four evaluation goals into a series of specific research objectives that the process evaluation data collection activities (discussed further in Chapter 2) addressed, as summarized in Table 3.

[3] Minimum energy usage criteria do not apply to residents of Addison County. Vermont Gas may also waive the criteria on a case-by-case basis if other information indicates a notable energy savings potential.

Table 3: Data Source Summary

Process Evaluation Goal: *Provide Insights for How To:*	Research Objectives	Data Sources			
		Staff Interview & Data/Doc. Review	Stalled Part. Surveys	Complete Part. Surveys	Contractor Interviews
Increase participation rates	Assess motivations for participation		X	X	
	Identify effective outreach approaches and compelling messages	X		X	X
	Assess awareness and uptake of financing options		X	X	
	Understand reasons for low project volume and contractor inactivity	X			X
Increase average savings per participant	Identify barriers to participation and measure installation	X	X		X
	Identify opportunities to increase rate of project completion		X		X
	Assess whether major measures are installed outside the program		X	X	X
Reduce administrative cost	Assess program experience and identify opportunities to improve program processes	X	X	X	X
Improve installed measure quality and longevity	Understand the role of program participation in contractor's businesses				X
	Understand contractor approaches to HPwES assessments	X			X
	Understand approaches to identifying efficiency opportunities and estimating savings	X			X
	Assess participant satisfaction with measure quality and energy savings			X	

The HPwES and HR programs, as is typical for programs targeting whole-building thermal efficiency, encourage participants to make large, complex upgrades. To support these upgrades, the programs and their participating contractors work closely with participants through a multi-step participation process. As a result, increasing the program's "closure rate" – that is, the proportion of participants who complete the full participation process – is a key opportunity to increase the efficiency of program delivery. Identifying the factors that either encourage customers to fully participate, or conversely, to become stalled in the process are important aspects of this process evaluation.

Ensuring that each installation realizes its predicted savings through improving the quality and longevity of installed measures provides another opportunity to increase the efficiency of program delivery. This evaluation gathered data on savings estimation practices and the needs and opportunities to increase the quality of measure installation to meet predicted savings levels. However, logistical challenges

prevented us from completing a detailed analysis of installation quality and opportunities to improve savings realization rates. As a result, this was a secondary focus to identifying opportunities to reduce the number of participants who become stalled after entering the program.

1.3. Structure of This Report

The next chapter describes the data sources that inform this evaluation. Chapter 3 focuses on findings from interviews with participating contractors, and Chapter 4 presents findings from a survey of program participants. Chapter 5 presents overarching conclusions and recommendations that draw on multiple data sources.

2. Evaluation Approach

The findings presented in this report draw from four key data sources: program staff interviews and document review, analysis of program tracking data, interviews with participating contractors, and a survey of participants. The sections below describe each data source. Data collection instruments are included in the appendices.

2.1. Program Staff Interviews and Document Review

The evaluation team conducted interviews with program administrator staff and a detailed review of program documents to develop an understanding of Vermont's thermal efficiency programs. We conducted an initial round of interviews early in the evaluation as well as follow-up interviews to clarify specific points. In addition to interviews with Efficiency Vermont and Vermont Gas staff, we spoke with staff of Neighborworks of Western Vermont, which promotes energy efficiency retrofits in select counties in Vermont through its H.E.A.T. Squad program. While the H.E.A.T. Squad program is outside the scope of this evaluation, this interview provided valuable context on the way H.E.A.T. Squad and HPwES work together. In addition to interviews with program staff, we drew on documents including Processes and Procedures manuals, application forms, example audit reports, process flow diagrams, and example marketing collateral to further understand program offerings and processes. The evaluation team also gathered data on program trends from analysis of program tracking data.

2.2. Contractor Interviews

The evaluation team conducted phone interviews with contractors completing projects through the HPwES and Home Retrofit programs. Program data identified 74 contractors associated with HPwES projects and 16 contractors associated with Home Retrofit projects between 2014 and 2017. The evaluation team used two criteria, listed in Table 4 to focus contractor outreach to increase the likelihood that a limited number of interviews would provide relevant and useful data. Forty-six of the 74 HPwES contractors and 11 of the 16 Home Retrofit contractors listed in the program data met both of these criteria.

Table 4: Contractor Sampling Criteria

Criteria	Definition	Rationale
Recent program activity	• HPwES Contractors: At least one audit reported in 2016 (last full year for which program data were available) • Home Retrofit Contractors: At least one installation reported in 2016	• Contractors who have not worked with the program in more than a year are less likely to accurately recall their experience with the program, interactions with program staff, and customer reactions to the program. • Program policies and offerings (e.g. availability of audit review incentive) may have changed since contractors with long periods of inactivity last worked with the program.

Criteria	Definition	Rationale
Good program standing	• Contractors not removed from program for disciplinary reasons	• While contractors removed from the program for disciplinary reasons may have valid feedback, in some cases the evaluation team would likely not be able to effectively judge whether a particular concern truly reflects an opportunity for program improvement or a legitimate program effort to maintain standards for installation quality.

To obtain a diverse range of contractor viewpoints, the evaluation team classified the remaining contractors into four sub-groups. The largest group of contractors targeted for interviews were active, high-volume HPwES contractors, as these contractors have the most experience working with HPwES participants and interacting with program processes. However, the evaluation team also sought the perspectives of low-volume HPwES contractors, inactive HPwES contractors, and VGS contractors. Table 5 summarizes these groupings.

Table 5: Contractor Sampling Sub-Groups

Group	Definition	Population Size	Number of Interviews Completed
HPwES Active, High-Volume	HPwES contractors with "active" status and at least 20 assessments reported in the 2014-2016 period	31	10
HPwES Active, Low-Volume	HPwES contractors with "active" status and less than 15 assessments reported in the 2014-2016 period	9	3
HPwES Inactive	HPwES contractors with "inactive" status or no status listed	3	1
VGS Home Retrofit	Home Retrofit contractors completing at least 3 installations in the 2014-2016 period	8	3

Interviewers made up to five attempts to reach each contractor by phone. The interviews included a combination of open-ended and closed-ended questions, and interviewers used a computer-aided telephone interface (CATI) system to capture interview responses. With respondents' permission, interviewers also audio recorded the interviews to ensure accuracy of the interview notes.

2.3. Participant Survey

The evaluation team conducted an online survey of participants in the HPwES and Home Retrofit programs to understand their motivations for participation, barriers to installation of recommended measures, and to assess the extent to which participants install measures outside the programs. The survey also assessed the participation experience. The evaluation team limited survey invitations to participants who had an audit between January 1, 2016 and the date of the evaluation team's data pull,

in October 2017, to increase the likelihood that respondents would have good recall of their participation experience and the associated decision-making.

Efficiency Vermont's (EVT's) program tracking database identified a population of 1,475 energy audits completed between January 1, 2016, and October 10, 2017. Vermont Gas records identified 207 audits completed for the Home Retrofit program over the same period. From this population list, we extracted reachable contacts by email (64% of the population) to develop a sample frame. The final sample distribution by the program administrator closely resembles the population's as shown in Table 6.

Table 6: Population, Sample Frame, and Sample

	Population		Sample Frame		Sample	
	Count	Column %	Count	Column %	Count	Column %
Efficiency Vermont	1,475	88%	785	82%	159	84%
Vermont Gas	207	12%	172	18%	30	16%
Total	**1,682**	**100%**	**957**	**100%**	**189**	**100%**

We implemented the online survey between May 10th and 24th, 2018. Potential respondents received an initial invitation email with a link to the online survey, and those that did not respond received three reminder emails over the course of the survey period. We received 189 fully completed responses, and the total response rate was 21%.

3. Contractor Interviews

This chapter presents findings from interviews with contractors participating in Efficiency Vermont's Home Performance with ENERGY STAR and Vermont Gas' Home Retrofit programs. As described in greater detail in Section 2.2, these interviews targeted three sub-groups of contractors:

- High-volume HPwES contractors, defined as those who reported at least 20 assessments to the program between 2014 and 2016.
- Low-volume and inactive HPwES contractors, defined as those that reported less than 15 assessments to the program between 2014 and 2016 or those with a status of "Inactive" in the program database.
- High-volume VGS contractors, defined as those who completed at least three installations between 2014 and 2016.

The interviews sought to understand the role program participation plays in contractors' larger business, to identify opportunities to increase project completion, and to assess contractors' experiences with program processes and support. The interviews also sought details on how HPwES contractors present and deliver the program to potential participants

Contractors play a much larger role in the HPwES program than in the Home Retrofit program. HPwES contractors are responsible for recruiting participants, identifying efficiency opportunities, conducting pre- and post-retrofit diagnostic testing, and installing measures. In contrast, Vermont Gas leads participant recruiting efforts and conducts assessments for the Home Retrofit program, and contractors have a more limited role, focused on measure installation. As a result, the bulk of this chapter focuses on the experience with HPwES contractors. Section 3.5 addresses the experience of Home Retrofit contractors.

3.1. HPwES Contractor Approach to Program

High-volume contractors complete most HPwES projects as stand-alone energy efficiency retrofits. All but one high-volume contractor reported completing the majority of their HPwES projects as stand-alone energy efficiency retrofits, rather than as part of a larger remodel that includes non-energy elements. Although most reported that fewer than half of their HPwES projects combine installation of energy efficiency improvements with larger retrofits, high volume contractors varied in their reports of how frequently they do so. While five reported they combine energy efficiency improvements with larger remodels very rarely (less than 10% of the time), four reported doing so somewhat more frequently (between 11% and 40% of the time).[4]

Interview findings suggest that the volume of projects contractors conduct through the HPwES program reflects their business strategy to a greater extent than their organizational capacity. Contractors who conducted a high volume of projects through the program varied widely in the share of

[4] The remaining contractor was an outlier, reporting that more than 90% of their HPwES projects were part of a larger remodel.

their overall business that HPwES projects make up. Most low-volume and inactive contractors, in contrast, reported that HPwES projects make up very little of their overall business (Table 7). Two low-volume contractors reported their businesses primarily focus on auditing commercial buildings, and their work may not translate well to most residential projects, where customers may be unwilling to pay the expense of a detailed audit report and may prefer a contractor that offers turnkey auditing and installation services. While the other low-volume contractor and the inactive contractor reported focusing on residential work, both noted their businesses were shifting away from full-scale delivery of HPwES projects.

Table 7: HPwES Projects as Proportion of Contractor's Total Business

HPwES Projects as a Proportion of Contractor's Total Business	High Volume Contractors (n=10)	Low Volume & Inactive Contractors (n=4)
Almost all (>90%)	1	0
Most (61-90%)	3	0
About half (41-60%)	2	0
A minority (11-40%)	2	1
Very little (>10%)	2	3

While few contractors experienced growth in the volume of HPwES projects they completed in the past few years, assessments of the strength of the market for efficiency retrofits were mixed. Most of the interviewed high-volume HPwES contractors reported the number of projects they had completed through the program had been steady (4) or decreased (4) over the past few years; two reported an increase.

Three of the four high-volume contractors who reported their project volume had decreased, along with one whose project volume had been steady, assessed the market for energy efficiency upgrades in Vermont as weak. These respondents gave two main reasons for the weakness they saw in the market. First, three noted that few homes remained with low-cost, high-savings opportunities: there was little "low-hanging fruit." Three contractors also noted that low fuel prices reduced the economic benefit of efficiency improvements. The assessment that the market for efficiency upgrades was weak was not universal, however. An equal number of contractors to those that assessed the market as weak (4) reported the market was strong, noting they had seen steady or growing demand for retrofit services.

Two of the three interviewed low-volume HPwES contractors suggested that there was demand in the market for small projects ($5,000 or less) or single measure improvements like window replacements or solar installation. These contractors reported less demand for larger, more comprehensive efficiency retrofits.

The number of HPwES contractors declined from 2014 to 2016, and with them the number of assessments decreased. HPwES program data indicate the number of contractors active in the HPwES program (defined as those who conducted at least one assessment each year) declined from a high of 64 in 2014 to 41 in 2017. While new contractors entered the program each year, a greater number left the program.

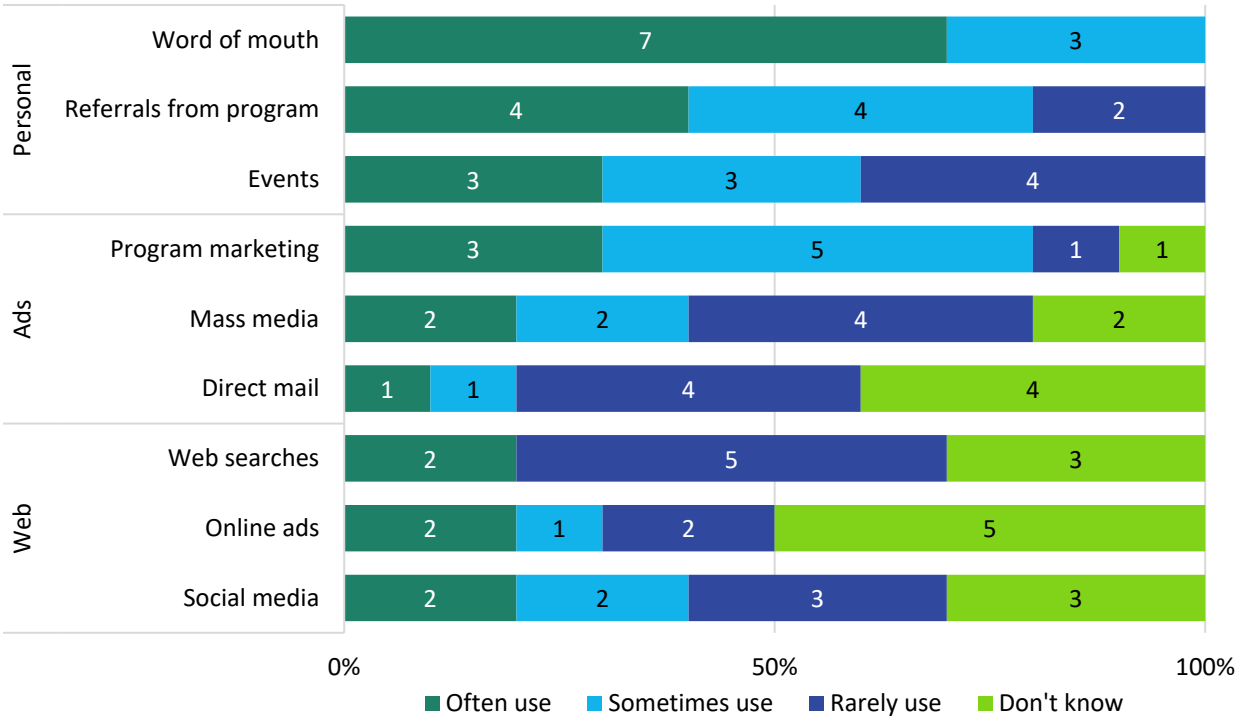
3.2. Approach to HPwES Program Delivery

Contractors are central to the delivery of the HPwES program. They are the primary actors responsible for recruiting projects to the program and identifying energy efficiency opportunities for participants. This section reviews the interviewed contractors' approaches to project recruiting and conducting home energy assessments.

Project Recruitment

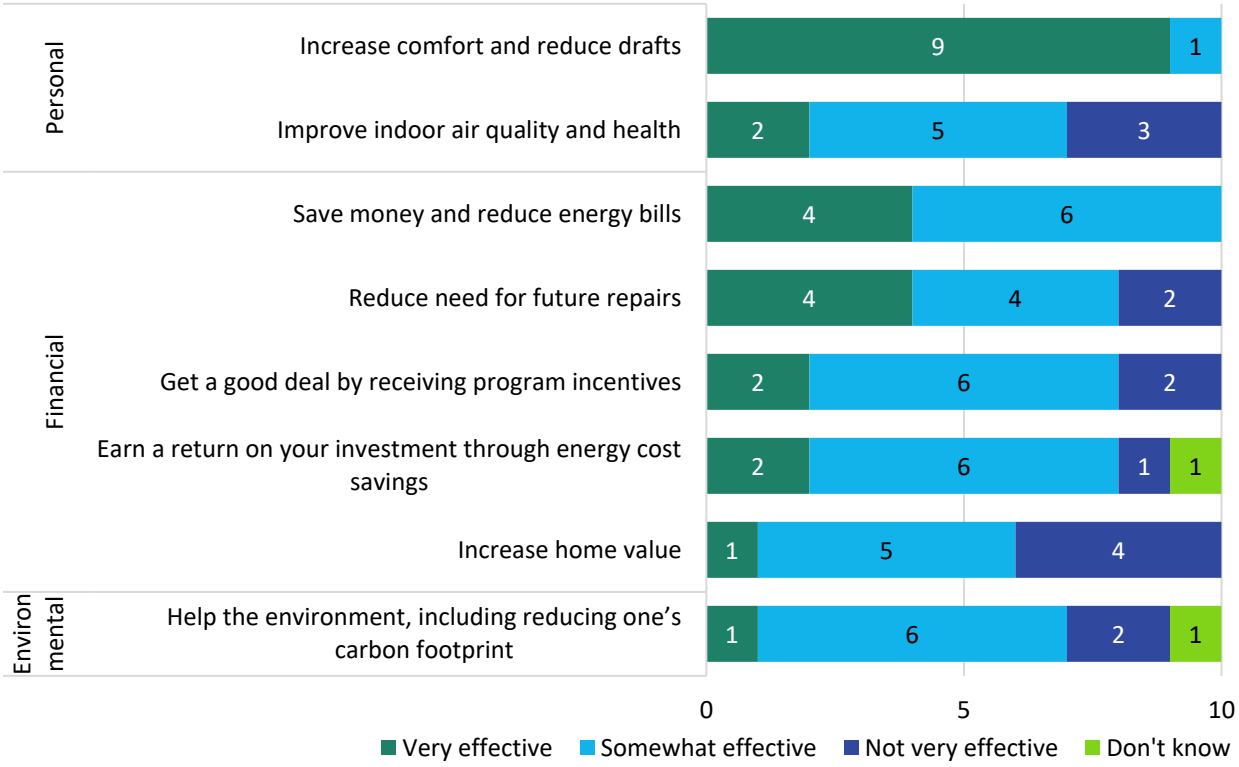
Person-to-person outreach is important in recruiting HPwES projects. Contractors were most knowledgeable about their companies' efforts to recruit projects for HPwES projects through person-to-person outreach like word of mouth, referrals from the HPwES program, and attending community events, and most often reported using these approaches. Contractors were less knowledgeable about, and less often reported using, traditional advertising and web-based outreach approaches.

Figure 1: High-Volume HPwES Contractor Outreach Approaches



Contractors view the potential to increase comfort in the home as the most effective selling point for energy efficiency improvements. All but one contractor reported the potential to increase comfort and reduce drafts was a very effective selling point to encourage customers to make efficiency improvements. While fewer high-volume contractors reported saving money was a very effective selling point, all found it at least somewhat effective. Nonetheless, half of the high-volume contractors reported at least one selling point other than energy cost savings or comfort was very effective, and all reported one or more was somewhat effective. These findings suggest that contractors use these points in addition to the "comfort" benefits or that, for some customers, these points make a difference.

Figure 2: High-volume HPwES Contractor Assessments of Selling Points for Efficiency Improvements



Most high-volume HPwES contractors (8 of 10) present efficiency improvements as an investment. These contractors reported they provide customers with estimates of the energy savings for the recommended efficiency improvements and also present those savings as a return on the participant's investment. Two elaborated that they seek to do so in a way that is accessible to participants. One reported presenting the net monthly cost to the participant were they to take out an energy efficiency loan at 2.49%. The other said "I don't think my customers are doing the return on investment, but they like to see the savings."

While a large majority of the interviewed high-volume contractors present specific estimates of energy and cost savings to their participants, most did not view these estimates as the improvements' primary selling point. Half of the high-volume contractors that provide estimates of energy and cost savings (4 of 8) reported they were important in motivating participants to make the recommended improvements, although two of those noted that the potential to improve comfort was more important. Two contractors also noted that low fuel prices made cost savings a less compelling argument for participants. All four of the interviewed low-volume and inactive contractors also reported providing specific energy and cost savings estimates, and two noted that these elements help their customers prioritize the recommended improvements.

The two contractors that do not provide detailed estimates suggested that doing so can be problematic if the projected savings do not occur. One of these reported avoiding this risk by focusing on improved comfort. The other respondent noted that they "do not know how [the homeowner] lives and uses their

house" and expressed concern that customers will hold them responsible if the savings do not materialize.

Assessments

Most high-volume HPwES contractors (8 of 10) reported they identify energy efficiency opportunities during their initial visit to a customer's home without conducting an audit with diagnostic equipment and preparing a formal audit report. Some contractors described this initial visit as a "walk-through" and stated it takes between 45 and 90 minutes. According to one contractor, "We don't need a blower door to tell us if the house is inefficient… We have been doing this for a long time and have the experience to do this." In open-ended responses two contractors elaborated that, in their walk-through assessments, they take the same measurements that they would in a diagnostic audit, with the exception of those that require diagnostic equipment. A third stated that preparing formal audit reports was the most time-consuming element, and reported they use diagnostic equipment on their initial audits, but do not prepare a formal report.

Most of the interviewed HPwES contractors reported charging customers for their audits, although half reported they waive or credit this fee if the customer hires them to make the recommended improvements. The amounts contractors reported charging for audits ranged from $200 to $600, with most of those specifying a price (5 of 8) citing figures in the lower half of that range ($200-$600).

Efficiency Vermont's decision to end the $100 audit review incentive at the end of 2016 appears to have had little impact on contractors' audit or data submission practices. While Neighborworks of Western Vermont reported that, without that incentive, they could no longer afford to report audits that do not move forward, the other interviewed contractors reported their reporting practices had not changed. Most contractors (9 of 10) indicated they report all the comprehensive audits they complete to Efficiency Vermont, although contractors may not conduct all the elements of a comprehensive audit until a customer has decided to make energy efficiency improvements and may not report these "walk-through" audits.

3.3. HPwES Project Completion

High-volume HPwES contractors varied widely in their estimates of the proportion of customers to whom they recommend efficiency improvements that end up participating in the program. While estimates ranged from 20% to 90%, most respondents (6 of 10) stated that between 30% and 50% of their customers move forward with the improvements they recommend. Two contractors noted that their conversion rates had decreased. One of these contractors attributed the decrease to a shift from a $400 comprehensive audit to a free walk-through to scope the project. The other contractor was unsure of why their conversion rate had decreased.

Contractors noted characteristics of both participants and their homes as indicators those participants were likely to move forward with the recommended energy efficiency improvements. Contractors reported that older (1 respondent), stick-built homes (1 respondent) were most likely to have retrofit opportunities that would be good candidates for the HPwES program. Contractors reported that participants with an open-ended interest in energy efficiency improvements, demonstrated through engagement in the audit, were also more likely to make upgrades (2 respondents). One of these contractors noted that participants "who are convinced they know what they need" are not good

candidates for the program, because they may not be open to opportunities beyond their perceived need. Finally, one contractor reported that participants who enter the program with a realistic expectation regarding the likely cost of energy efficiency improvements are more likely to move forward with a project.

High-volume HPwES contractors cited cost and reluctance to pursue financing as the primary reasons participants do not make recommended efficiency improvements. Seven contractors noted that the upfront cost or reluctance to take a loan for improvements was a frequent reason projects did not proceed, and one noted that home characteristics like vermiculite in the attic have the potential to greatly increase project costs. Two noted that homeowners sometimes choose not to complete a project because it would be too invasive or disruptive to the homeowner's schedule.

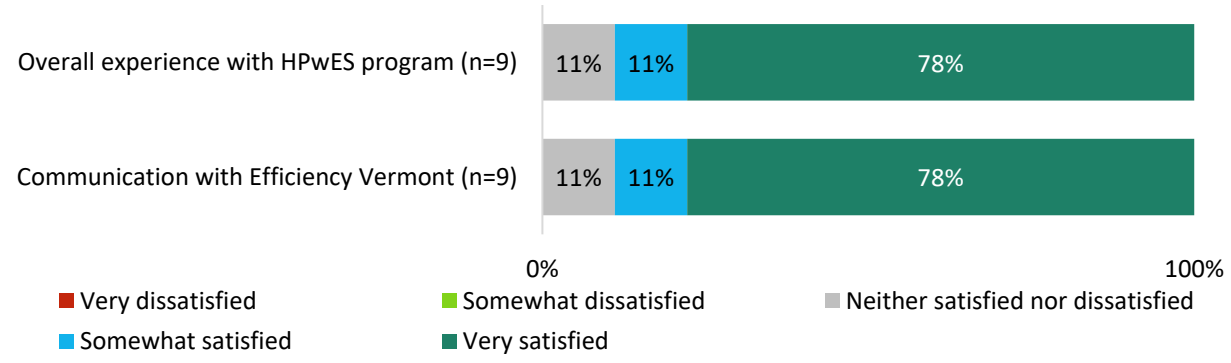
Contractors may opt not to invest the time and effort in the HPwES participation process for small projects or those that need to happen quickly. Four of the ten interviewed high-volume HPwES contractors and two of the three interviewed low-volume HPwES contractors reported they occasionally make improvements that would qualify for HPwES incentives but do not go through the program. Two high-volume and two low-volume contractors elaborated that they may choose not to use the program for eligible improvements on projects smaller than about $1,500 because the time and effort required for the incentive process would be too great relative to the overall project size. Another high-volume contractor noted that they may not go through the program if a customer needs to complete the improvements quickly.

3.4. Satisfaction with HPwES Processes and Resources

Overall Satisfaction

Overall, high-volume contractors were highly satisfied with their experience with the HPwES program and their interactions with Efficiency Vermont. All but two high-volume contractors reported they were very satisfied with both their overall program experience and their communication with Efficiency Vermont, and none reported they were dissatisfied with either element. In open-ended responses, three contractors praised Efficiency Vermont staff and noted that the program has been very "fair" and responsive to contractor's requests. Three contractors also reported that the program has increased awareness of efficiency services in the marketplace, and one stated that their affiliation with the program helps to give their firm credibility.

Figure 3: High-Volume Contractor Satisfaction with HPwES

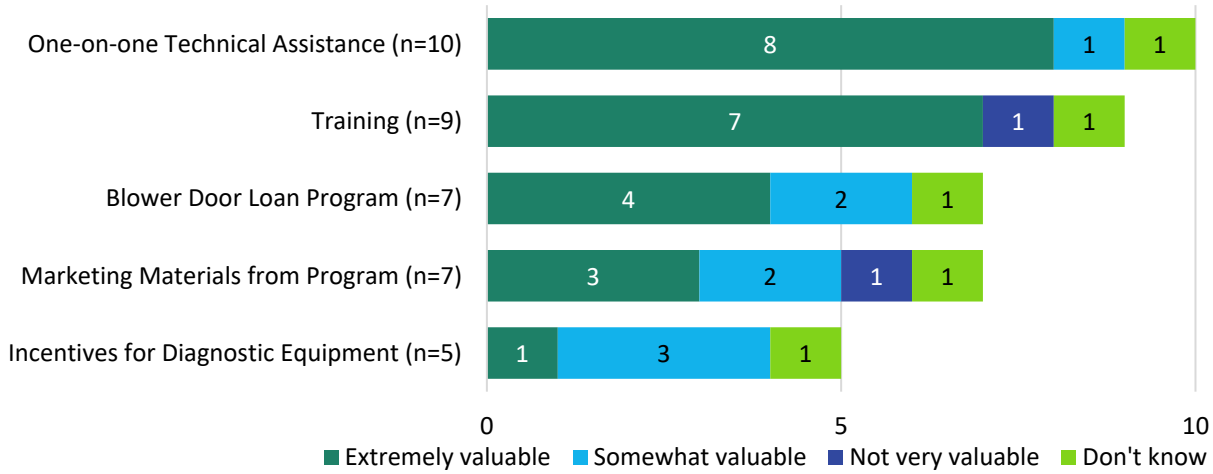


Contractor suggestions for program improvement most often focused on incentives. Six of the nine interviewed high-volume contractors suggested incentives should be increased. A seventh contractor suggested that the program should pay incentives directly to contractors. One low-volume contractor also suggested the program should increase incentives, particularly for measures like air-source heat pumps. Other suggestions for improvement included providing BPI certification and generally increasing awareness of the program among potential participants. Finally, a low-volume contractor suggested the program should divide its contractor network into two tiers, with one tier focused on single-measure retrofits and the other focused on larger, Home Performance and net-zero-energy projects.

Program Resources

Among the resources the HPwES program offers to contractors, high-volume contractors most often used one-on-one technical assistance and training and found those resources most valuable. All of the interviewed contractors had taken advantage of the one-on-one technical assistance and all but one reported it was extremely valuable (Figure 4). Seven of the nine contractors who had used the program's training offerings reported they were extremely valuable. Fewer contractors had used program marketing materials or taken advantage of the program's support in purchasing or borrowing diagnostic equipment, and those that did were less likely to rate these resources as extremely valuable, although most nonetheless found them at least somewhat valuable.

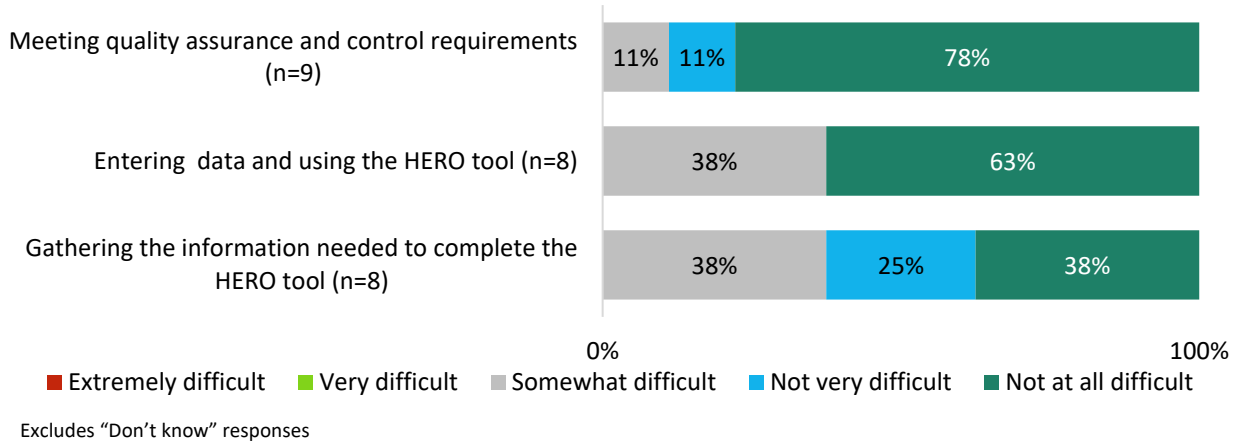
Figure 4: Use and Value of Program Resources



Data Collection and Reporting

While gathering the information needed to complete the HERO tool is the most difficult element of the program's reporting and quality assurance processes for High-volume HPwES contractors, none rated gathering the information as more than "somewhat" difficult (Figure 5). High-volume HPwES contractors were split on the ease of using the HERO tool itself, with most (5 of 8 providing a response) reporting the tool was not at all difficult to use and the rest (3 of 8) reporting the tool was somewhat difficult. The three contractors who found the tool somewhat difficult did not elaborate on which elements of the tool they found challenging.

Figure 5: High-volume Contractor Ratings of Difficulty of HPwES Reporting and QA/QC Processes



Excludes "Don't know" responses

Most contractors reported little difficulty obtaining the fuel usage data they needed from their customers. Nine of the ten interviewed high-volume contractors were aware of how frequently their HPwES customers could provide fuel usage data. Two-thirds of those contractors (6 of 9) reported they obtain documented records of fuel usage for at least 75% of their HPwES customers. On average, high-volume contractors reported receiving documented fuel usage data for 65% of their HPwES customers. Contractors' reports were split for HPwES participants who did not provide documented fuel usage data, with contractor reports of the proportion providing estimated fuel usage averaging 20% and contractor reports of the proportion not providing data averaging 15%.

3.5. Home Retrofit Contractors

As in HPwES, contractors reported that most Home Retrofit projects are stand-alone energy efficiency retrofits. Two of the three interviewed Home Retrofit contractors reported completing very few Home Retrofit projects as part of a larger remodel. The third contractor reported that, while they occasionally complete Home Retrofit projects as part of a larger remodel, they do so on a minority of their projects.

The interviewed contractors varied in the extent to which their businesses focus on Home Retrofit projects. Two of the interviewed Home Retrofit contractors had completed similar volumes of projects in the past year (15 and 22 respectively). Nonetheless, one reported that those projects had accounted for less than 10% of their company's business during that period, while the other reported program projects had accounted for 90% of their business. The third contractor completed a lower volume of Home Retrofit projects and reported they made up less than 10% of their projects.

Despite a declining volume of Home Retrofit projects for their companies, all of the interviewed Home Retrofit contractors agreed market demand for efficiency services is strong. One contractor attributed their decline in Home Retrofit project volume to increased competition from new firms entering the energy audit and weatherization market. The other two reported shifting the focus of their businesses away from program retrofits. While HPwES contractors were mixed in their assessment of the market for energy efficiency retrofits in Vermont, all of the interviewed Home Retrofit contractors stated that the market for energy efficiency retrofits was strong. One elaborated that many homes remain

uninsulated or received energy efficiency improvements long ago and new technologies and methods allow for additional energy savings opportunities.

In general, the interviewed Home Retrofit contractors suggested contractor business strategies, rather than market conditions or issues around program processes, drive variation in the number of Home Retrofit projects contractor firms complete. Two contractors reported that some contractors may participate in the program as a secondary business focus that can keep staff busy when their primary business area is slow. For example, a home builder may become a program contractor and take on Home Retrofit projects when they do not have a home to build or when there are delays in their home building projects.

All the interviewed Home Retrofit program contractors reported high levels of satisfaction with the program. All three reported they were very satisfied with their communication with Vermont Gas and their overall experience with the Home Retrofit program. All the interviewed VGS contractors had used one-on-one technical assistance from program staff, two found it very valuable and one somewhat valuable. All three reported no difficulty meeting the program's quality assurance and control requirements. The interviewed contractors expressed satisfaction, in particular, with the program's role in recruiting customers and its prompt payments to contractors.

4. Participant Survey

This chapter presents findings from a survey of participants in Efficiency Vermont's Home Performance with ENERGY STAR and Vermont Gas' Home Retrofit programs who had energy efficiency assessments in their homes between January 2016 and October 2017. The surveyed participants included both those who had made energy efficiency improvements to their homes in response to the findings of their energy audits (complete participants) and those who had not made any of the improvements their audits recommended (stalled participants). Table 8 summarizes the distribution of survey respondents by their participation status. Additional detail on the survey methodology is available in Section 2.3.

Table 8: Distribution of Survey Respondents by Participation Status

	Efficiency Vermont (n=159)	Vermont Gas (n=30)	Total (n=189)
Stalled	37%	27%	35%
Complete	63%	73%	65%
Total	**100%**	**100%**	**100%**

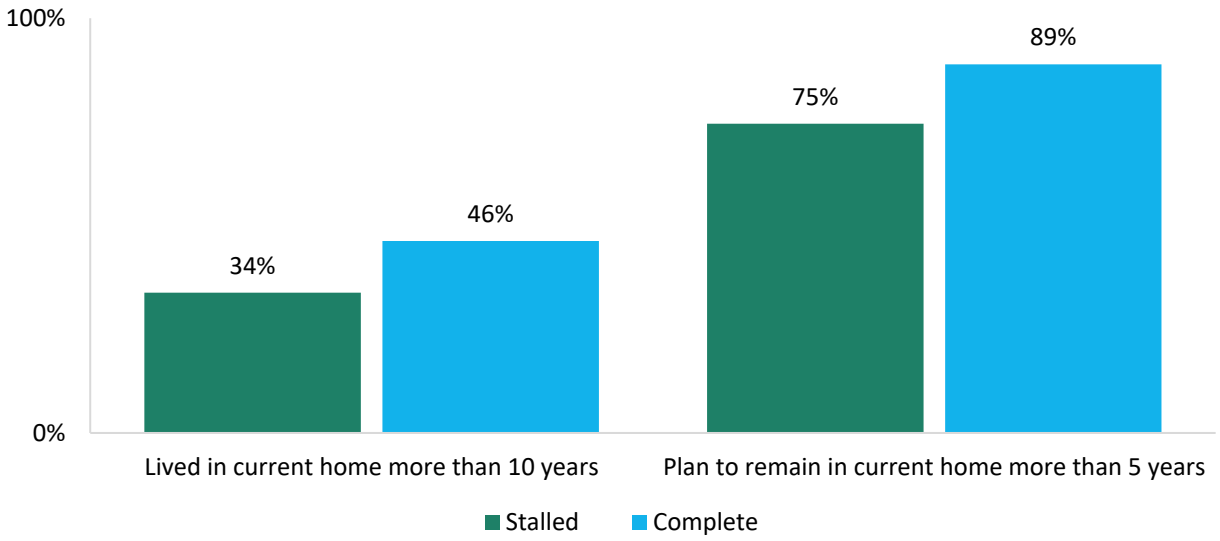
The survey assessed participants' characteristics, their responses to audit recommendations, how they had learned about the program and what messages they found compelling, their participation experience, and their response to available financing options. By comparing responses between complete and stalled participants, we further sought to identify opportunities for the programs to increase uptake of recommended improvements.

4.1. Characteristics of Participants

Most participants were homeowners living in smaller households. In general, participants in both programs owned their homes (98%), and most came from smaller households, with roughly two-thirds (66%) reporting two people or fewer lived in their households. Participants were also generally highly educated, with 77% reporting they had at least a bachelor's degree. Most participants (85%) were Caucasian. These characteristics did not differ notably between stalled and complete participants.

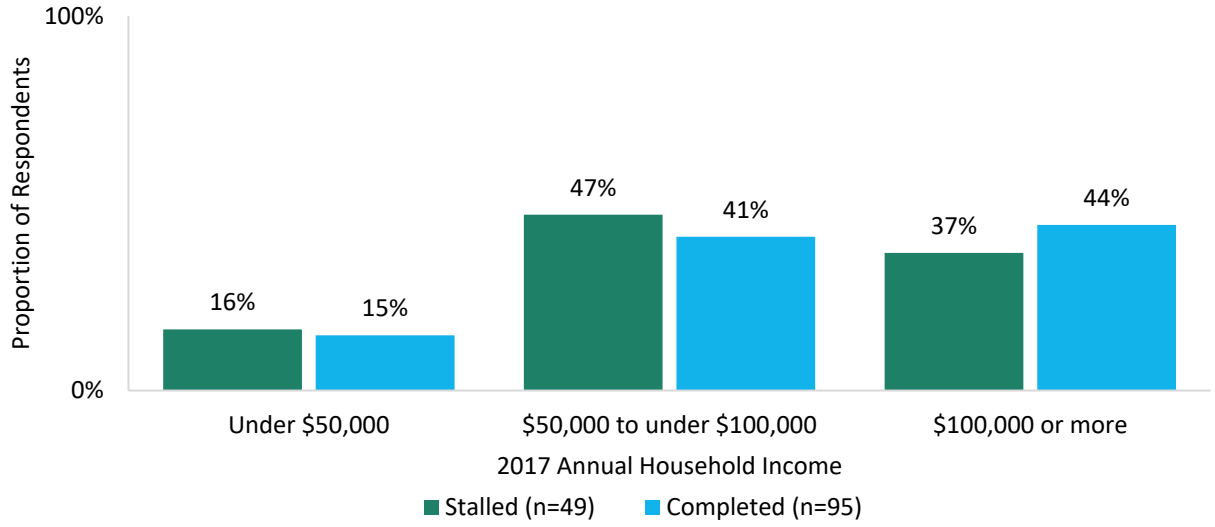
Complete participants were more settled in their homes than stalled participants. Complete participants were significantly more likely than stalled participants to have lived in their homes 10 years or more and to plan to remain in their current homes for at least five more years (Figure 6).

Figure 6: Tenure in Home by Participation Status



Complete participants reported somewhat higher incomes than stalled participants, although the difference was not statistically significant (Figure 7). This is consistent with findings from analysis of EVT program data, that participation was greatest in counties with larger proportions of high-income households. Specifically, there was a positive correlation between the proportion of households in a county earning more than $100,000 per year and the proportion of households in that county that participated in the HPwES program.[5]

Figure 7: Income by Participation Status

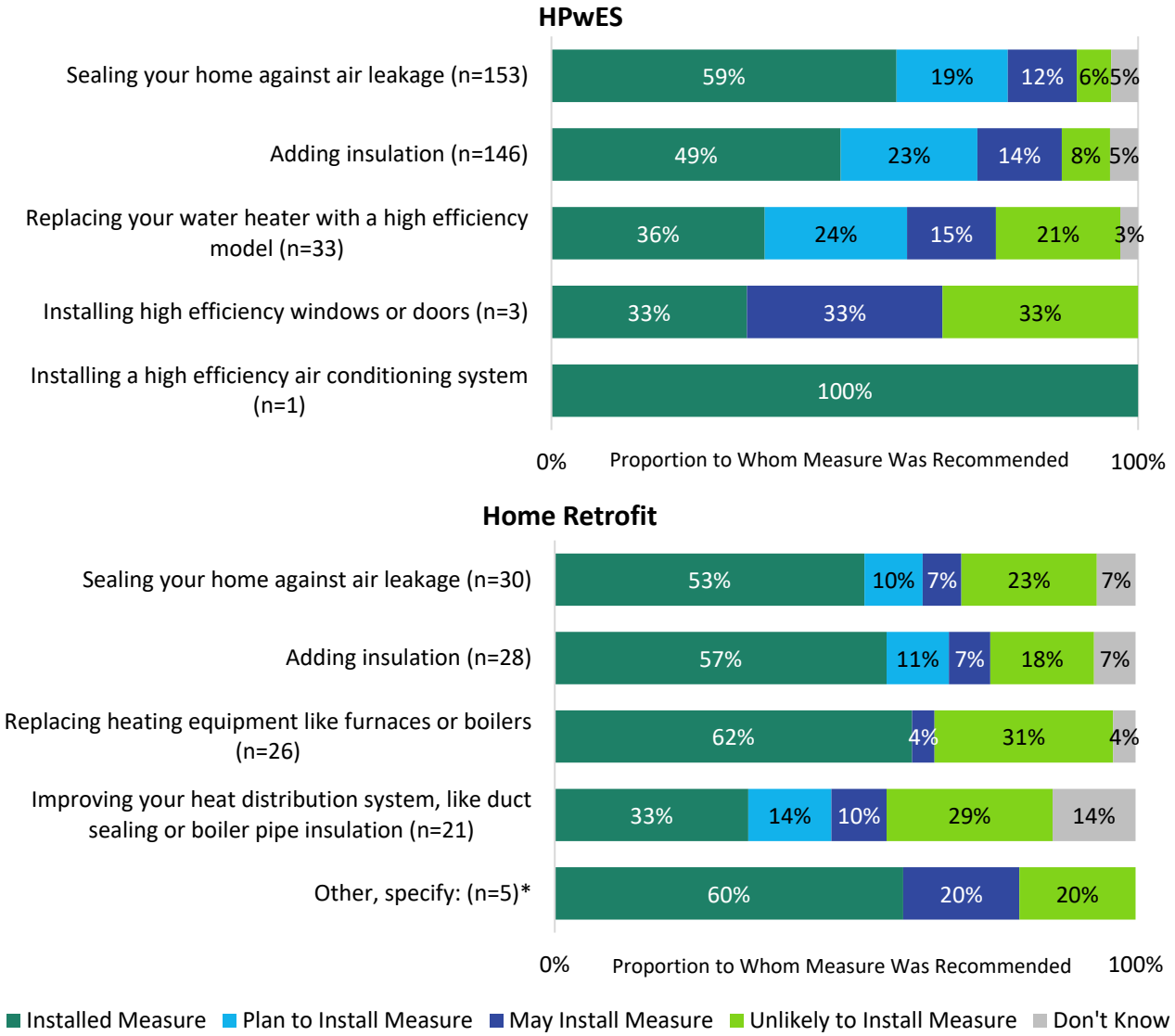


5 There was a significant positive correlation between the percentage of households earning more than $100,000 per year and the percentage of stalled projects, p=.042 r=.55 (n=14) and a marginally significant correlation between the percentage of households earning more than $100,000 per year and percentage of completed projects, p=.068, r=.50 (n=14).

4.2. Participant Response to Audit Recommendations

Air sealing was the most commonly recommended measure and one of the most frequently completed. Both HPwES and Home Retrofit participants most often received recommendations for air sealing. HPwES participants most often reported following the recommendations they received for air sealing, while Home Retrofit participants most often followed recommendations to replace their heating systems (Figure 8).

Figure 8: Survey Respondents' Response to Measure Recommendations



* "Other" responses include window replacement (2 respondents), installation of a cold climate heat pump (1 respondent), insulating water heater wrap (1 respondent), and one respondent who did not specify.

HPwES participants may take longer to complete recommended upgrades than Home Retrofit participants. HPwES participants who had not yet installed measures (stalled participants) more often

reported plans to install measures in the next two years than Home Retrofit participants who had not yet installed measures, although the difference was not statistically significant (Table 9). This is consistent with program data analysis, which found that, between 2014 and 2016, on average, 190 days elapsed between audit and test-out for HPwES projects, while an average of 131 days elapsed between audit and test-out for Home Retrofit participants.

Table 9: Proportion of Respondents Likely to Install Additional Measures in Next Two Years

Participation Status	HPwES	Home Retrofit
Stalled	51%	25%
Complete	12%	14%
Total	**26%**	**17%**

Barriers to Installation

Cost and competing priorities are key factors limiting the measures participants install. Respondents in both programs most often reported they had not yet made the improvements they intended to make because of the cost of those improvements (Table 10). Prioritizing other types of home improvements was the next most common reason respondents cited for not yet completing recommended efficiency improvements. Those who had completed some recommended improvements (complete participants) cited other priorities more often than those who had not made any recommended improvements (stalled participants), although this difference was not statistically significant.

Table 10: Factors Prevented from Making Improvements Among Those Likely to Make Improvements (HPwES and Home Retrofit Participants Combined; Multiple Response Allowed)

	Stalled (n=32)	Completed (n=15)	Total (n=47)
You could not afford the cost	59%	53%	57%
You wanted to focus on other types of home improvements first	31%	53%	38%
You need to take steps to prepare your home for the improvement	19%	27%	21%
Making the improvement would have been too inconvenient or invasive in your home	16%	7%	13%
You had a hard time figuring out how to go about making the recommended improvement	19%	0%	13%
You did not want to discard equipment that was still working	6%	20%	11%
Other	31%	7%	23%

Note: There was no statistically significant finding between the two project status groups.

As with improvements respondents had postponed, cost, both in terms of inability to afford the cost of the improvements and in terms of the value of the improvements relative to their cost, was the most

common reason respondents gave for declining to install the recommended improvements they had decided against (Table 11). Participants who had made some improvements (complete participants) were somewhat more likely than stalled participants to cite practical reasons, like the construction of their home, the invasiveness of the improvements, or the safety of the materials, as reasons for declining to make improvements.

Complete participants were also more likely to report their homes were already efficient enough without making the improvements. Stalled participants, in contrast, were more likely to raise concerns about the reliability of the equipment recommended and whether the expected energy savings would justify the costs. Stalled participants were also more likely to report it was difficult to figure out how to go about making the recommended improvements. None of these differences were statistically significant, however.

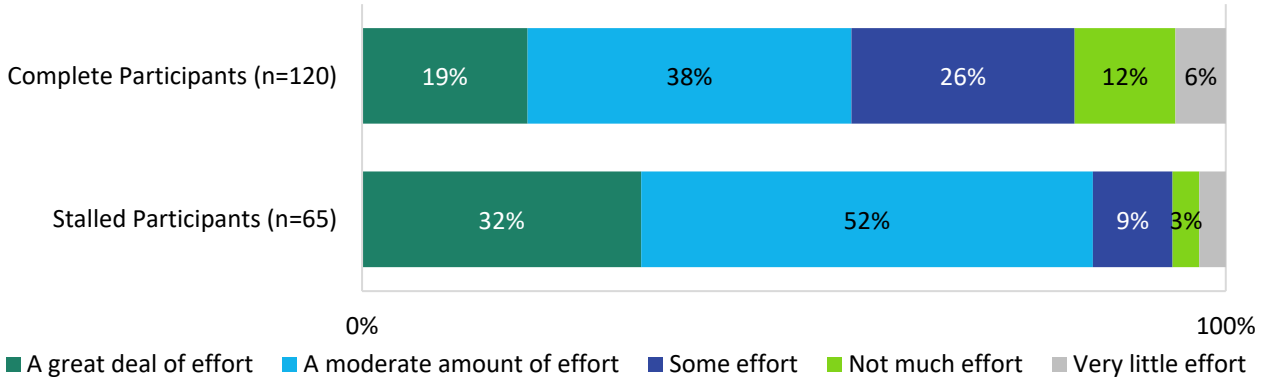
Table 11: Reasons HPwES Participants Chose Not to Make Recommended Improvements (Multiple Response Allowed)

	Stalled (n=19)	Completed (n=17)	Total (n=36)
You could not afford the cost	37%	41%	39%
The expected energy savings did not justify the cost	32%	24%	28%
Your home is efficient enough without making the recommended improvements	21%	35%	28%
You wanted to focus on other types of home improvements	21%	24%	22%
You did not want to discard equipment that was still working	21%	18%	19%
Your home is constructed in a way that makes it not possible, not practical, or it would require significant, and costly, work, to make the improvement as it was recommended	11%	24%	17%
Making the improvement would have been too inconvenient or invasive in your home	5%	12%	8%
You had a hard time figuring out how to go about making the recommended improvement	16%	0%	8%
You had concerns about reliability of the equipment, noise levels, maintenance needs or whether it would provide sufficient heat	11%	0%	6%
You had concerns about the safety of the insulation or sealing materials	0%	6%	3%
Other	11%	35%	22%

Note: There was no statistically significant finding between the stalled and completed groups.

Stalled participants perceived the energy efficiency improvements their audits recommended would require significantly more effort to complete than complete participants, with 84% of stalled participants reporting installing the improvements would require a moderate amount or great deal of effort, relative to 57% of complete participants (Figure 9).

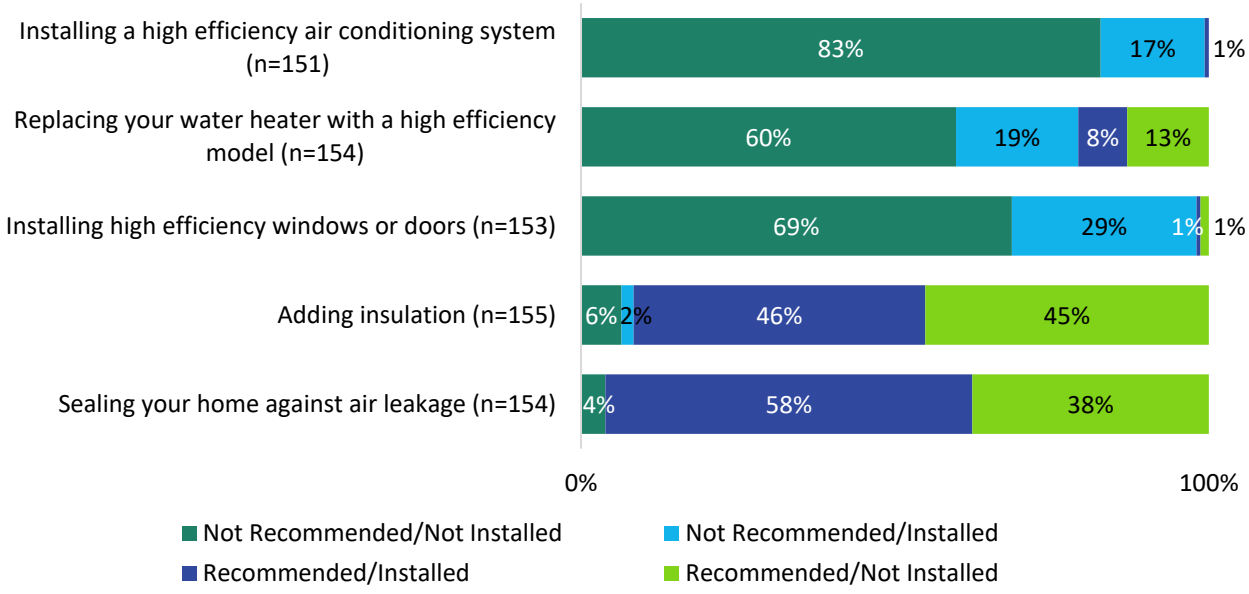
Figure 9: Perceived Level of Effort Required to Make Recommended Improvements



Installation Outside Program

Participants frequently installed efficiency improvements their audits did not recommend. Nearly two-thirds (64%) of HPwES participants reported installing efficiency improvements beyond those that program data indicate their energy audits recommended.[6] Most often, respondents reported installing high efficiency windows or doors and programmable thermostats, the third and fourth most frequently installed measures overall, without a recommendation (Figure 10). Most respondents who installed efficiency measures beyond those recommended reported doing so without receiving incentives for their installations.

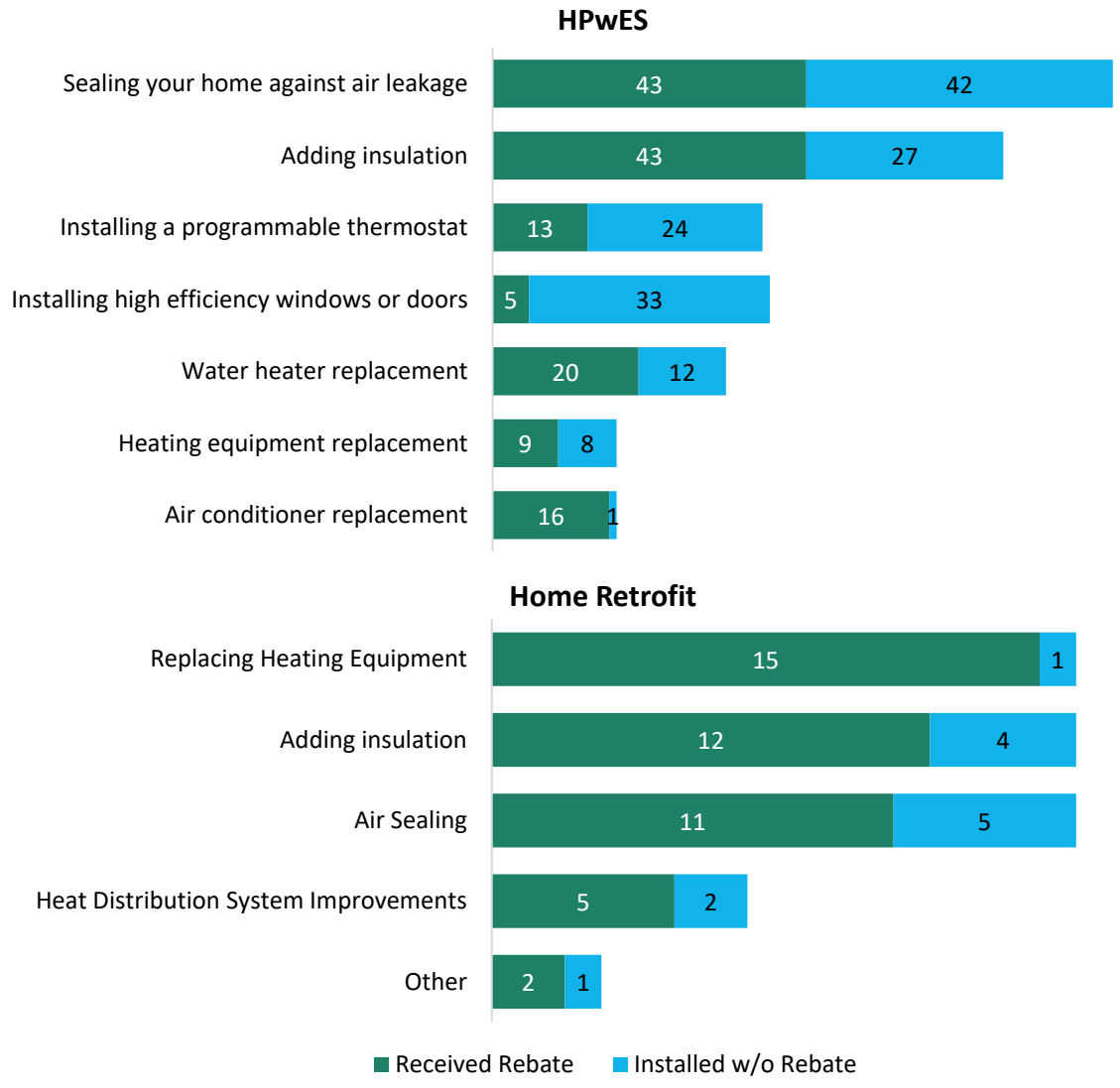
Figure 10: Measures Recommended to and Installed by HPwES Participants



6 Due to the structure of Vermont Gas' program data, the evaluation team was unable to incorporate data on the measures recommended to Home Retrofit participants into the survey.

Survey findings suggest that outside-the-program installations extend to recommended measures as well; a notable proportion of HPwES participants (43%) reported they had installed one or more of the energy efficiency improvements their audit recommended without receiving a rebate. Most often respondents reported completing air sealing improvements without receiving a rebate (Figure 11), with nearly as many reporting they had not received an incentive for their improvements as reporting they had received one.

Figure 11: Measures Installed with and Without Program Incentives



Excludes "Don't know" responses.

The scope of the improvements participants made outside the program is unclear, however, as respondents most often reported they did not receive a rebate for these improvements because the improvements did not qualify for a rebate, they wanted to do the work themselves or with a contractor outside of the program, or because they were not aware if the improvements would qualify (Table 12).

Table 12: Reasons Given for Installing Measures Outside HPwES Program

Reason Installed Measures Did Not Receive Incentives	Proportion of Respondents Installing Measures Without Incentives (n=68)
The improvement(s) did not qualify for a rebate	29%
Did not want to work with a program-approved contractor (including DIY)	24%
You were not aware whether the improvement(s) would qualify for a rebate	22%
Did not want to go through the process of applying for a rebate	12%
Work still in progress	10%
Made improvements before becoming aware of program	4%
Other	6%
Don't know	6%

Among HPwES participants only, one-fifth of those who opted not to receive a rebate for measures they installed (13 of 68, 19%) reported they did not want to work with a program-approved contractor. This was the most common reason that participants who installed insulation outside the program cited (9 of 26, 35%). Open-ended responses suggest that some participants perceive program-approved contractors to be more expensive than other contractors. For example, one reported that an approved contractor quoted a higher price for their project, with the difference "suspiciously close to the amount of rebate we would receive," while another stated that "I saved more money than the rebate using a different contractor [rather] than an overpriced approved contractor."

Approximately one-fourth of Home Retrofit participants (7 of 30, 23%) reported installing measures for which they did not receive a rebate. As with HPwES participants, these respondents most often (6 of 7) reported the improvements they made did not qualify for a rebate or they did not want to work with a program-approved contractor (1 of 7).

4.3. Sources of Program Awareness and Compelling Messages

A desire to reduce energy bills was the most common reason respondents reported for having an energy audit, across both stalled and complete participants (Table 13). Complete participants were more likely than stalled participants to report a desire to make their homes more comfortable as an additional motivator, although the difference was not statistically significant. As one might expect, participants with an immediate equipment replacement need were more likely to move forward with recommended energy efficiency improvements that would address those needs. Complete participants were significantly more likely than stalled participants to report seeking an audit because they needed to replace a piece of equipment that had failed or was near failure.

Table 13: Reasons Why Interested in Having an Audit? (HPwES and Home Retrofit Participants Combined; Multiple Response Allowed)

	Stalled (n=67)	Completed (n=122)	Total (n=189)
Reduce energy bills	91%	92%	92%
Make you home more comfortable	64%	73%	70%
Do your part to help the environment or your community	67%	66%	67%
Lean about and qualify for rebates for a project you had planned	48%	43%	44%
Make your home more valuable	40%	42%	41%
Improve the air quality inside your home	24%	22%	23%
Replace a piece of equipment that had failed or was near failure *	10%	24%	19%
Other	7%	7%	7%

The benefits of energy efficiency upgrades that participants recalled discussing with their contractors were consistent with the motivations participants reported. Participants most often recalled their contractors discussing energy bill savings (Table 14). Most participants (78%) reported their contractor presented energy efficiency improvements as an investment that would pay for themselves over time. Complete participants (83%) were significantly more likely than stalled participants (70%) to recall their contractor describing energy savings in this way. Complete participants were also more likely to recall discussing all of the non-energy benefits listed, although, with the exception of reducing noise levels in the home, the differences were not statistically significant.

Table 14: Energy Efficiency Benefits Discussed with Auditor or Contractor

	Stalled (n=67)	Completed (n=122)	Total (n=189)
Saving money on your energy bills	93%	89%	90%
Making your home more comfortable and draft free	78%	87%	84%
Protecting the environment	30%	39%	36%
Improving your home's air quality or making your home healthier	27%	39%	35%
Increasing your home's value	18%	23%	21%
Reducing unexpected repairs or avoiding equipment failure	10%	13%	12%
Reducing noise inside your home *	3%	11%	8%
Other	4%	2%	3%
Don't know	0%	0%	0%

Note: The asterisk denotes statistically significant difference between the stalled and completed groups.

Survey findings suggest that differences exist between the ways HPwES contractors present the benefits of energy efficiency retrofits and the way Home Retrofit program auditors present those benefits. Home retrofit participants were significantly more likely than HPwES participants to report their auditor discussing increased home value (37% of Home Retrofit participants vs. 18% of HPwES participants) and reduced noise inside the home (23% of Home Retrofit participants vs. 6% of HPwES participants).

The factors participants found most influential in their assessment of the value of the recommended energy efficiency improvements further reflect common motivations for receiving an audit and the benefits auditors discussed most frequently. Participants rated energy cost savings as the most influential factor in their assessment of the value of the recommended improvements, although complete participants were significantly more likely than stalled participants to also cite increased comfort as an influential factor (Table 15).

Table 15: "Very" or "Extremely" Influential Factors in Considering the Value of Recommended Improvement

	Stalled (n=67)	Completed (n=119)	Total (n=186)
Energy cost savings	82%	82%	82%
Increased comfort *	62%	79%	73%
Viewing improvements as an investment that will pay back over time through energy cost savings (n=146)	70%	71%	71%
Environmental benefits	50%	60%	56%
Increased resale value of your home	31%	32%	32%
Improved indoor air quality	20%	31%	27%
Avoiding unexpected repairs or equipment replacement	29%	23%	25%
Noise reduction	5%	11%	9%

Note: The asterisk denotes statistically significant difference between the stalled and completed groups.

4.4. Participation Experience

Program administrator and utility outreach were important in building awareness of thermal efficiency programs. The information sources through which participants learned about the program were largely similar between HPwES and Home Retrofit participants. As a result, we report them in aggregate here. Participants most often reported learning about both programs from the program administrator's website or from mail or email outreach from their utility (Table 16). Word of mouth was also a common source of awareness for both stalled and complete participants. Contractors were the fourth-most commonly-cited source of awareness, and complete participants were significantly more likely to report learning about the program from a contractor than stalled participants.

Table 16: Information Sources About the Program Audit or Rebate (Multiple Response Allowed)

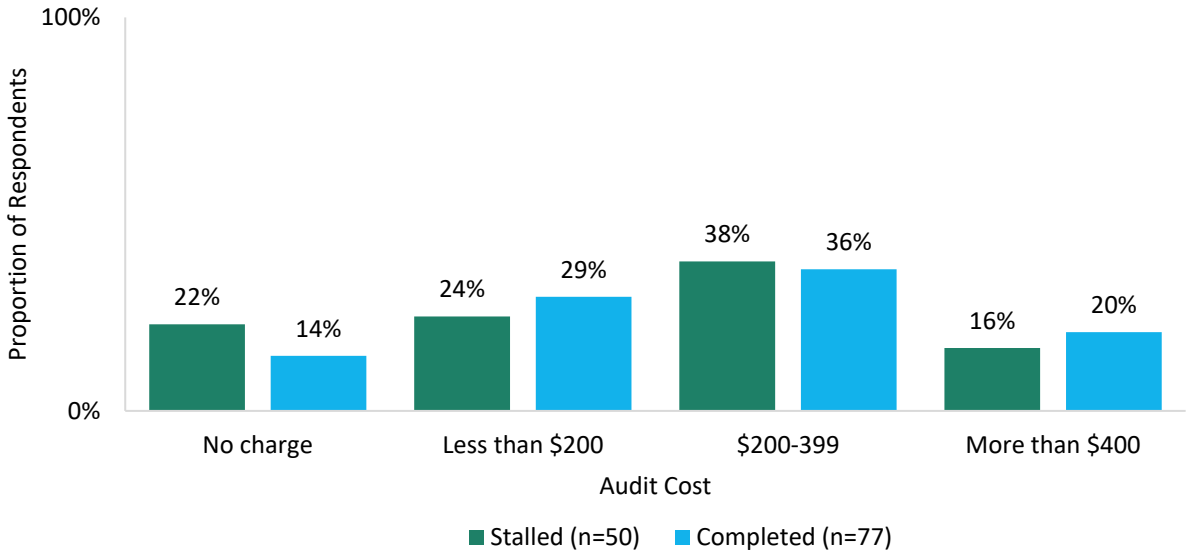
	Stalled (n=67)	Completed (n=122)	Total (n=189)
Vermont Gas website (n=30)	25%	59%	50%
Efficiency Vermont website (n=159)	33%	34%	33%
Word of mouth - friends, family, work, etc.	34%	28%	30%
Mail or email contact from utility	24%	28%	26%
A contractor *	6%	22%	16%
Paid advertisement	19%	12%	15%
Online search	6%	11%	9%
Other	16%	15%	15%
Don't know	4%	3%	4%

Note: The asterisk denotes statistically significant difference between the stalled and completed groups.

Assessment

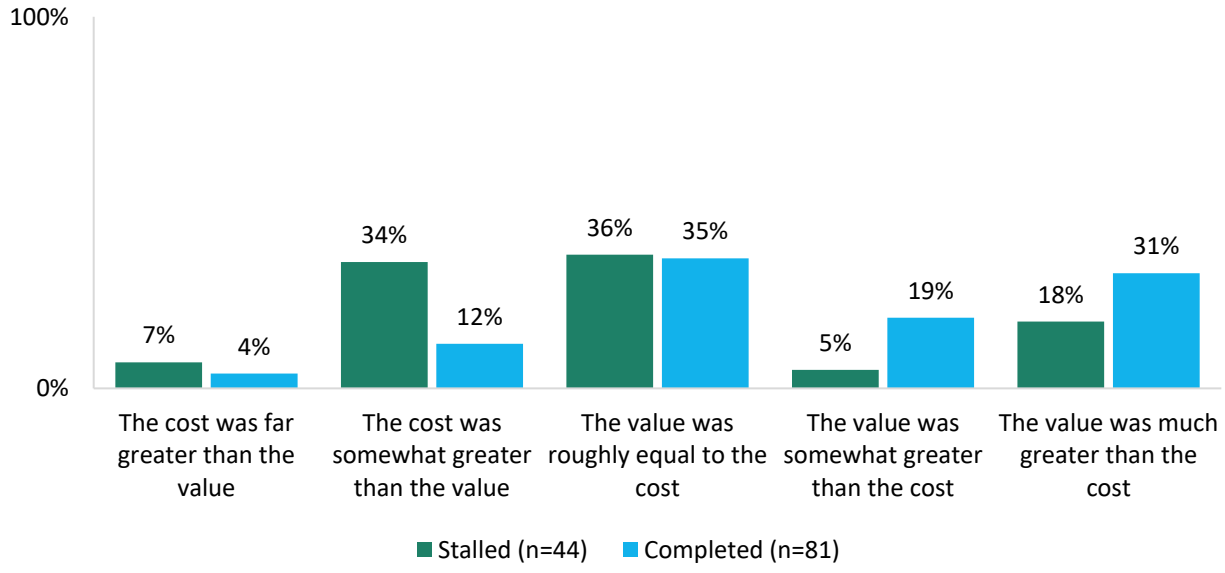
HPwES Audit Costs vary widely. HPwES participants reported paying a wide range of costs for their energy audits, although most (60%) cited costs between $100 and $399. Approximately one fifth of HPwES participants reported receiving their audit at no charge, and an additional 10% reported their contractors deducted the audit cost from the cost of any recommended measures they installed. Consistent with industry theory that no-cost audits have greater potential to attract participants who are merely curious about their homes, not seriously interested in making efficiency upgrades, stalled participants were more likely than complete participants to report receiving their audits at no-cost, although the difference was not statistically significant (Figure 12).

Figure 12: Audit Costs Reported by HPwES Participants



Complete participants reported more positively on their audit experience and perceived greater value from their audits than stalled participants. Complete participants were significantly more likely than stalled participants to report that the value of the information they received from their energy audits exceeded the cost (Figure 13).

Figure 13: Participant Ratings of Audit Value Relative to Cost

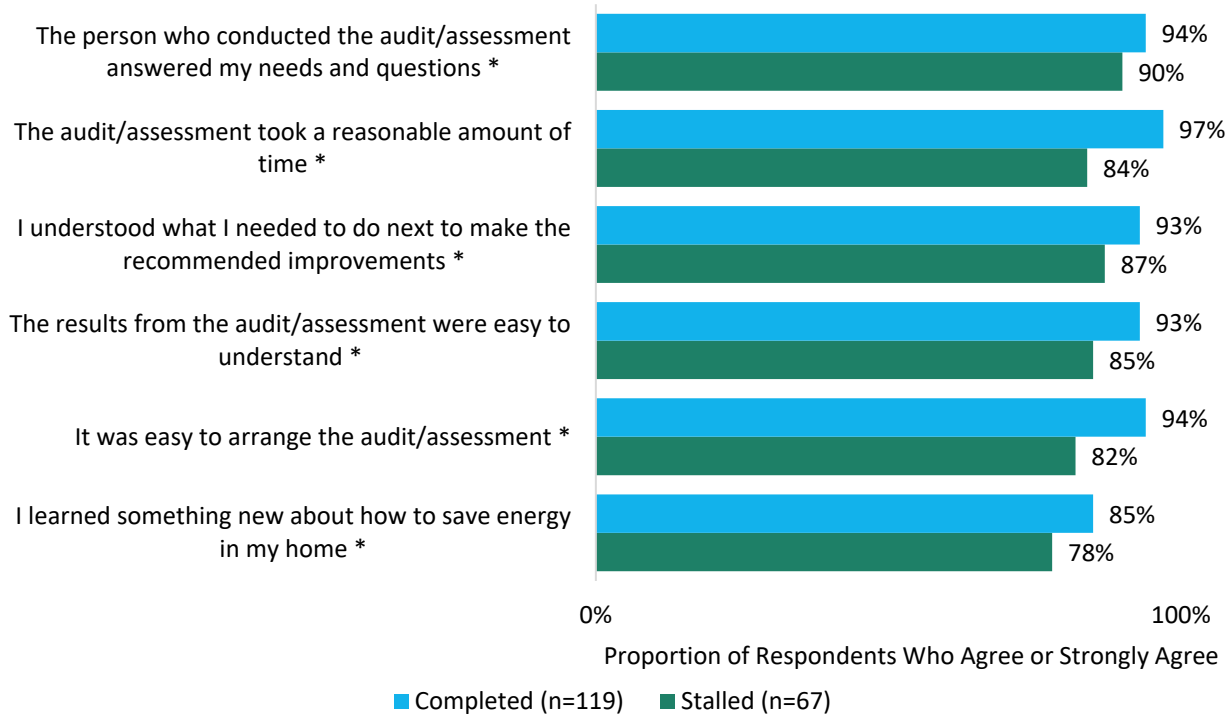


Note: "Don't know" respondents (n=10) are excluded from the analysis.

Consistent with their rating of the value of the audit, complete participants gave significantly more positive ratings to all aspects of their audit experience than stalled participants (Figure 14). Nonetheless,

both complete and stalled participants gave high ratings to the assessment experience, with the highest proportion of participants, overall, agreeing that the auditor was responsive to their needs and the fewest agreeing that they learned something new about their homes.

Figure 14: Ratings of Elements of Audit Experience

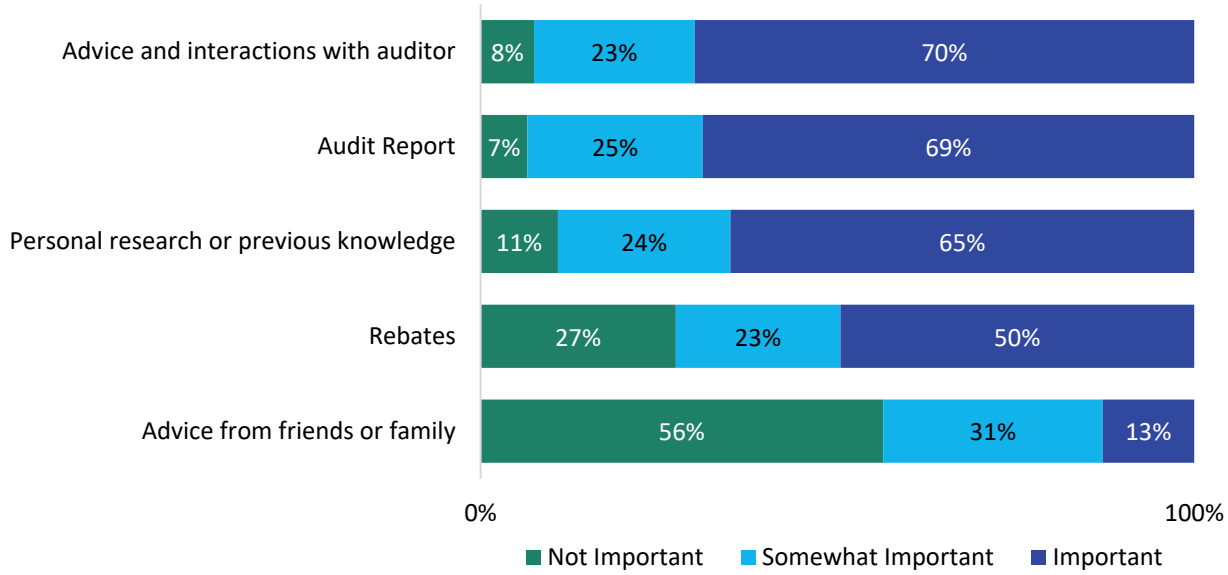


* Difference between stalled and completed participants is statistically significant at 90% confidence with 10% precision.

Measure Installation

Complete participants reported that interactions surrounding the energy audit and their own research were most important in their efforts to improve the efficiency of their home, rating rebates somewhat less important (Figure 15).

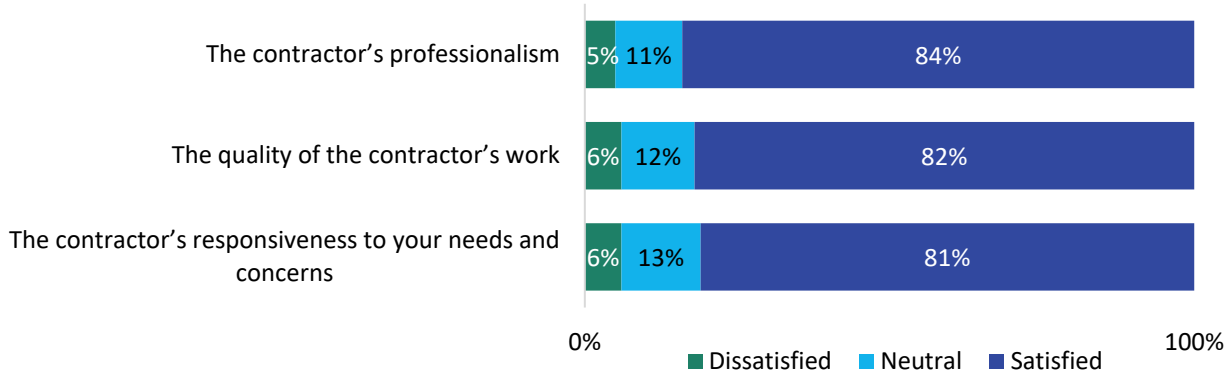
Figure 15: Complete HPwES Participant Ratings of Importance of Program Elements in Retrofit Decision



Note: "Not important" category combines 'not at all important' and 'slightly important' options, and "Important" category combines 'very important' and 'extremely important' options. "Don't know" respondents are excluded from this analysis.

Complete participants were largely satisfied with their experience working with the contractors who installed their energy efficiency measures (Figure 16).

Figure 16: Complete Participant Satisfaction with Measure Installation Experience (n=112)

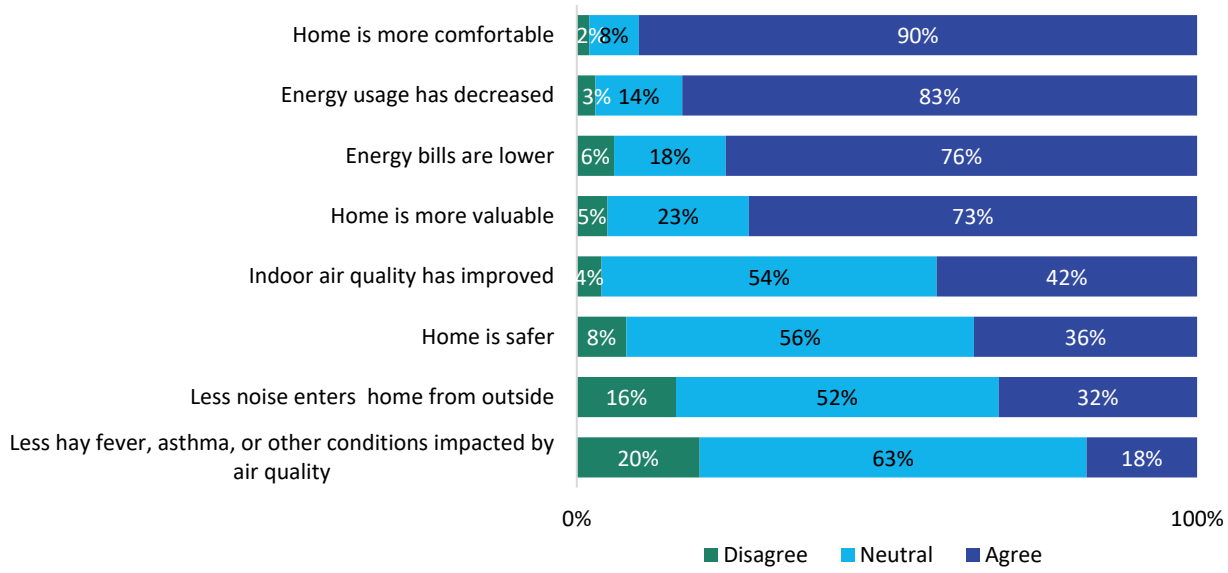


Note: "Don't know" respondents are excluded from the analysis.

Post-Installation Benefits Experienced

Participants experienced both expected (comfort) and unexpected (increased home value) benefits from their energy efficiency upgrades. Complete participants most often reported an increase in the comfort of their home following the installation of their energy efficiency improvements. While participants did not report increasing the value of the home as a major motivator or factor in their assessment of the value of upgrades, and it was not a major topic of discussion with auditors, nearly three-fourths of participants nonetheless perceived their home to be more valuable following their efficiency improvements (Figure 17).

Figure 17: Participant Assessment of Benefits Following Efficiency Improvements



Note: "Don't know" respondents are excluded from the analysis.

Survey findings suggest that participants are experiencing the energy savings they expected. More than three-fourths of participants also reported their energy usage had decreased and their energy bills were lower after making energy efficiency improvements. A large majority (88%) of participants reported that they experienced at least the level of energy savings they expected.

4.5. Response to Financing Options

Awareness that loan options were available specifically to help finance energy efficiency improvements was high, although a reluctance to take on debt drove low loan uptake. Approximately four-fifths of participants (78%) were aware loans were available to finance their energy efficiency improvements (Table 17). This level of awareness was consistent across both complete (78%) and stalled (79%) participants. Nonetheless, relatively few complete participants (13%) reported using a loan to finance some or all of the cost of their improvements. Most often complete participants reported they did not take out a loan because they did not need to borrow money for the improvements or did not want to take on the obligation of debt or monthly payments. A desire to avoid taking on debt was also common among stalled participants who considered the loan offering.

Table 17: Participant Uptake of Loan Offerings and Reasons for Declining Financing

Response to Loan Offering			HPwES (n=59)	Home Retrofit (n=8)	Total (n=67)
Stalled Participants					
Not aware of loan			20%	25%	21%
Aware of Loan	Did not consider loan		37%	63%	40%
	Considered loan (Multiple responses allowed)	Did not want to take on debt or make monthly payments	14%	0%	12%
		Could not afford monthly loan payment	10%	13%	10%
		Did not think you would qualify	5%	0%	4%
		Did not want to go through the loan process	3%	0%	3%
		Decided not to install measures for reasons other than their upfront cost	3%	0%	3%
		Wanted a loan with a lower interest rate	2%	13%	3%
		Wanted a longer time to repay the loan	2%	0%	1%
		Other	19%	0%	16%
Complete Participants					
Not aware of loan			24%	14%	22%
Aware of loan	Received loan		8%	9%	8%
	Did not receive loan (Multiple responses allowed)	Did not need to borrow money for the improvements	37%	73%	43%
		Did not want to take on debt or make monthly payments	34%	18%	31%
		Did not want to go through the loan process	16%	18%	16%
		Did not think you would qualify	7%	0%	6%
		Wanted a loan with a lower interest rate	4%	0%	3%
		Other	8%	9%	8%

Despite their relatively low uptake, the availability of loans was important in allowing those who used them to move ahead with energy efficiency upgrades. More than 80% of participants who received loans reported the availability of those loans were “very important” or “extremely important” in their decision to move forward with energy efficiency improvements (Table 18).

Table 18: Importance of Loan Availability in the Improvement Decision for Participants who Used Loans (n=16)

Importance of Loan Availability	Completed (n=16)
Not at all important	0%
Slightly important	0%
Somewhat important	19%
Very important	25%
Extremely important	56%
Total	**100%**

Consistent with the low uptake of loans among complete participants, most stalled participants reported that knowing a low-interest loan were available to finance their energy efficiency improvements would not have a large impact on their decision about whether to make those improvements. However, a notable minority (18%) reported that the availability of a loan would make them "much more likely" or "very much more likely" to make improvements (Table 19).

Table 19: Likelihood of Making Recommended Improvements If Low Interest Loan is Available among Stalled Participants (n=56)

Likelihood of Making Improvements if Loan Is Available	Stalled (n=56)
No more likely	34%
A little bit more likely	21%
Somewhat more likely	27%
Much more likely	7%
Very much more likely	11%
Total	**100%**

5. Conclusions and Recommendations

Based on the findings described above, the evaluation team draws the following conclusions and recommendations.

Conclusion 1: Both the HPwES and Home Retrofit programs are mature with well-established and clear, if somewhat different, participation processes. Contractors that work frequently with the programs understand these processes, and both contractors and participants are highly satisfied with them.

Neither participants nor contractors identified any areas of difficulty or confusion in the participation process. The HPwES program has developed a very flexible participation process that allows contractors freedom to customize their approach to key program delivery elements like conducting audits. The Home Retrofit program, in contrast, takes on much of the work of recruiting customers and identifying opportunities, leaving contractors to focus on installing measures.

Conclusion 2: The HPwES program allows contractors a great deal of flexibility in their program delivery approach to foster the creation of an independent market for home efficiency retrofits, but that flexibility comes at the expense of some market intelligence.

To allow contractors to most effectively build a business model around HPwES projects, and as a result to build a market for Home Performance retrofits in Vermont, the HPwES program provides contractors with a great deal of flexibility around the approach they take to conducting energy audits. While this flexibility allows contractors to deliver the program in a way that is most efficient for their business, it limits the program's visibility into customer interactions that do not become program retrofits, which in turn limits the program's ability to target its outreach and adjust program offerings.

> **Recommendation: Efficiency Vermont staff should consider opportunities to motivate contractors to submit data on potential HPwES projects they encounter but which do not move forward with rebates**. Most contractors do not complete full, diagnostic audits for projects they do not anticipate will move forward, and it would be impractical for the program to require them to do so. However, there may be an opportunity for Efficiency Vermont to capture less detailed, but nonetheless useful, information from the less formal, walk-through assessments contractors typically conduct. Efficiency Vermont could encourage contractors to provide this information by creating easy-to-use audit tools that contractors could complete as they move through a home or lead management software that would allow contractors to track their HPwES projects. Reinstating an audit reporting incentive may also encourage participants to report these data, assuming the reporting process was easy.

Conclusion 3: The programs may be better able to attract the remaining customers in the market with refreshed value propositions that extend beyond savings and comfort.

Energy cost savings was an important motivator for both stalled and complete participants to have an energy audit, and a benefit that auditors frequently discuss with participants. Nonetheless, energy cost savings may not be enough to drive many participants to make the improvements those audits recommend, particularly with fuel prices relatively low. Increasing comfort was also a common motivator, particularly for complete participants. Comfort was a less common motivator among stalled

participants, some of whom may not perceive their homes to be uncomfortable, however. As a result, the programs may need to develop additional value propositions that appeal to these participants.

> **Recommendation: Efficiency Vermont and Vermont Gas should work to refresh contractors' current selling points around energy cost savings and comfort and develop messaging and value propositions around a broader array of benefits**. While contractors bear the primary responsibility for recruiting projects in the HPwES program, they have found the program's training opportunities to be very valuable. As a result, the program could develop new and renewed selling points and value propositions around energy cost savings, comfort, and other benefits and disseminate those selling points to contractors through program-provided training. One area that may provide an opportunity as a selling point is the potential for energy efficiency improvements to increase home values. While this did not arise as a notable consideration in retrofit decisions, it was one of the most frequent benefits participants reported experiencing from their efficiency retrofits. Other frequently-cited motivations and considerations included environmental and community benefits.

Conclusion 4: Process evaluation findings provide context for further investigation into causes of low realization rates.

The impact evaluation that accompanies this process evaluation found a lower-than-expected realization rate for the HPwES program. The evaluation team has identified three factors that may contribute to low realization rates. The impact team is developing approaches to investigate the degree to which each of these factors affected the impact findings. This process evaluation can support these efforts by providing useful context for understanding each one, as we discuss in the following sections.

Inaccurate Model Inputs

If key characteristics of a home or the equipment being replaced are entered into an energy savings model inaccurately, it could result in inaccurate estimates of the energy savings likely to result from a retrofit project. This process evaluation does not assess the accuracy with which HPwES contractors report these data. Findings suggest the accuracy is sufficient to meet contractors' needs, and to satisfy customer expectations, but further investigation is necessary to determine whether more accurate data would lead to a higher realization rate.

Two factors motivate contractors to accurately report data: the need to meet the program's reporting requirements and a desire to manage their customers' expectations about energy savings so their customers are satisfied. Most of the interviewed contractors reported little difficulty gathering the needed information, including fuel usage data, or entering it into the HPwES program's HERO tool. Participant survey findings suggest that participants are satisfied with their savings estimates from contractors, with most (88%) reporting they had at least the level of energy savings they expected.

If further investigation determines more precise reporting requirements would lead to higher realization rates, then the program may need to consider how to impose more stringent requirements in a way that would prevent contractors from dropping out of the program. For example, the program could restructure the annual bonus incentives it offers contractors to reward realized energy savings rather than project volume alone, as the current incentive does.

Inaccurate Energy Savings Models

Inaccuracies in the algorithms and assumptions that generate energy savings estimates could lead to an over-estimation of energy savings. While a review of the calculations and assumptions that inform these estimates was outside the scope of this evaluation, the research team did assess contractors' use of the HERO tool. As noted above, most contractors reported little difficulty using the HERO tool, and most (8 of 10 high volume contractors) provided specific energy savings estimates to their customers. Finally, contractors did not indicate dissatisfaction with the energy savings estimates the HERO tool provides.

Improper Measure Installation

Improperly installed or commissioned measures may not provide the level of energy savings that models predict, since they assume proper installation. Efficiency Vermont conducts quality assurance field inspections on a sample of projects to ensure installed measures meet program standards. A large majority of high-volume contractors (8 of 9) reported that meeting these requirements was not difficult. However, since this evaluation did not include a detailed review of the inspection process or inspection findings, the evaluation team cannot draw conclusions about the effectiveness of this process.

> **Recommendation: Investigate reasons for low realization rate for unregulated fossil fuel heating measures.** This recommendation parallels one included in the impact evaluation. From a process perspective, it is it is important to understand the key causes of low realization rates and target any interventions to increase realization rates accordingly. It is particularly important for the program to carefully target any solutions that impact program processes or requirements for contractors. Given the central role that contractors play in delivering the HPwES program, their input and buy-in will be critical to the success of such changes. Overall, the program should avoid placing greater burdens on contractors, without compensating them in some way for their additional efforts.

Appendix A. Contractor Interview Approach

Memorandum

To: Keith Levenson, Vermont DPS

From: Joe Van Clock and Linda Dethman, Research Into Action

Date: March 1, 2018

Re: Thermal Programs Evaluation Contractor Interview Approach

This memo describes our planned approach for conducting contractor interviews to inform the process evaluation of thermal energy efficiency programs in Vermont. It begins with a characterization of the contractor populations active in each program and a review of the research objectives and specific researchable issues the interviews will seek to address. Based on the characteristics of the contractor population and the researchable issues, it then describes our planned interview approach.

Program Contractor Populations

This section provides background information on the population of contractors participating in Efficiency Vermont's (EVT) Home Performance with ENERGY STAR (HPwES) program and Vermont Gas' (VGS) Home Retrofit Program.

- Over the full evaluation period (2014-2016), **71 contractors submitted at least one project to EVT's HPwES program**; our database export lists 47 of those contractors with a status of "Active."
- **Some contractors have not recently submitted projects.** In 2016 alone, 54 contractors submitted at least one project to EVT's HPwES program, 42 of which were listed as active as of October 2017.
- **High-volume contractors account for a large proportion of projects.** In the 2014-2016 period, the 10 highest-volume contractors (8 of which were listed as active in October 2017) accounted for approximately 40% of all assessments listed in the database. The 20 highest-volume contractors (16 of which are listed as active) accounted for 58% of assessments.
- **Fewer contractors have completed VGS Home Retrofit projects, and the concentration of projects among the highest-volume contractors is greater than for EVT.** VGS' database lists 21 contractors that are associated with home retrofit projects between 2014 and 2016. Only six of those contractors had completed 10 or more projects during that period, and those six contractors accounted for 79% of projects for which a contractor was listed (a contractor was listed for 72% of projects).

- **There is little overlap between EVT and VGS contractors.** Five contractors appear on both the EVT and VGS contractor lists. However, these contractors had done a small volume of projects through the VGS program and had not worked with the VGS program recently. None of the five contractors had done more than three projects through the VGS program in the 2014-2016 period, and none of these contractors had completed a project through the VGS program since 2015.

Research Objectives

Contractor interviews will contribute to the process evaluation in two key ways:

- Providing insight into program processes, like estimating energy savings, QA/QC and application/reporting, that primarily interact with contractors.
- Imparting higher-level insight into participant motivations and barriers based on the contractors' experience in working closely with a wide range of program participants.

Contractor interviews will also provide insight into opportunities to understand issues affecting project closure and opportunities to reduce the number of participants that become stalled. The interviews will accomplish this both through seeking contractors' direct feedback on these opportunities and through comparing approaches and attitudes between contractors reporting higher and lower rates of closure.

EVT's HPwES program relies heavily on participating contractors to deliver the program, and leaves much of the specific methods by which contractors deliver the program to the contractor's discretion. This is particularly true since the end of 2016, when EVT discontinued its audit incentive, which had motivated contractors to report audit findings. Given the potential diversity in program delivery approaches among contractors, an important objective of the contractor interviews will be to understand how the contractors approach program elements like recruiting projects and conducting assessments. This understanding provides key context to understand differences in project completion by contractor and identifying opportunities to improve project closure.

Table 20: Contractor Interview Research Objectives and Researchable Issues

Research Objective	Researchable Issue
Understand the contractors' relationship to the programs	What proportion of the contractor's work comes from program projects?
	How does the contractor identify potential program projects? Do they actively market the program, and, if so, how? What proportion of projects come from referrals, either from the program or from other customers?
	Has the volume of projects the contractor has completed through the program(s) changed over the past few years? If so, how and why?

Research Objective	Researchable Issue
Understand how contractors in EVT's HPwES program approach home energy assessments, particularly following the elimination of the audit incentive	At what point in the sales process does the assessment take place? Do all interested customers receive assessments or is there a pre-assessment screening process?
	Does the contractor continue to offer stand-alone assessments? If not, what approach do they use?
	When does the contractor report assessment results to EVT?
	Does the contractor charge for assessments? If so, how much and what is the fee structure?
	How has the elimination of EVT's audit incentive affected the contractor's approach to assessments?
Identify opportunities to increase project completion	What proportion of customers that express initial interest complete upgrades?
	What are the most effective messages or approaches for motivating participants to make recommended upgrades? How effective is framing upgrades as an investment?
	What are the greatest barriers preventing more customers from making recommended upgrades?
	Have the contractors identified any characteristics associated with customers that are more or less likely to make recommended upgrades?
Assess contractors' experience with program processes and support	What types of program support (e.g. training, marketing materials, etc.) have contractors used? How satisfied are they with those resources?
	How satisfied are contractors with program processes (e.g. application/reporting, QA/QC, etc.)
	How satisfied are contractors with their communication with the program? Are they sufficiently informed about program changes?

Interview Approach

Completing a smaller number of more open-ended and in-depth interviews with high-volume contractors, rather than a larger sample of brief, closed-ended surveys across both high-and low-volume contractors, will best meet the research objectives listed above.[7] The concentration of many projects among relatively few contractors suggests those contractors will have the most important and useful insights about program processes, project completion, customer behavior, and views of the program. This approach also will allow us to capture contractor experience for a larger and more diverse set of program projects.

[7] The evaluation team's original approach was to complete short, close-ended surveys (10 minutes or less) with 30 high-performing contractors. However, we found only 47 active contractors had completed projects during the evaluation period. Based upon our past experience surveying contractors, a greater than 50% completion rate, even using a close-ended approach, is not likely.

In order to balance the perspective of the active high-volume contractors and better understand the full contractor population, we will also have brief conversations with small groups of low-volume contractors, and high-volume inactive contractors primarily focused on the reasons for their inactivity or their low volume of activity .[8] These efforts will be focused on contractors who have a substantial volume of activity overall, but only a small number participate in the program, if such contractors can be identified. Previous experience suggests that contractors with a low volume of overall activity are generally not a good source of insights into efficiency programs as they typically run small operations, are likely to have only one or two employees and are often more concerned with completing a small number of projects per year than developing a business model or considering how the HPwES program could help them to increase their volume of work.

We anticipate that a target sample size of 17 contractors (8 high-volume EVT HPwES contractors, 3 low-volume EVT HPwES contractors, 3 inactive high-volume EVT HPwES contractors and 3 VGS Home Retrofit Contractors) will provide sufficient diversity of experiences and opinions, while still allowing for this open-ended approach. Our proposed sampling approach is based on contractors meeting the characteristics described in Table 21.

Table 21: Contractor Sampling Approach

Contractor Characteristic	Definition	Rationale
Active Status	Contractors listed as "Active" in either the EVT or VGS databases.	The broader objectives of this evaluation focus more strongly on understanding the participant experience, motivations, and barriers than on relations between the contractor and program. Active contractors will likely be better able to provide insight into these participant-focused objectives.
Inactive Status	Contractors listed as "Inactive" or without a status listed in either the EVT or VGS databases.	Interviews with these contractors will focus on their reasons for inactivity.
High Project Volume	For EVT HPwES contractors: at least 20 assessments completed in the 2014-2016 period. For VGS Home Retrofit contractors: at least 3 projects completed in the 2014-2016 period.	We hope to represent the greatest possible proportion of program projects with the least number of contractor interviews. We will prioritize the highest-volume contractors. We selected the listed project volume thresholds to provide a sufficient sample frame.

[8] We will verify with Efficiency Vermont that any inactive contractors we seek to interview were not removed from the program involuntarily. While these contractors may have valid feedback about the program, we are not well positioned to assess what feedback is legitimate and what might reflect bitterness about the contractor's removal from the program.

Contractor Characteristic	Definition	Rationale
Low Project Volume	(EVT HPwES contractors only): less than 15 assessments completed in the 2014-2016 period	Interviews with these contractors will provide insight on the characteristics of lower-volume contractors and reasons for low participation. We selected the listed project volume threshold to provide a sufficient sample frame while adequately differentiating from high volume contractors.
Recent Program Experience	At least one project completed in 2016	Contractors with recent program experience will be better able to provide insight into participant motivations and barriers.

Roughly half of the contractors that have completed projects through each program meet the criteria described above. Table 22 lists the number of contractors that meet the sampling criteria for each program.

Table 22: Contractor Sample Sizes and Targets

Program	Total Contractor Population	Contractors Meeting Sampling Criteria	Target Sample Size
EVT HPwES Active	71	High volume: 32	8
		Low volume: 9	3
EVT HPwES Inactive	27	7	3
VGS Home Retrofit	21	10	3
Total	**92**	**51**	**17**

We will conduct contractor interviews by phone. We anticipate that interviews with high-volume EVT HPwES contractors will take approximately 20-25 minutes. Because the contractors' role is more limited in the VGS Home Retrofit program, interviews with VGS contractors will take 15-20 minutes. Interviews with low-volume and inactive EVT HPwES contractors will take 5-10 minutes. Given the small population sizes, it may be difficult to achieve the target sample sizes. Research Into Action does not anticipate the need to offer an incentive for completing the survey. However, it response rates are lower than anticipated, this approach will be re-visited.

Appendix B. Contractor Interview Guide

B.1. Inactive

Introduction

Hello, my name is _____. I'm calling from Research Into Action on behalf of the Vermont Department of Public Service. We are working with the DPS to identify opportunities to improve [**PA**]'s [**Program**] program and help more Vermonters increase the energy efficiency of their homes. I understand you have completed projects through the program in the past, but are not currently active. I'd like to know about your experience with the program and why you no longer actively work with the program so we can help find ways for the program to better work with contractors and better serve Vermont homes. Are you the best person to talk with about your company's work with the [**Program**] program? [*If not, ask for best contact.*]

Great, I have about five minutes of questions for you. Is now a good time to talk? [*If not, attempt to schedule another time.*]

Thanks, and before we get started, I want to let you know that we will keep everything you say confidential. We won't report anything in a way that would identify any individual respondent and we won't share our notes from this call.

Instrument [ASK ALL]

[ASK ALL]

Q1. To start with, please tell me a little bit about your company, what kinds of projects do you primarily do?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q2. What initially motivated your company to become involved in Efficiency Vermont's Home Performance with ENERGY STAR program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q3. And why are you no longer involved in the program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q4. In general, how do you see the market for home energy efficiency improvements in Vermont? [*If needed, probe: Is there strong demand for improvements? Why or why not?*]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q5. How often do you make efficiency improvements that would qualify for program incentives but where the project doesn't go through the [**Program**] program? Would you say this happens:

[SINGLE RESPONSE]

1. Very rarely or not at all
2. Rarely
3. Sometimes
4. Often
5. Very often

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL]

Q6. What aspects of the [**Program**] program worked best? Why do you say that?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q7. What do you see as the greatest opportunity to improve the [**Program**] program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q8. Those were all the questions I had prepared. Is there anything else you think it's important that I know about the [**Program**] program as we are thinking about ways that it could improve?

1. [OPEN-ENDED RESPONSE]

B.2. High-Volume

Introduction

Hello, my name is _____. I'm calling from Research Into Action on behalf of the Vermont Department of Public Service. We are working with the DPS to identify opportunities to improve [**PA**]'s [**Program**] program and help more Vermonters increase the energy efficiency of their homes. Since you have been a particularly active contractor in that program, your perspective would be very valuable to our research. Are you the best person to talk with about your company's work with the [**Program**] program? [*If not, ask for best contact*.]

Great, I have about [IF PA=EVT] **20 minutes** [IF PA=VGS] **15 minutes** of questions for you. Is now a good time to talk? [*If not, attempt to schedule another time.*]

Thanks, and before we get started, I want to let you know that we will keep everything you say confidential. We won't report anything in a way that would identify any individual respondent and we won't share our notes from this call.

Relationship to Program [ASK ALL]

[ASK ALL]

Q1. In the past year, how many projects did your company complete that qualified for incentives through the [**Program**]?

[SINGLE RESPONSE]

1. Response Text

[*Do not read*:]

98. Don't know

[ASK ALL]

Q2. About what proportion of the projects your company did last year were [**Program**] projects?

[SINGLE RESPONSE]

1. Very little (10% or less)
2. A minority (11-40%)
3. About half (41-60%)
4. A majority (61-90%)
5. Almost all (More than 90%)

[*Do not read*:]

98. Don't know

[ASK ALL]

Q3. How, if at all, has the number of projects your company has completed through the [PROGRAM] program changed over the past few years? Would you say it has:

[SINGLE RESPONSE]

1. Increased
2. Stayed the same
3. Decreased

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q3=1 OR 3]

Q4. What caused that change in the number of projects your company has completed through the program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q5. About what proportion of the projects your company has done through [**Program**] were part of a larger remodel, where you made changes to the home that went beyond the energy efficiency improvements you installed?

[SINGLE RESPONSE]

1. Very little (10% or less)
2. A minority (11-40%)
3. About half (41-60%)
4. A majority (61-90%)
5. Almost all (More than 90%)

[*Do not read*:]

98. Don't know

[ASK ALL]

Q6. In general, how do you see the market for home energy efficiency improvements in Vermont? [*If needed, probe: Is there strong demand for improvements? Why or why not?*]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q7. I'm going to read through a list of ways you might find customers who qualify for efficiency projects through [PROGRAM]. For each one I'd like you to tell me if you often find customers that way, sometimes find customers that way, rarely find customers that way, or if you don't use that approach at all. *Interviewer: prompt with responses for each, do not read 97-99.*

[MATRIX QUESTION]

[RANDOMIZE] Item	Often find customers	Sometimes find customers	Rarely find customers	Don't use	98 DK
Word of mouth or referrals from previous customers					
Referrals from the [PROGRAM] program					
Direct mailing or door hangers					
Mass media (radio, TV, newspaper) advertising					
Web searches (including sites like Yelp and Angie's List)					
Online advertising					
Social media					
Marketing from the [PROGRAM] program					
Attending home shows or other community events					

[ASK ALL]

Q8. What other ways, if any, do you find customers for [PROGRAM] projects?

1. [OPEN-ENDED RESPONSE]
2. None

[*Do not read*:]

98. Don't know

[ASK ALL]

Q9. We have noticed that some contractors complete lots of projects through the program, while others only complete a few. Why do you think that is? [*Probe if needed: Do high volume contractors approach the program differently? If so, how? Is it easier for larger companies to participate?*]

1. [OPEN-ENDED RESPONSE]

Assessment Approach [EVT CONTRACTORS]

[IF PROGRAM = HPWES]

Q10. When you first talk with a customer who may be eligible or interested in participating in the Home Performance with ENERGY STAR program, what kind of screening do you do, if any, to find out if they are a good candidate for the program?

1. [OPEN-ENDED RESPONSE]

[IF PROGRAM = HPWES]

Q11. How often do you conduct a formal energy audit, including the diagnostic testing such as a blower door test, as part of visits to customers who may be eligible for or interested in participating in Home Performance with ENERGY STAR? Is that something you do for:

[*Interviewer note: It is our understanding that, while EVT requires contractors to conduct all the measurements that would traditionally be part of a comprehensive energy audit, they are not required to do so in a single, stand-alone visit.*]

[SINGLE RESPONSE]

1. All customers
2. Most customers
3. Some customers
4. A few customers
5. No customers

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q11=1, 2, 3, OR 4]

Q12. When you do a full energy audit, do you also provide customers with a written audit report?

1. Yes
2. No

[*Do not read*:]

98. Don't know

[IF Q11=2, 3, OR 4]

Q13. How do you decide when to conduct a full energy audit?

1. [OPEN-ENDED RESPONSE]

[IF Q11≠1 OR 98]

Q14. If you don't conduct a full audit, what do you do instead to determine the best energy efficiency opportunities available to customers through the program? *Probe: Do you provide a formal audit report?*

1. [OPEN-ENDED RESPONSE]

[IF Q11 = 1, 2, 3, OR 4]

Q15. Which of the following best describes how you typically cover the cost of conducting an energy audit? Do you…

[SINGLE RESPONSE]

1. Charge customers a set fee whether or not they do a project.
2. Charge customers a fee that is waived or credited to the customer if they do a project
3. Not charge customers a separate fee for the audit

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q15=1 OR 2]

Q16. How much do you charge for energy audits, even if these costs are eventually waived or wrapped into the project?

1. [OPEN-ENDED RESPONSE]

[*Do not read*:]

98. Don't know
99. Refused

[IF PROGRAM = HPWES]

Q17. I understand that at the beginning of 2017, Efficiency Vermont stopped offering $100 to contractors when they submit projects for audit review. How, if at all, has that change affected the way you approach audits for Home Performance with ENERGY STAR projects?

1. [OPEN-ENDED RESPONSE]

[IF PROGRAM = HPWES]

Q18. When audits did not move forward, how often did you submit audit data to Efficiency Vermont when the $100 payment was available: did you submit all, some, or none of your audits? Since

the payment ended, how often do you submit audits that do not move forward to Efficiency Vermont?

Prompt with responses for each, do not read 97-99

[MATRIX QUESTION]

[LOGIC] Item	1. Sent all audits to EVT	2. Sent some audits to EVT	2. Do not send any audits to EVT	98 DK
1. When $100 payment was available				
2. Currently				

[IF ANY ITEM IN Q18=2]

Q19. How do you decide when to upload audit information to Efficiency Vermont? How has that changed since the incentive ended?

1. [OPEN-ENDED RESPONSE]

Project Closure [ASK ALL]

[ASK ALL]

Q20. About what proportion of the customers you recommend improvements that could go through the [PROGRAM] program to move forward with those improvements? [*Interviewer: If needed prompt with categories: "All or almost all (90% or more), Most (60%-89%), About half (40-59%), Some (10%-39%), Few or none (less than 10%)"*]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q21. How often do you make efficiency improvements that would qualify for program incentives but the project doesn't go through the [PROGRAM] program? Would you say this happens:

[SINGLE RESPONSE]

1. Very rarely or not at all
2. Rarely
3. Sometimes
4. Often
5. Very often

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q21=3, 4, OR 5]

Q22. What are the reasons those projects don't go through the program?

1. [OPEN-ENDED RESPONSE]

[IF PA=EVT]

Q23. When you recommend energy efficiency improvements to customers, do you tell them a specific amount of energy, money, or percent of their heating bill they can expect to save from those improvements?

[SINGLE RESPONSE]

1. Yes
2. No

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q23=1 OR 96]

Q24. [*Interviewer: If Q23=Other, use your discretion as to whether this question is applicable:*] How do you estimate the energy savings from the efficiency improvements you recommend? Do you…

[MULTIPLE RESPONSE]

1. Use the Efficiency Vermont audit tool (HERO)
2. Use a different audit tool
3. Calculate the estimated savings on your own
4. Estimate the savings based on your experience

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
97. Not applicable
98. Don't know

[IF Q24≠1 (DO NOT PROVIDE ESTIMATES, OR PROVIDE ESTIMATES BUT DO NOT USE HERO)]

Q25. Why don't you use the HERO tool to estimate the energy savings from your recommended efficiency improvements?

1. [OPEN-ENDED RESPONSE]

[IF Q23=1 OR 96]

Q26. How important are those customized, specific savings estimates in your customers' decisions about whether to make upgrades? Why do you say that?

1. [OPEN-ENDED RESPONSE]

[*Do not read*:]

98. Don't know
99. Refused

[IF PA=EVT]

Q27. I understand that Efficiency Vermont asks contractors to submit customers' heating fuel usage data into the audit tool. What challenges, if any, have you faced in obtaining customers' heating fuel usage data?

1. [OPEN-ENDED RESPONSE]

[IF PA=EVT]

Q28. How accurate is the heating fuel usage data or estimates customers provide? What proportion of customers provide… Interviewer: prompt with responses for each, do not read 97-99

[MATRIX QUESTION]

[LOGIC] Item	Proportion of customers	96 Other, specify	98 DK
Documented records of actual fuel usage			
Detailed estimates of their fuel usage (e.g. $154 last month)			
General estimates of their fuel usage (e.g. about $150 last month)			
Uncertain guesses of their fuel usage (e.g. between $100 and $200 last month)			
No fuel usage data			

[IF Q23=1 OR 96]

Q29. [*Interviewer: If Q23=Other, use your discretion as to whether this question is applicable:*] Do you use the customer's heating fuel usage to estimate their energy savings from the improvements you recommend? Is this something you do for…

[SINGLE RESPONSE]

1. All customers that provide heating fuel usage data
2. Some customers that provide heating fuel usage data

3. Few or no customers

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q29=2]

Q30. How do you decide whether to use a customer's bill information in your energy savings estimates? [*Probe to understand how frequently they use bill information*.]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q31. How frequently, if at all, do you present energy efficiency improvements as an investment that will provide customers with a financial return through their energy cost savings? Do you present improvements this way:

[SINGLE RESPONSE]

1. To all customers
2. To most customers
3. To some customers
4. To a few customers
5. To no customers

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL]

Q32. I'd like to know how effective certain selling points are in encouraging customers to make efficiency improvements through the program. For each selling point I read, please tell me if it is a very effective, somewhat effective, or not very effective selling point, or if you have not used that selling point. How effective is promoting efficiency improvements as a way to…

Interviewer: prompt with responses for each, do not read 97-99

[MATRIX QUESTION]

[RANDOMIZE] Item	1. Very effective	2. Somewhat effective	3. Not very effective	4. Have not used	96 Other: Specify	98 DK
Save money and reduce energy bills						
Increase comfort and reduce drafts						
Improve indoor air quality and health						
Increase home value						

[RANDOMIZE] Item	1. Very effective	2. Somewhat effective	3. Not very effective	4. Have not used	96 Other: Specify	98 DK
Reduce need for future repairs						
Get a good deal by receiving program incentives						
Help the environment, including reducing one's carbon footprint						
[IF Q24=1, 2, OR 3] Earn a return on your investment through energy cost savings						

[ASK ALL]

Q33. What other selling points have you found to be effective in encouraging customers to move forward with energy efficiency improvements through the program?

1. [OPEN-ENDED RESPONSE]
2. None

[*Do not read*:]

98. Don't know

[ASK ALL]

Q34. What are the most common reasons your customers decide not to make the recommended energy efficiency improvements through the program?

[MULTIPLE RESPONSE] [*Do not read, record open-ended response then probe to code:*]

1. [OPEN-ENDED RESPONSE]
2. They are not convinced the benefits will justify the costs
3. Other home improvements are a higher priority
4. Making the improvements would be too inconvenient or invasive in their home
5. They do not want to discard equipment that is still working
6. It would require significant effort to prepare the home for the improvement (for example, replacing knob and tube wiring or removing vermiculite insulation)
7. They could not afford the upfront cost and could not qualify for, or did not want to take on, a loan to pay for the improvements
8. Their primary goals was to learn about their home's energy efficiency: they are not interested in taking on an improvement project
9. They do not plan to stay in their current home
96. Other
98. Don't know

[ASK ALL]

Q35. When you talk with a customer, what clues do you look for to indicate how likely that customer is to move ahead with energy efficiency improvements?

1. [OPEN-ENDED RESPONSE]

Program Processes and Support [ASK ALL]

[ASK ALL]

Q36. Which of the following types of support or resources that the [PROGRAM] program provides have you used:

[MULTIPLE RESPONSE]

1. Training offered by the [PROGRAM] program
2. Marketing materials produced by the [PROGRAM] program
3. One-on-one technical assistance from [PROGRAM] staff
4. [IF PROGRAM = HPwES:] Incentives for purchase of diagnostic equipment
5. [IF PROGRAM = HPwES:] Blower door loan program

[*Do not read*:]

97. None of the above
98. Don't know

[IF Q36≠97 OR 98]

Q37. How valuable were each of the resources you used in helping you do more [PROGRAM] projects or do them more effectively? For each one, please tell me whether it was extremely valuable, somewhat valuable, not very valuable, or not at all valuable *Interviewer: do not read 98*.

[MATRIX QUESTION: SCALE]

[DISPLAY ONLY ITEMS SELECTED IN Q36] Item	Extremely valuable	Somewhat valuable	Not very valuable	Not at all valuable	98 DK
Training offered by [PROGRAM] program					
Marketing materials produced by the [PROGRAM] program					
One-on-one technical assistance from [PROGRAM] staff					
Incentives for purchase of diagnostic equipment					
Blower door loan program					

[IF ANY ITEM IN Q37=1, 2, OR 3]

Q38. You said some of the resources you used were not very valuable. How could the resources the program provided have been more valuable? *Interviewer: prompt with responses for each.*

[MATRIX QUESTION]

[DISPLAY ONLY ITEMS FOR WHICH Q37= Not very valuable or Not at all valuable] Item	[OPEN ENDED RESPONSE]
Training offered by [PROGRAM] program	
Marketing materials produced by the [PROGRAM] program	
One-on-one technical assistance from [PA] staff	
Incentives for purchase of diagnostic equipment	
Blower door loan program	

[IF PA=EVT]

Q39. How difficult are each of the following aspects of participating in the program? *Interviewer: do not read 97-99.*

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1. Extremely difficult	2. Very difficult	3. Somewhat difficult	4. Not very difficult	5. Not at all difficult	97 NA	98 DK	99 RF
Gathering the information needed to complete the HERO tool								
Entering the data and using the HERO tool itself								
Meeting the program's quality assurance and control requirements								

[IF ANY ITEM IN Q39= 1, 2, OR 3 (SOMEWHAT, VERY, OR EXTREMELY DIFFICULT)]

Q40. You mentioned that [**Items rated 1, 2, or 3 in Q39**] were difficult. What about those things, specifically, is difficult?

1. [OPEN-ENDED RESPONSE]

[IF ANY ITEM IN Q39= 1, 2, OR 3 (SOMEWHAT, VERY, OR EXTREMELY DIFFICULT)]

Q41. Has that difficulty limited the number of projects you have been able to complete through the program? If so, how?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q42. How satisfied are you with the following aspects of working with the [PROGRAM] program? Would you say you were very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, or very dissatisfied with… Interviewer: do not read 97-99

[MATRIX QUESTION: SCALE]

[LOGIC] Item	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied	98 DK
Your communication with [PA]						
Your overall experience with the [PROGRAM] program						

[ASK ALL]

Q43. What aspects of the [PROGRAM] program work best: what do you not want to see changed? Why do you say that?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q44. What do you see as the greatest opportunity to improve the [PROGRAM] program?

[*Interviewer: Probe on any items from Q25 rated 3 or below that are not initially mentioned.*]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q45. Those were all the questions I had prepared. Is there anything else you think it's important that I know about the [PROGRAM] program as we are thinking about ways that it could improve?

1. [OPEN-ENDED RESPONSE]

B.3. Low

Introduction

Hello, my name is _____. I'm calling from Research Into Action on behalf of the Vermont Department of Public Service. We are working with the DPS to identify opportunities to improve [**PA**]'s [**Program**] program and help more Vermonters increase the energy efficiency of their homes. I understand you have completed projects through the program, and that experience, combined with your expertise working in Vermont homes would be very valuable to our research. Are you the best person to talk with about your company's work with the [**Program**] program? [*If not, ask for best contact.*]

Great, I have about five minutes of questions for you. Is now a good time to talk? [*If not, attempt to schedule another time.*]

Thanks, and before we get started, I want to let you know that we will keep everything you say confidential. We won't report anything in a way that would identify any individual respondent and we won't share our notes from this call.

Instrument [ASK ALL]

[ASK ALL]

Q1. In the past year, how many projects did your company complete that qualified for incentives through the [**Program**]?

[SINGLE RESPONSE]

1. Response Text

[*Do not read*:]

98. Don't know

[ASK ALL]

Q2. About what proportion of the projects your company did last year were [**Program**] projects?

[SINGLE RESPONSE]

1. Very little (10% or less)
2. A minority (11-40%)
3. About half (41-60%)
4. A majority (61-90%)
5. Almost all (More than 90%)

[*Do not read*:]

98. Don't know

[ASK ALL]

Q3. About what proportion of the projects your company has done through [**Program**] were part of a larger remodel, where you made changes to the home that went beyond the energy efficiency improvements you installed?

[SINGLE RESPONSE]

1. Very little (10% or less)
2. A minority (11-40%)
3. About half (41-60%)
4. A majority (61-90%)
5. Almost all (More than 90%)

[*Do not read*:]

98. Don't know

[ASK ALL]

Q4. How often do you make efficiency improvements that would qualify for program incentives but where the project doesn't go through the [**Program**] program? Would you say this happens:

[SINGLE RESPONSE]

1. Very rarely or not at all
2. Rarely
3. Sometimes
4. Often
5. Very often

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q4=3, 4, OR 5]

Q5. What are the reasons those projects don't go through the program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q6. When you recommend energy efficiency improvements to customers, do you tell them a specific amount of energy, money, or percent of their heating bill they can expect to save from those improvements?

[SINGLE RESPONSE]

1. Yes
2. No

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q6=1 OR 96]

Q7. [*Interviewer: If Q6=Other, use your discretion as to whether this question is applicable:*] How do you estimate the energy savings from the efficiency improvements you recommend? Do you…

[MULTIPLE RESPONSE]

1. Use the Efficiency Vermont audit tool (HERO)
2. Use a different audit tool

3. Calculate the estimated savings on your own
4. Estimate the savings based on your experience

[*Do not read*:]

96. Other, please specify: [OPEN-ENDED RESPONSE]
97. Not applicable
98. Don't know

[IF Q7≠1 (DO NOT PROVIDE ESTIMATES, OR PROVIDE ESTIMATES BUT DO NOT USE HERO)]

Q8. Why don't you use the HERO tool to estimate the energy savings from your recommended efficiency improvements?

1. [OPEN-ENDED RESPONSE]

[IF Q6=1 OR 96]

Q9. How important are those customized, specific savings estimates in your customers' decisions about whether to make upgrades? Why do you say that?

1. [OPEN-ENDED RESPONSE]

[*Do not read*:]

98. Don't know

[IF Q2≠4 OR 5]

Q10. What are the main reasons you didn't do more [**Program**] projects in the past year? [*Interviewer: Record open-ended response, then code to response options as applicable*.]

[MULTIPLE RESPONSE]

1. [OPEN-ENDED RESPONSE]
2. Lack of customer demand for projects that would qualify for [**Program**]
3. Busy with other types of projects
4. Energy efficiency projects are not a focus of the business
5. [**Program**] projects are not profitable enough
6. [**Program**] processes (application, QA/QC, etc.) are too difficult
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL]

Q11. In general, how do you see the market for home energy efficiency improvements in Vermont? [*If needed, probe: Is there strong demand for improvements? Why or why not?*]

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q12. What aspects of the [**Program**] program work best: what do you not want to see changed? Why do you say that?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q13. What do you see as the greatest opportunity to improve the [**Program**] program?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q14. Those were all the questions I had prepared. Is there anything else you think it's important that I know about the [**Program**] program as we are thinking about ways that it could improve?

1. [OPEN-ENDED RESPONSE]

Appendix C. Participant Survey Instrument

C.1. Screening [ASK ALL]

S1. Did you have an energy efficiency audit at [**Address**] through the [**Program Name**] program?

An energy audit is when someone comes to your home to identify opportunities to make your home more energy efficient.

1. Yes – my household had an energy audit
2. No – my household did not have an energy audit
98. Don't know

[IF S1=2 OR 98]

S2. Did you work with [**Contractor Name**] to make improvements that made your home more energy efficient?

1. Yes – my household made energy efficiency improvements
2. No – my household did not make energy efficiency improvements (→TERMINATE)
98. Don't know (→TERMINATE)

[IF S1=1 OR S2=1]

S3. We would like to hear from a household member that was involved in the energy audit or the energy efficiency improvement project you completed. Were you involved in making decisions about the audit or project?

[SINGLE RESPONSE]

1. Yes – I was involved in the audit or project
2. No – I was not involved in the audit or project
98. Don't know (→TERMINATE)

[IF S3=2 OR 98]

S4. Is there someone else in your household who made decisions about the energy audit or energy efficiency improvement project and could complete this survey?

If so, please forward the survey link you received to that person.

[SINGLE RESPONSE]

1. Yes, knowledgeable person has received survey link: select this option to continue the survey
2. No, no one involved in the energy audit or efficiency improvement project is available to take the survey (→TERMINATE)
98. Don't know (→TERMINATE)

C.2. Home Energy Audit Experience [ASK ALL]

[ASK ALL]

Q1. How did you learn about the opportunity to have a home energy audit or receive rebates for making your home more energy efficient through [**Program Name**]? Select all that apply:

[MULTIPLE RESPONSE; RANDOMIZE OPTIONS 1-9]

1. Mailing or bill insert from Efficiency Vermont or your utility
2. Radio, TV, or print advertising
3. Online advertising
4. Email from your utility
5. Online search
6. A contractor
7. A friend, family member, or other acquaintance
8. Efficiency Vermont website
9. Utility website
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF RESPONDENT HAD AUDIT (IF S1=1)]

Q2. Why were you interested in having a home energy audit? Were you seeking opportunities to… (please select all that apply:)

[MULTIPLE RESPONSE, RANDOMIZE OPTIONS 1-7]

1. Reduce energy bills
2. Do your part to help the environment or your community
3. Make your home more comfortable
4. Improve the air quality inside your home
5. Replace a piece of equipment that had failed or was near failure
6. Make your home more valuable
7. Learn about and/or qualify for rebates for a project you had been planning previously
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF RESPONDENT HAD AUDIT]

Q3. To what extent do you agree with each of the following statements about your energy audit experience?

[MATRIX QUESTION: SCALE]

[RANDOMIZE Items]	1 – Strongly disagree	2 – Disagree	3 – Neither agree nor disagree	4 – Agree	5 – Strongly agree	98 DK
It was easy to arrange the audit						
The audit took a reasonable amount of time						
The person who conducted the audit answered my needs and questions						
The results from the audit were easy to understand						
I learned more about how to save energy in my home						
I understood what I needed to do next to make the recommended improvements						

[IF RESPONDENT HAD AUDIT AND IF PA=EVT]

Q4. Did your contractor charge you for your home energy audit?

[SINGLE RESPONSE]

1. Yes
2. Yes, but the cost was deducted from the cost of the improvements you made
3. No
98. Don't know

[IF Q4=1 OR 2]

Q5. How much did your contractor charge for your audit?

[SINGLE RESPONSE]

1. Less than $100
2. $100 to $199
3. $200 to $299
4. $300 to $399
5. $400 to $499
6. More than $500
98. Don't know

[IF Q4=1 OR 2 AND Q5≠98 OR IF PA = VGS]

Q6. How would you rate the value of the information you got from the audit relative to its cost?

[SINGLE RESPONSE]

1. The cost was far greater than the value
2. The cost was somewhat greater than the value
3. The value was roughly equal to the cost
4. The value was somewhat greater than the cost
5. The value was much greater than the cost

[IF RESPONDENT HAD AUDIT]

Q7. Which of these benefits of making energy efficiency improvements did you discuss with your energy auditor or contractor?

[MULTIPLE RESPONSE; RANDOMIZE OPTIONS 1-7]

1. Saving money on your energy bills
2. Protecting the environment (such as reducing greenhouse gasses or using fewer fossil fuels)
3. Making your home more comfortable and draft free
4. Improving your home's air quality or making your home more healthy
5. Reducing noise inside your home
6. Increasing your home's value
7. Reducing unexpected repairs or avoiding equipment failure
96. Other, please specify: [OPEN-ENDED RESPONSE]
97. None of the above
98. Don't know

[IF RESPONDENT HAD AUDIT]

Q8. Did the auditor or contractor describe how the energy efficiency improvements would pay for themselves over time through savings on your energy bills?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know

[IF RESPONDENT HAD AUDIT]

Q9. How influential was each of these factors when you considered the value of the improvements your energy audit recommended?

[MATRIX QUESTION: SCALE]

[RANDOMIZE] Item	Not at all influential	Not very influential	Somewhat influential	Very influential	Extremely influential	98 DK
Energy cost savings						
Environmental benefits						
Increased comfort						
Improved indoor air quality						
Noise reduction						
Increased resale value of your home						
Avoiding unexpected repairs or equipment replacement						
[Open-ended response from Q7_96]						
[IF Q8=1] Viewing improvements as an investment that will pay back over time through energy cost savings						

C.3. Response to Audit Recommendations [ASK ALL]

[IF RESPONDENT HAD AUDIT]

Q10. Once you reviewed the recommended improvements, how much effort did you think it would take to make those improvements? (Effort to choose what to do, select a contractor, schedule the work, etc.)

[SINGLE RESPONSE]

1. A great deal of effort
2. A moderate amount of effort
3. Some effort
4. Not much effort
5. Very little effort
98. Don't know

[IF PA=VGS]

Q11. Did you make energy efficiency improvements in each of the following areas?

[MATRIX QUESTION]

[LOGIC] Item	1. Yes, made improvements	2. No, did not make improvements	3. No improvements recommended	98 DK
Sealing your home against air leakage				
Adding insulation				
Improving your heat distribution system, like duct sealing or boiler pipe insulation				
Replacing heating equipment like furnaces or boilers				
Other, specify: [OPEN ENDED RESPONSE]				

[IF ANY ITEM IN Q11=2]

Q12. In the next two years, how likely are you to make the recommended improvements you have not completed?

[MATRIX QUESTION]

[DISPLAY ONLY ITEMS FOR WHICH Q11=2] Item	1. Definitely will not make improvements	2. Probably will not make improvements	3. May make improvements	4. Will likely make improvements	5. Definitely plan to make improvements	98 DK
Sealing your home against air leakage						
Adding insulation						
Improving your heat distribution system, like duct sealing or boiler pipe insulation						
Replacing heating equipment like furnaces or boilers						
[Open ended-response from Q11_Other]						

[IF RESPONDENT HAD AUDIT AND PA=EVT]

Q13. According to our records, your audit recommended the following energy efficiency improvements. For each one, please indicate whether you made the recommended improvement.

[MATRIX QUESTION]

[LOGIC] Item	1. Made improvement	2. Did not make improvement	3. Did not receive recommendation	98 DK
[IF REC_INSULATION=1] Adding insulation				
[IF REC_AIR SEALING=1] Sealing your home against air leakage				
[IF REC_WINDOWS OR DOORS=1] Installing high efficiency windows or doors				
[IF REC_HEATING SYSTEM=1] Replacing heating equipment like furnaces or boilers				
[IF REC_THERMOSTAT=1] Installing a programmable thermostat				
[IF REC_WATER HEATER=1] Replacing your water heater with a high efficiency model				
[IF REC_A/C=1] Installing a high efficiency air conditioning system				

[IF RESPONDENT HAD AUDIT AND PA=EVT]

Q14. Did you make any other energy efficiency improvements to your home?

[MATRIX QUESTION]

[LOGIC] Item	1. Yes, made improvement	2. No, did not make improvement	98 DK
[IF REC_AIR SEALING≠1] Sealing your home against air leakage			
[IF REC_INSULATION≠1] Adding insulation			
[IF REC_WINDOWS OR DOORS≠1] Installing high efficiency windows or doors			
[IF REC_THERMOSTAT≠1] Installing a programmable thermostat			
[IF REC_HEATING SYSTEM≠1] Replacing space heating equipment like a furnace or boiler			
[IF REC_WATER HEATER≠1] Replacing water heating equipment			
[IF REC_A/C≠1] Installing a high efficiency air conditioning system			

[IF ANY ITEM IN Q13=2]

Q15. In the next two years, how likely are you to make the recommended improvements you have not completed?

[MATRIX QUESTION]

[DISPLAY ONLY ITEMS FOR WHICH Q13=2] Item	1. Definitely will not make improvements	2. Probably will not make improvements	3. May make improvements	4. Will likely make improvements	5. Definitely plan to make improvements	98 DK
Adding insulation						
Sealing your home against air leakage						
Installing high efficiency windows or doors						
Replacing heating equipment like furnaces or boilers						
Installing a programmable thermostat						
Replacing your water heater with a high efficiency model						
Installing a high efficiency air conditioning system						

[IF ANY ITEM IN Q12=1 OR 2 OR IF ANY ITEM IN Q15=1 OR 2]

Q16. For the improvements you are unlikely to make, why don't you plan to make those improvements? Please select all that apply:

[MULTIPLE RESPONSE]

1. You could not afford the cost
2. The expected energy savings did not justify the cost
3. Making the improvement would have been too inconvenient or invasive in your home
4. You did not want to discard equipment that was still working
5. Your home is constructed in a way that makes it not possible, not practical, or it would require significant, and costly, work, to make the improvement as it was recommended (for example, replacing knob and tube wiring or removing vermiculite insulation)
6. Your home is efficient enough without making the recommended improvements
7. You had a hard time figuring out how to go about making the recommended improvement
8. [IF Q15_Adding Insulation=1 OR 2 OR IF Q15_Sealing your home=1 OR 2:] You had concerns about the safety of the insulation or sealing materials

9. [IF Q15_Replacing heating equipment=1 OR 2 OR IF Q14_Replacing your water heater=1 OR 2:] You had concerns about reliability of the equipment, noise levels, maintenance needs or whether it would provide sufficient heat
10. You wanted to focus on other types of home improvements
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF ANY ITEM IN Q12=4 OR 5 OR IF ANY ITEM IN Q15=4 OR 5]

Q17. Which of the following factors have prevented you from making the improvements you've planned?

[MULTIPLE RESPONSE]

1. You could not afford the cost
2. Making the improvement would have been too inconvenient or invasive in your home
3. You did not want to discard equipment that was still working
4. You need to take steps to prepare your home for the improvement (for example, replacing knob and tube wiring or removing vermiculite insulation)
5. You had a hard time figuring out how to go about making the recommended improvement
6. You wanted to focus on other types of home improvements first
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

C.4. Measures Installed [ASK ALL]

[IF RESPONDENT HAS NOT HAD AUDIT (S2=1) AND INST_ANY=1]AND IF ANY ITEM IN Q18=1 OR ANY ITEM IN Q19=1]

Q18. Why did you decide to make energy efficiency improvements to your home? Were you seeking to… (please select all that apply):

[MULTIPLE RESPONSE, RANDOMIZE OPTIONS 1-7]

1. Reduce energy bills
2. Do your part to help the environment or your community
3. Make your home more comfortable
4. Improve the air quality inside your home
5. Replace a piece of equipment that had failed or was near failure
6. Make your home more valuable
7. Learn about and/or qualify for rebates for a project you had been planning previously
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF RESPONDENT INSTALLED MEASURES (IF ANY ITEM IN Q11=1 OR IF ANY ITEM IN Q13=1 OR IF ANY ITEM IN Q18=1 OR IF ANY ITEM IN Q19=1) AND PA=VGS]

Q19. Did you receive a rebate from Vermont Gas for the energy efficiency improvements you made?

[MATRIX QUESTION]

[DISPLAY ITEMS FOR WHICH Q11=1] Item	1. Yes, received a rebate	2. No, made improvements without receiving a rebate	98 DK
Sealing your home against air leakage			
Adding insulation			
Improving your heat distribution system, like duct sealing or boiler pipe insulation			
Replacing heating equipment like furnaces or boilers			
[Open ended-response from Q11_Other]			

[IF RESPONDENT INSTALLED MEASURES AND PA=EVT]

Q20. Did you receive a rebate from Efficiency Vermont for the energy efficiency improvements you made?

[MATRIX QUESTION]

[DISPLAY ITEMS FOR WHICH Q11=1 OR Q19=1] Item	1. Yes, received a rebate	2. No, made improvements without receiving a rebate	98 DK
Adding insulation			
Sealing your home against air leakage			
Installing high efficiency windows or doors			
Replacing heating equipment like furnaces or boilers			
Installing a programmable thermostat			
Replacing your water heater with a high efficiency model			
Installing a high efficiency air conditioning system			

[IF ANY ITEM IN Q21=2 OR IF ANY ITEM IN Q22=2]

Q21. Why didn't you receive rebates for some or all of the energy efficiency improvements you made?

[MULTIPLE RESPONSE, RANDOMIZE ITEMS 1-4]

1. Did not want to work with a program-approved contractor
2. Did not want to go through the process of applying for a rebate
3. The improvement(s) did not qualify for a rebate
4. You were not aware whether the improvement(s) would qualify for a rebate

96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF RESPONDENT INSTALLED MEASURES]

Q22. How important were these factors in helping you make energy efficiency improvements in your home?

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1. Not at all important	2. Slightly important	3. Somewhat important	4. Very important	5. Extremely important	97. Not applicable: Did not have	98 DK
Your home efficiency audit report							
Specific estimates of the energy or cost savings the improvements would generate							
Advice and interactions with the auditor or contractor who came to your home							
Advice from friends or family							
The rebates you received for making improvements							
Your personal research or previous knowledge							

C.5. Financing [ASK ALL]

[ASK ALL]

Q23. Were you aware that loan options are available specifically to help Vermont residents finance energy efficiency improvements to their homes?

[SINGLE RESPONSE]

1. Yes
2. No

[IF Q25=1 AND IF RESPONDENT INSTALLED MEASURES]

Q24. Did you use one of these energy efficiency loans to finance the improvements you made to your home?

[SINGLE RESPONSE]

1. Yes, financed full project cost with an energy efficiency loan
2. Yes, financed part of the project cost with an energy efficiency loan
3. No, did not use an energy efficiency loan
98. Don't know

[IF Q26=1 OR 2]

Q25. How important was the availability of the energy efficiency loan in your decision to make energy efficiency improvements in your home?

[SINGLE RESPONSE]

1. Not at all important
2. Slightly important
3. Somewhat important
4. Very important
5. Extremely important
98. Don't know

[IF Q26=3]

Q26. Why did you decide not to finance your improvements using an energy efficiency loan? Please select all that apply:

[MULTIPLE RESPONSE]

1. Did not need to borrow money for the improvements
2. Did not want to take on debt or make monthly payments
3. Did not think you would qualify
4. Did not want to go through the loan process
5. Wanted a longer time to repay the loan
6. Wanted a loan with a lower interest rate
7. Loan application was denied
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF Q25=1 AND RESPONDENT DID NOT INSTALL MEASURES (IF ALL ITEMS IN Q11≠1 OR IF ALL ITEMS IN Q13≠1 OR IF ALL ITEMS IN Q18≠1)]

Q27. Did you consider using an energy efficiency loan to finance the recommended energy efficiency improvements?

[SINGLE RESPONSE]

1. Yes
2. No
98. Don't know

[IF Q29=1]

Q28. Why did you decide not to use an energy efficiency loan?

[MULTIPLE RESPONSE]

1. Decided not to install measures for reasons other than their upfront cost
2. Could not afford monthly loan payment
3. Did not want to take on debt or make monthly payments
4. Did not think you would qualify
5. Did not want to go through the loan process
6. Wanted a longer time to repay the loan
7. Wanted a lower interest rate
8. Loan application was denied
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[IF RESPONDENT DID NOT INSTALL MEASURES (IF ALL ITEMS IN Q11≠1 OR IF ALL ITEMS IN Q13≠1 OR IF ALL ITEMS IN Q18≠1) AND Q30_1, Q30_2, AND Q30_3 ARE NOT SELECTED]

Q29. If a low interest loan were available to you to finance the recommended energy efficiency improvements, how much more likely would you be to make those improvements?

[SINGLE RESPONSE]

1. No more likely
2. A little bit more likely
3. Somewhat more likely
4. Much more likely
5. Very much more likely

C.6. Installation Experience [IF RESPONDENT INSTALLED MEASURES]

[IF RESPONDENT INSTALLED MEASURES]

Q30. How satisfied are you with the following aspects of working with the contractor who installed your energy efficiency improvements?

[MATRIX QUESTION: SCALE]

[RANDOMIZE] Item	1 – Not at all satisfied	2 – Slightly satisfied	3 – Somewhat satisfied	4 – Very satisfied	5 – Extremely satisfied	98 DK
The contractor's responsiveness to your needs and concerns						
The contractor's professionalism						
The quality of the contractor's work						

[IF RESPONDENT INSTALLED MEASURES]

Q31. To what extent do you agree with the following statements about your home since you made your efficiency upgrades?

[MATRIX QUESTION: SCALE]

[RANDOMIZE] Item	1 – Strongly Disagree	2 – Disagree	3 – Neither agree nor disagree	4 – Agree	5 – Strongly Agree	98 DK
My home is more comfortable						
My monthly energy bills are lower						
My home is more valuable						
My home is safer						
My energy usage has decreased						
Less noise enters my home from outside						
My indoor air quality has improved						
People in my household have experienced less hay fever, asthma, or other conditions impacted by air quality						

[IF Q33_MONTHLY ENERGY BILLS = 4 OR 5 OR IF Q33_ENERGY USAGE = 4 OR 5]

Q32. How have the energy and/or cost savings you have experienced compared to what you expected before making your energy efficiency improvements?

[SINGLE RESPONSE]

1. Savings are much less than expected
2. Savings are somewhat less than expected
3. Savings are about what was expected
4. Savings are somewhat more than expected
5. Savings are much more than expected
98. Don't know

C.7. Demographics [ASK ALL]

Thank you for your responses so far. We have just a few more questions that will help [**PA**] ensure its energy efficiency services are reaching all Vermonters.

[ASK ALL]

Q33. Do you or members of your household own your home, or do you rent it?

[SINGLE RESPONSE]

1. Own
2. Rent
3. Occupy rent free
98. Don't know
99. Prefer not to answer

[ASK ALL]

Q34. Including yourself, how many people currently live in your home year-round?

[SINGLE RESPONSE]

1. Response Text [FORCE NUMERIC RESPONSE]

[ASK ALL]

Q35. Which of the following ranges includes your total annual household income in 2017, before taxes?

[SINGLE RESPONSE]

1. Under $20,000
2. $20,000 to under $30,000
3. $30,000 to under $40,000
4. $40,000 to under $50,000
5. $50,000 to under $60,000

6. $60,000 to under $80,000
7. $80,000 to under $100,000
8. $100,000 to under $120,000
9. $120,000 or more
98. Don't know
99. Prefer not to answer

[ASK ALL]

Q36. What is the highest level of education you have completed so far?

[SINGLE RESPONSE]

1. No schooling
2. Less than high school
3. Some high school
4. High school graduate or equivalent (such as GED)
5. Trade or technical school
6. Some college
7. Associate degree
8. College degree (Bachelor's degree)
9. Some graduate school
10. Master's Degree
11. Doctorate, (including Ph.D., M.D., J.D.)
99. Prefer not to answer

[ASK ALL]

Q37. Which of the following best describe your racial or ethnic identity? Please select all that apply:

[MULTIPLE RESPONSE]

1. White, European American
2. Black, African American
3. Hispanic/Latino(a)/Spanish origin
4. American Indian or Alaska Native
5. Asian
6. Native Hawaiian or Other Pacific Islander
96. Other
99. Prefer not to answer

[ASK ALL]

Q38. How long have you lived in your current home?

[SINGLE RESPONSE]

1. Less than 6 months
2. 6 months – less than 1 year
3. 1 – 4 years

4. 5 – 9 years
5. 10 – 14 years
6. 15 – 19 years
7. 20 or more years
96. Other, please specify: [OPEN-ENDED RESPONSE]

[ASK ALL]

Q39. How long do you anticipate remaining in your current home?

[SINGLE RESPONSE]

1. Less than 6 months
2. 6 months – less than 1 year
3. 1 – 4 years
4. 5 – 9 years
5. 10 – 14 years
6. 15 – 19 years
7. 20 or more years
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know