Appendix A. Survey Weights

Home Energy Services Initiative Participant Survey

The evaluation team developed the participant survey sample to capture and measure the characteristics of the census population with respect to the following strata:

- Program Administrator
- Vendor Type
- HEAT Loan Participation
- Audit Type[1]

The team sampled participants in order to satisfy confidence and precision goals within each stratification. In other words, relative to the odds of being randomly selected from the population, any given stratum combination (participant type) may have been over or under sampled in relation to the overall population. We developed and applied sample weights for each participant type to account for any over or under sampling in the procedure. When aggregating information above the chosen stratum, it is important to take into account the relative likelihood of participant type selection in order to obtain an accurate representation of the target population.

The sample weight is a ratio adjustment made for each participant. The ratio of the total population within a stratum is multiplied by the inverse of the sampled stratum population ratio. A sample weight above a value of one indicates that a participant type was under-sampled, while a value below one indicates it has been over-sampled. The sample weight is applied by multiplying quantifiable observations by the weight so that calculated averages and other statistical outputs are accurate representations of the chosen target population.

$$Sample\ Weight = \frac{Total\ Strata\ Population}{Total\ Population} * \frac{Sample\ Population}{Sampled\ Strata\ Population}$$

Table 1 shows the participant survey sample weights. Stratum combinations not found in the tables below were not sampled, resulting from a very small overall population size in the stratum combination.

[1] Defined as the type of measure installed: Audit-only measures, weatherization measures, weatherization and cool smart measures, and weatherization and High Efficiency Heating and Water Heating Equipment (HEHE) measures.

Table 1. Home Energy Services Initiative Participant Survey Sample Weights

PA	Delivery Channel	HEAT Loan Participation	HES Initiative Participation			
			Audit-only	Wx	Wx/HEHE	Wx/COOL SMART
Berkshire Gas	LV	No	0.85	0.54	0.03	-
		Yes	0.08	0.09	0.02	-
National Grid	LV	No	3.85	3.82	0.05	0.04
		Yes	1.36	0.65	0.03	0.04
	HPC	No	2.32	2.05	0.02	0.02
		Yes	0.87	0.21	0.02	0.02
Eversource East Massachusetts*	LV	No	4.00	5.28	0.05	0.07
		Yes	1.63	0.74	0.05	0.05
	HPC	No	2.21	2.65	0.02	0.03
		Yes	0.36	0.14	0.02	0.02
Unitil	HPC	No	0.1	0.11	0.02	0.04
		Yes	-	0.02	-	-
Cape Light Compact	LV	No	0.63	0.68	-	0.03
		Yes	0.22	0.20	-	0.03
	HPC	No	0.14	0.25	-	0.02
		Yes	-	0.04	-	0.01
Columbia Gas	LV	No	3.92	0.45	0.01	-
		Yes	-	-	-	-
	HPC	No	1.06	0.54	0.01	-
		Yes	-	-	-	-
Liberty Utilities	LV	No	0.57	0.05		
		Yes	-	-	-	-

* Formerly known as NStar
LV = lead vendor
HPC = home performance contractor
Wx = weatherization

HEAT Loan Nonparticipant Survey

The development of sample weights for the nonparticipant survey is analogous to the procedure described above. The nonparticipant survey weights were calculated with respect to one stratum, the program administrator. For a Cool Smart participant, the program administrator is recorded as the electric provider while the heating provider is used for HEHE participants. For participants who were involved within both the HEHE and Cool Smart programs, the heating program administrator was used in the development of sample weights. Table 2 shows the nonparticipant survey sample weights.

Table 2. HEAT Loan Nonparticipant Survey Sample Weights

PA	Sample Weight
Berkshire Gas	0.32
Cape Light Compact	0.90
Columbia Gas	1.84
Liberty Gas	0.39
National Grid	1.17
Eversource East Massachusetts*	1.32
Unitil	0.07

* Formerly known as NStar

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Appendix B. Massachusetts HES Initiative Delivery Assessment: Findings from Home Performance Contractor and Lead Vendor In-Depth Interviews

In support of the 2014 Home Energy Services (HES) initiative delivery assessment, the evaluation team interviewed 25 home performance contractors (HPCs) and all four lead vendors about their experiences implementing the initiative.[2] Specifically, we asked about initiative delivery (i.e., marketing and outreach, the home energy assessment process, and major measure recommendations), quality control, and cross-program promotion.

Summary of Key Findings

In general, HPCs and lead vendors described similar approaches for implementing the HES initiative. Both HPCs and lead vendors said that during the assessment they installed as many instant savings measures (ISMs) as possible, within limits of the initiative and based on customers' needs and preferences. Despite offerings that assist customers with pre-weatherization barriers (e.g., knob and tube wiring) and upfront costs, contractors most commonly cited these as the primary challenges to encouraging customers to move forward with recommendations from the assessment. They also frequently cited customer inconvenience caused by weatherization work as a challenge. When asked what incentives or offerings customers were the most responsive to or interested in, HPCs and lead vendors both said the HEAT Loan and early boiler replacement (EBR). HPCs and lead vendors differed in their follow-up procedures, with lead vendors describing a more regimented or standardized long-term follow-up process.

The evaluation team also asked HPCs and lead vendors about their quality control procedures. We found that these vary considerably among lead vendors. For example, lead vendors said they performed quality control on between 20% and 60% of HPC and independent installation contractor (IIC) jobs, with one lead vendor inspecting 100% of the jobs performed by new HPCs and IICs.

Most HPCs said they appreciated getting feedback from quality control visits performed by the lead vendors and the independent statewide quality control auditor so they could continually improve their services. However, five HPCs also expressed concern regarding the way issues that were identified during the quality control process were communicated to the customers. Specifically, these HPCs said they believed the lead vendors and the independent quality control auditor could be more tactful when explaining the quality control process and results to the HPCs' customers. Four HPCs also thought there were some inconsistencies in how quality control was carried out by the lead vendors and the independent quality control auditor, and five were concerned about the inspectors' focus on what the HPCs perceived were small or inconsequential mistakes.

[2] At the time the evaluation team conducted the interviews, four lead vendors (CSG, CET, Rise, and Honeywell) implemented the program for the PAs. However, Honeywell no longer implements the program.

We asked contractors how and when they talk with customers about other Mass Save program offerings, such as the HEAT Loan and the High Efficiency Heating and Water Heating Equipment (HEHE) and COOL SMART programs. Although all HPCs and lead vendors said they promoted the HEAT Loan to their HES customers, HPCs were less proactive in promoting other program offerings like the HEHE and Cool Smart programs than they were with the HEAT Loan. HPCs and lead vendors had similar views on customer awareness and understanding of Mass Save—HPCs and lead vendors thought customers were becoming more aware over time of Mass Save offerings, but they also believed most customers did not understand these offerings very well and could be confused and overwhelmed.

The evaluation team asked HPCs and lead vendors what improvements they would suggest for the HES initiative and HEAT Loan. The most frequently suggested improvement for the HES initiative was for Program Administrators (PAs) and/or lead vendors to provide more complete information about Mass Save programs and offerings to contractors. Specifically, HPCs asked that lead vendors provide them with more lead time when they want to tell their customers about new or limited-duration program offerings. Similarly, lead vendors asked for advanced notification from PAs. HPCs also wanted better explanations of measure and customer eligibility. To improve the HEAT Loan, HPCs and lead vendors most frequently said they wanted the loan to cover additional measures (e.g., spray foam), and three HPCs wanted the PAs to explicitly allow all customers to use the HEAT Loan multiple times instead of only on a case-by-case basis so they could make additional upgrades if they needed to in the future.

Methodology

The evaluation team conducted 30 interviews with lead vendors and HPCs in June and July 2014. The interviews addressed these research questions:

- Do these actions—customer recruitment, ISM installations, audit recommendations, or quality installation practices—vary by PA or delivery channel?
- What are the current quality control procedures and results, and how do they vary (if at all) by delivery channel?
- How are other programs promoted through HES (including the HEAT Loan)?
- How well do customers understand the various program offerings available to them?
- Is there a way to increase participation by revising the HEAT Loan delivery method or eliminating steps in the application process?

Sampling

The PAs provided the evaluation team with a list of all four lead vendors who work with the HES initiative. We conducted interviews with each lead vendor and one additional interview with an auditor for one of the lead vendors, for a total of five interviews.

We compiled a comprehensive list of HPCs from the directory on the Mass Save website. We conducted interviews with 20 out of the 23 unique HPC organizations, with an additional five interviews with four

of the HPCs, for a total of 25 HPC interviews. To ensure representation across the state, the team interviewed at least one HPC that worked with each PA.

Table 3 shows the contractor type, population size, and the number of interviews.

Table 3. Completed Number of Interviews with HPCs and lead vendors

Contractor Type	Population	Interviews with Unique Organizations	Total Interviews
Lead Vendor	4	4	5
HPC	23	20	25
Total	**27**	**25**	**30**

Table 4 shows PA, HPC population, number of interviews with unique HPC organizations, and the total number of HPC interviews.

Table 4. Completed Number of Interviews with HPCs, by PA

PA*	Population of HPC Organizations	Interviews with Unique HPC Organizations	Total HPC Interviews
Columbia Gas of Massachusetts	9	8	10
Eversource West Massachusetts**	6	6	6
Berkshire Gas	2	2	2
Cape Light Compact	1	1	2
National Grid	13	12	16
Eversource East Massachusetts**	13	12	16
Unitil	2	2	3

* Liberty Utilities does not use the HPC model. At the time that these interviews were conducted, all PAs except for Unitil used the lead vendor model. In autumn 2014 (after these interviews were completed), Unitil contracted with a lead vendor.

** Formerly WMECo.

*** Formerly NStar.

Detailed Findings

HES Initiative Delivery

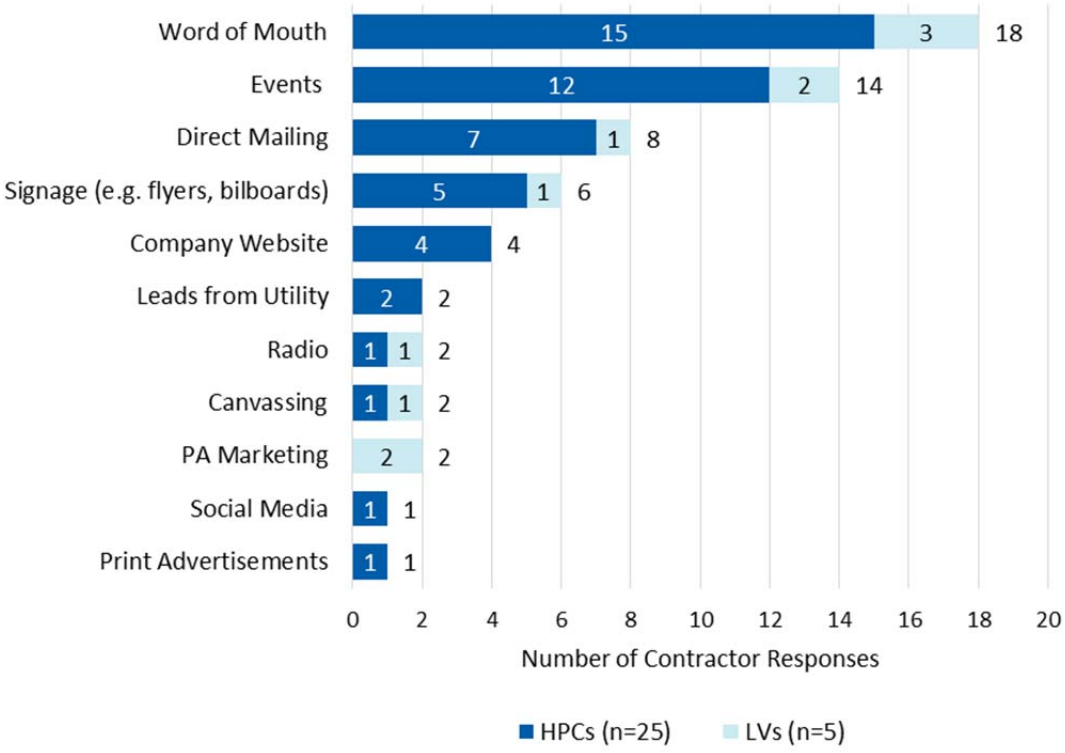
To understand the HES initiative delivery, and if there are any differences among delivery channels, the evaluation team asked HPCs and LVs how they promote the HES initiative and recruit customers and how they deliver the home energy assessments and recommendations.

Marketing and Outreach

As Figure 1 shows, the customer recruitment channels that lead vendors most frequently cited were word of mouth and referrals and events (e.g., farmers markets, trade shows, home shows, local festivals). Two lead vendors mentioned that, in addition to specific HES initiative marketing that their organization performs for the PAs, they also rely on the general Mass Save HES marketing to help them recruit customers. The lead vendors also recruited customers through canvassing, direct mailings, radio, and signage.

The most frequently cited HPC recruitment channels were also word of mouth and referrals, events (e.g., farmers markets, trade shows, home shows, local festivals), and direct mailings. They also cited signage, their company's website, partnerships with other businesses such as HVAC companies, canvassing, print ads, radio, and social media.

Figure 1. HPC and lead vendor Customer Recruitment Channels



Notes: Multiple responses accepted.

Generally, HPCs and lead vendors described similar methods for promoting the initiative and recruiting customers. The main difference between the two delivery channels was that LVs directly benefit from PA-sponsored statewide Mass Save marketing. Five HPCs said that as HPCs they are generally responsible for generating their own leads and did not directly benefit from the PA-sponsored Mass Save marketing. For example, they explained that the PA-sponsored Mass Save marketing materials

directed customers to the Mass Save 1-800 number for scheduling a home energy assessment, which in turn directs customers to the lead vendor delivery channel. Of these HPCs, two requested job leads from the PAs or lead vendors, and three said they wanted compensation from the PAs for their own marketing.

The evaluation team also asked HPCs and lead vendors if they used targeted marketing when promoting the initiative. Most HPCs said they did not do any targeted marketing other than reaching out to customers who are in relatively close proximity to their business. However, one HPC described using past customer participation data to determine which customers or geographic areas would be most likely to participate in the HES initiative. One lead vendor does some targeted marketing, specifically using propensity modeling. Another lead vendor said that if the firm's assessment workload is low, it will target specific cities through direct mail.

Home Energy Assessment Processes

Through the HES initiative, lead vendor Energy Specialists and HPCs provide customers with an assessment that identifies opportunities to install energy efficiency home improvements. Lead vendors and HPCs also make recommendations to customers for major weatherization measures (i.e., insulation and air sealing) incented through the HES initiative and heating, cooling, and water heating systems incented through other Mass Save programs.

To understand the home energy assessment process, the evaluation team asked interviewees:

- How they decide which ISMs to install during the assessments
- How they follow up with customers after the assessment
- Which initiative aspects customers are the most and least interested in
- What challenges they encounter when encouraging customers to install major measures
- Whether they recommend non-initiative measures to customers during the assessment (HPCs only)

Instant Savings Measure Installations

In general, HPCs and lead vendors said they installed as many ISMs as possible, within limits of the HES initiative and based on customer needs and preferences. One HPC explained that: *"We try to install every single ISM that we can in the home, because we have metrics to hit within the program."*

Both HPCs and lead vendors acknowledged that the initiative had limits on ISMs, which had implications for what and how many they could install. For example, auditors could install only one or two LEDs, depending on the PA.[3] Other than initiative limits, they said the primary forces driving installation decisions were customer needs and preferences:

- **Customer needs:** Interviewees said that customer needs may dictate which ISMs they install. For example, in areas of high use, they tried to install CFLs and LED bulbs.
- **Customer preferences:** HPCs said customers often declined CFLs and water-saving measures, but both HPCs and lead vendors explained that customers were very interested in LEDs.

Customer Response to HES Initiative Aspects

We asked HPCs and lead vendors what aspects of the initiative they thought customers were the most and the least responsive to or interested in.

Interviewees (both HPCs and lead vendors) differed in their opinions on customer response to ISMs. Roughly half of the interviewees thought the ISMs were one of the best received initiative elements, but a third said ISMs were the element customers were least interested in. However, when asked to elaborate, several interviewees explained that customers were least responsive to water-saving measures and CFLs, while most customers were very interested in LEDs. As one lead vendor clarified about the ISMs, *"People don't like the [CFL] bulbs, that's a touchy subject… the LEDs are fine."* As an HPC stated, *"Even customers who are hesitant about CFLs will always take LEDs."*

Other aspects that HPCs and lead vendors commonly said customers were most interested in were:

- The weatherization measures (e.g. insulation and air sealing) (12 contractors)
- The EBR (6 contractors)
- The HEAT Loan (6 contractors)

HPCs and lead vendors said customers were the least responsive to having to spend money (three contractors) and customer inconvenience, such as having someone in their home, the time commitment, and invasive work (three contractors).

Post-Audit Follow-Up

Most HPCs and lead vendors said they conducted both short- and long-term follow-up to encourage customers to make recommended upgrades. The main difference between HPCs and lead vendors was that lead vendors appeared to have a more regimented or standardized long-term follow-up process:

- One lead vendor said it followed up with customers at one month intervals (30-, 60-, and 90-day follow-ups) via e-mail and occasionally by phone.

[3] This program requirement changed in June, 2014 (during the HPC interview process); some HPCs noted the change and were pleased that they could offer more LEDs.

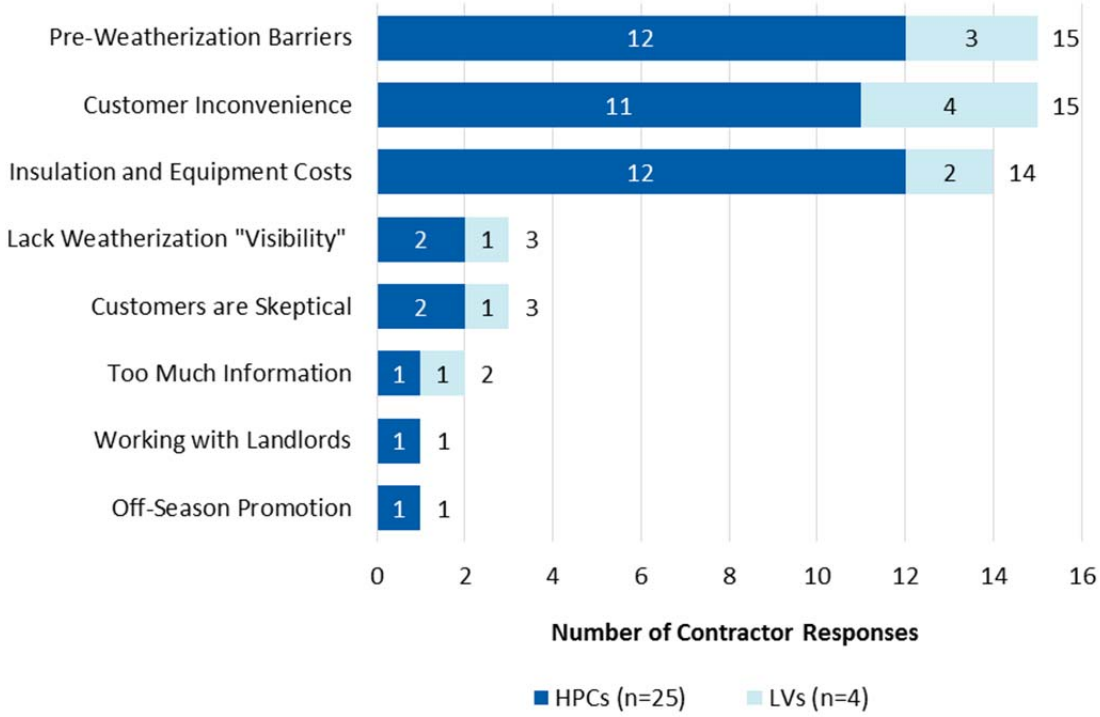
- One lead vendor said that although its auditors are encouraged to reach out to and engage customers on their own, its organization also sends out automated e-mails after 7, 15, and 45 days, reminding customers about the opportunity to participate.
- Another lead vendor said that after 90 days and 180 days auditors send personalized e-mails to their customers.
- One lead vendor said that it follows up with customers with two e-mails—the first two days after the audit and another two to three weeks later.

Over half of the HPCs (13 out of 25) said that if customers did not initially sign on for weatherization work during the assessment, the HPCs typically followed up via phone or e-mail within one to two weeks. In contrast with lead vendors, however, only one HPC described following up with customers at set intervals. Although HPCs said they do long-term follow-up with customers, most did not describe a systematic method for doing so. The majority said they followed up within a few weeks to a few months and sometimes multiple times throughout the year. Four HPCs said they choose if and when to follow up with customers on a case-by-case basis. One HPC explained that their company occasionally offered $100 incentives to bring in customers when business is slow. This HPC and another HPC also mentioned that the utility also occasionally provided an incentive to customers for this purpose, which they took advantage of to follow-up with customers.

Major Measure Installation Barriers

The evaluation team asked HPCs and lead vendors what challenges they encountered when encouraging customers to take recommendations from the assessment and install major measures (i.e., insulation and air sealing) through the initiative. As Figure 2 shows, HPCs and lead vendors indicated a variety of barriers to major measure installation.

Figure 2. Contractor Challenges to Encouraging Customers to Make Recommended Improvements



Notes: Multiple responses accepted.

Each of these challenges (many of which are common for all weatherization programs and are barriers the PAs have worked to mitigate) are described in more detail here:

- **Pre-weatherization barriers:** 15 HES contractors cited pre-weatherization barriers, such as knob and tube wiring, asbestos, and mold.[4] Although the evaluation team did not explicitly survey HPCs and lead vendors about their awareness of the pre-weatherization barrier offering from Mass Save, nine contractors mentioned that they were aware of this offering and that they promoted it to help their customers overcome these barriers.
- **Customer inconvenience:** 15 contractors described several inconveniences preventing customers from making weatherization upgrades, such as:
  - Having to take time off work to be home for the improvements
  - Potentially invasive nature of weatherization work (e.g., creating a mess, noise)
  - Hassle of removing belongings from attics or crawl spaces before work can be performed

[4] To help overcome some of these pre-weatherization challenges, the PAs offer incentives to help cover the costs of knob and tube wiring evaluations, combustion safety evaluation and repair, and dryer venting replacements, installation, and repair. The Massachusetts Department of Energy Resources also offers barrier mitigation grants to assist HES participants with the cost of knob and tube wiring remediation and asbestos abatement.

- **Weatherization and equipment costs:** 14 contractors explained that customers were sometimes hesitant to spend money. Some said that even with incentive funding customers may not be able to afford the out-of-pocket costs to install weatherization upgrades and may not want to take on debt through the HEAT Loan.
- **Lack of weatherization "visibility" and prioritization:** Three contractors explained that weatherization measures are less tangible and customers often did not fully understand the benefits of insulation or air sealing. One contractor said: *"Customers are unaware of the insulation and benefits of insulation, it's not a sexy product. They would rather have a new TV on their wall instead of air sealing in the attic."*
- **Customer skepticism:** Three contractors believed that some customers were skeptical about the program. For example, one contractor explained that some of his customers initially did not believe that the HEAT Loan provided 0% interest financing.
- **Too much information:** Two contractors explained that customers may be overwhelmed by the amount of information presented during the assessments. They also said that the two to three hours spent on the assessment was sometimes not enough time to help customers understand all of the benefits of the various energy efficiency improvements.
- **Working with landlords:** One contractor said that working with rental properties was difficult. He explained that tenants can receive assessments, but landlords must approve building upgrades. This discrepancy between the person who receives the assessment and the person who makes upgrade decisions made it difficult for this contractor to encourage customers to move forward with recommended improvements. He explained that landlords may not want to make improvements until the tenant leaves, may be an absentee landlord, or may not be familiar with the initiative.
- **Off-season promotion:** One contractor found it challenging to promote insulation to customers during the summer when they are less concerned about insulating their homes.

Non-Initiative Measure Recommendations

Through the HES initiative, lead vendors are not permitted to recommend non-initiative measures to customers, but HPCs are permitted to do so. To gain a better understanding of how HPCs may promote non-initiative measures, the evaluation team asked only HPCs if they recommended any energy-saving improvements during the assessment that are not eligible for incentives through the Mass Save energy efficiency programs.

The majority of the HPCs (22 out of 25) we spoke with said they at least occasionally recommended or mentioned non-initiative measures to their customers during the assessment. Table 5 lists the measures HPCs said they discussed with customers. HPCs most commonly said they recommended spray foam, solar or wind projects, windows (e.g., replacements for old or damaged double-pane windows), and thicker insulation than the R49 insulation for which the HES initiative offers incentives.

Table 5. HPC Recommended Non-Initiative Measures

Non-Initiative Measure	Number of Contractor Responses
Spray Foam	5
Renewables (Solar and Wind)	5
Windows	4
Thicker Insulation (e.g., R60)	3
Doors	2
Recessed Lighting Covers	1
Pipe Insulation	1
Non-Incented Programmable Thermostats	1
Thermal Shades	1
Ductwork	1
Water Controls	1
Moving Belongings	1

Although the majority of HPCs said they discussed non-initiative measures with their customers, most said they briefly mentioned these improvements and did not actively promote them to their customers. Some said that only a small portion of their customers moved forward with non-initiative measures. Others said their businesses did not provide many of these other services (e.g., renewable energy) so they did not follow up with customers and were unaware if customers moved forward with these recommendations.

Quality Control

The lead vendors and the independent statewide quality control auditor conduct customer surveys and in-person quality control inspections of home energy assessments and weatherization projects to ensure that contractors are adhering to HES initiative standards.[5] The independent statewide quality control auditor inspects 5% to 10% of randomly selected home energy audits (by lead vendors and HPCs) and weatherization installations (by HPCs and IICs). Lead vendors also inspect HPC home energy assessments and HPC and IIC weatherization work.

To understand the initiative's current quality control procedures, the evaluation team asked:

- What quality control procedures do lead vendors use for the initiative and how do they communicate quality control results to HPCs and IICs?

[5] HPCs and IICs perform weatherization work through the initiative. HPCs independently recruit customers, conduct HEAs, and provide weatherization services. IICs perform weatherization work only and primarily receive job leads from the lead vendor.

- What quality control documentation or training do HPCs receive from lead vendors for the initiative?
- How do HPCs use the results from the quality control process to make improvements and address issues that arise through the process?
- Have HPCs experienced any issues with the way that quality control has been performed for the HES projects they have completed?

Lead Vendor Quality Control Procedures

The procedures and frequency of quality control inspections for installation work and home energy assessments varied by lead vendor:

- Lead vendors said they performed quality control on 20% to 60% of all weatherization jobs.
- One lead vendor said it inspected 100% of all jobs performed by new IICs or HPCs and provided tiered rankings for these HPCs and IICs based on their total quality control scores each month. These tiered rankings were also used for determining the number of jobs that lead vendors give to IICs each month—better quality control scores result in more work from lead vendors.
- Two lead vendors said they performed in-process home energy assessment inspections of each auditor two to five times per month.

The evaluation team also asked lead vendors what type of quality control documentation and communication they provided to HPCs and IICs. The team found that lead vendors communicated results from these quality control inspections to HPCs and IICs in a variety of forms:[6]

- One lead vendor provided HPCs and IICs a scorecard with a 1 to 10 rating and a report for every weatherization job on a monthly basis. If a job failed the inspection, this lead vendor informed the contractor of any issues within a week.
- One lead vendor provided scores to HPCs and IICs on a quarterly basis but did not share individual reports for every home. It did inform the contractor of any positive and negative customer feedback, and if there was a specific issue, it sent the contractor a report.
- Another lead vendor provided HPCs and IICs with the independent statewide quality control auditor reports as well as its internal reports. Although it initially provided reports only when problems arose, it changed to providing both positive and negative feedback to HPCs and IICs.

[6] The HES Delivery Assessment evaluation plan did not include a task for collecting and analyzing the quality control data collected by the lead vendors and statewide auditor. All of the findings regarding quality control presented here are the outputs of our qualitative interviews with stakeholders. Future research studies could include a review of the quality control data.

Three lead vendors estimated that there were callbacks to fix work on 10% to 30% of HPC and IIC weatherization jobs, mainly for these reasons:

- Improper wrapping of duct work
- Voids in wall insulation
- Combustion safety issues
- Improper damming around stairs or heat sources
- Cleanliness of work upon completion

Quality Control Documentation and Training

Seven HPCs described receiving training during the quality control inspections while they were conducting the assessment or installing weatherization upgrades. Some HPCs said that the lead vendor also provides them with pass/fail sheets and written documentation if problems arise through the quality control process. Many HPCs work with more than one lead vendor, and they explained that training and documentation varied by lead vendor.

Issues with the Quality Control Process

When asked if they had encountered any issues with the way quality control had been performed on the projects they completed, HPCs described several issues, including:

- **Negative portrayal of their work to customers:** Five HPCs expressed concerns that some quality control inspectors portrayed their work negatively to customers, which could damage relationships with their customers. Two examples are:
  - One HPC participated as a customer in the HES initiative (that is, had his employees perform a home energy assessment at his home) and his home received an inspection from the independent statewide quality control auditor. This HPC said he was uncomfortable with how the inspector presented the quality control process: *"The way it was portrayed to me was that the quality control check was to make sure the auditor came out and did everything correct, [that the auditor] didn't take advantage [of the customer] or not serve them properly… it felt a little dirty the way it was phrased."*
  - Another HPC said that *"[Quality control inspectors] go out and sometimes act like the HPC did something wrong with the job. That hurts the customer relationship, even if it is a small miss or a one-off comment by the QC'er about the HPC missing something, it breaks trust with the customer."*

  The HPCs explained that customer service and satisfaction are very important to their business. They wanted quality control inspectors to be mindful of this throughout the quality control process and exercise good judgment when deciding which issues merit discussion with the customer.
- **Overemphasis on small details and mistakes:** Five HPCs (three of whom also said negative portrayal of their work to customers was an issue) thought that some quality control inspectors

focused too much on small issues that arose through the process. For example, one HPC believed it was excessive for his crew to return to fix six linear feet of air sealing. Although he understood the importance and benefits of quality control, he explained that the crew were sometimes asked to return to homes to make minor changes that he thought had negligible impacts; this cost him time and money and could harm his relationships with his customers. As another HPC stated: *"You can find something wrong with every weatherization job. It's different at every house… it's almost impossible to do [the job] perfectly."*

- **Inconsistency in the quality control process:** Four HPCs believed that the quality control process was subjective and varied by the individual inspector and lead vendor. Some also believed that there can be minor differences of opinion between the HPC and the inspector for how certain measures should be installed.
- **Lack of detailed feedback provided to HPCs:** Three HPCs wanted more feedback and results from the quality control process. They explained that they often did not receive detailed feedback but instead got an overall 1 to 10 rating or only heard that they had passed the inspection.

Using Quality Control Results

Overall, most HPCs said they appreciated the quality control process and welcomed any feedback so they could continually improve their services. The HPCs said they communicated the results of the quality control process to their staff, sharing feedback about what could be improved and training their employees in the proper methods.

One HPC said: *"We use it as a teaching and a learning tool to become better at what we do."* Two HPCs said they promoted quality control as an additional benefit to their customers. As one HPC described it: *"I see [quality control] as a benefit and present it to my customers as a benefit… having a third party come in to make us accountable."*

Cross-Program Promotion

To understand how the HES initiative interacts with other Mass Save programs and offerings, we asked contractors what other program offerings they promoted through the HES initiative, including the HEAT Loan and the HEHE and COOL SMART programs.

HEAT Loan Promotion

All of the 30 HPC and lead vendor interviewees said they promoted the HEAT Loan during the home energy assessment. HPCs and lead vendors typically discussed the HEAT Loan with customers at the end of the assessment when providing the customers with the HES initiative information packet and paperwork. Although interviewees described varying levels of engagement with the loan, most said they walked customers through loan materials and summarized its components (e.g., eligible equipment and eligibility requirements). Three HPCs said that the lead vendor either required them to discuss the HEAT Loan with customers or used it as one of their performance indicators. Some HPCs and lead vendors said they used the loan as a sales tool.

HEHE and COOL SMART Program Promotion

In addition to the HEAT Loan lead vendors and most HPCs said they also promoted the HEHE and COOL SMART programs to their customers. However, HPCs indicated less proactive promotion of these programs than with the HEAT Loan. Five HPCs described actively promoting the HEHE or COOL SMART programs. Seven other HPCs said they typically promoted the HEHE or COOL SMART programs in a more general way by mentioning them or providing leave-behind materials but without getting into specific details. As one HPC explained about the HEHE program: *"We don't promote it necessarily, it's our job to make customers aware of it."* However, they explained that they typically provided more detail to customers who expressed interest in these offerings or obviously needed to replace their heating or cooling equipment.

Four HPCs said they refrained from actively promoting the COOL SMART program because they were not very familiar with its requirements or they lacked information, as noted in these quotes:

- *"Once in a while [we promote COOL SMART]. There's not really a lot of information that they give us to promote it."*
- *"We do not push [the COOL SMART Program] because we are not familiar with their guidelines. This is where duct sealing would take place, but because we're not familiar with their guidelines we cannot recommend or provide duct sealing."*

"We do not push [the COOL SMART Program] because we are not familiar with their guidelines."

One HPC explained that since his company does not provide HVAC services, he did not want to focus the assessment on the HEHE program because it might direct customers' attention away from the services that his business does provide. He said: *"I can't get into it too much because it takes time away from focusing on the other things. I don't spend a lot of time on it unless it's a hot thing for them, like they really need a boiler and thought about it beforehand."*

Although this HPC did provide leave behind materials for the HEHE and COOL SMART programs, he explained why his company did not actively follow up with customers to encourage non-weatherization measures: *"We don't make money on the other offerings, so why would we want to spend time talking about it? It's counterproductive. If I talk about replacing a boiler or furnace, they'll think 'I'll put money into that instead of weatherization.' It's counterproductive to even talk about those things—I don't want to talk to them into something else."* He suggested that if the PAs provided a financial incentive to contractors when customers participate in other Mass Save programs, he would be more receptive to promoting these offerings.

Two other HPCs explained that, although their business does not provide HVAC services, they recommended other HVAC contractors or partners to customers.

Customer Responses to Other Programs

Both HPCs and lead vendors said customers were the most interested in the early boiler replacement (EBR) (12 interviewees) and the HEAT Loan (11 interviewees). However, according to one lead vendor: *"[Customer responsiveness to the programs or program aspects] varies a lot based on time of year. For example, right now statewide PAs have an aggressive campaign for EBR so all customers hear about is heating systems. In early September after the first cold snap, it's insulation."*

We also asked HPCs and lead vendors how well they think customers understood all of the Mass Save program offerings available to them. HPCs and lead vendors believed that most customers did not understand these various offerings very well and could easily be confused and overwhelmed.

- One lead vendor said that: *"[PAs] have deemed HES the gateway program, which is great but it is a lot of information for customers."*
- An HPC explained that: *"I think that's the confusion. Under the Mass Save umbrella, so many aspects don't quite perfectly mesh with each other. [Customers are] not always aware of what is really available to them unless you bring it to their awareness… the customer knows they need a new air conditioning system, who would think that the HEAT Loan would cover air conditioning?"*

One HPC explained that there is also an *"opportunity for information overload."* Auditors have limited time in customers' homes; some HPCs thought there was not enough time to install ISMs, conduct the assessment, and explain in-depth all of the Mass Save offerings to customers. As one HPC described it: *"Most customers are busy with their regular lives. We only interact with them for two or three hours, and it's hard [for them] to grasp all the different programs."*

Several Interviewees said that during the limited assessment time they must choose and focus on the most relevant programs and recommendations, tailoring information to customer needs and interests.

Three HPCs also said that the inconsistency in offerings or incentive levels available from some PAs was confusing for both customers and contractors. For example, one HPC noted that Cape Light Compact offered incentives up to $4,000 for insulation, while other PAs offered $2,000 for insulation measures.[7] Another HPC explained that*"… [Customers] are not sure what [the] incentives are for each utility. They should be identical for all utilities because it is Mass Save. Customers sometimes have a general frustration with program and don't understand [all the] pieces.*"

Suggested Improvements

The evaluation team asked HPCs and lead vendors to make suggestions that would encourage more HES customers to take advantage of other Mass Save programs and improve the HEAT Loan. This section

[7] Cape Light Compact. "Rebates and Incentives for your Home." Accessed March 2015: http://www.capelightcompact.org/energy-efficiency/residential/resrebates/

documents those HPC and lead vendor suggestions, which comprise HPC and lead vendor opinions and may not necessarily be feasible or reasonable changes. We provide comprehensive recommendations separately in the main report, which take into account context and the diverse perspectives from program managers, lenders, contractors, and customers.

Suggested Home Energy Services Improvements

Interviewees suggested several HES improvements, such as:

- **Provide better communication to contractors**: Seven interviewees requested better communication about programs. For example, four HPCs and one lead vendor requested advanced notice before programs are rolled out, especially with limited-duration offerings:
  - One lead vendor described getting only a two-week lead time on some programs, which made it difficult to prepare to deliver offerings in the program's timeframe.
  - An HPC noted that: *"Sometimes the programs are not rolled out with a huge amount of notice, so it's hard to change course immediately and get everyone educated. A little more warning time would be helpful."*
  - Another HPC described hearing about an HVAC program nearly two weeks after it began: *"I can't just send that out to staff. I need to sit and train and show them the paperwork. [It will be] another four to six days until we're really up and running with this. We're half way through the month with zero installs."*

  Three HPCs also wanted more information about measure eligibility, customer eligibility, and incentives. One HPC requested a one-page summary describing the incentives available throughout the year, including special offerings.
- **Offer more training for HPCs:** Three HPCs requested additional training from lead vendors and PAs so they are better versed in all of the offerings and can more effectively promote them to their customers.
- **Streamline program offerings:** Three interviewees suggested that Mass Save streamline program offerings. One HPC said that Mass Save should provide consistent offerings among PAs, explaining that, for example, through Western Mass Electric Company (WMECo) HPCs can offer all air sealing at no cost, but through Columbia Gas they can only offer eight hours of no-cost air sealing. Another HPC requested that Mass Save streamline the programs by reducing the limited-duration offerings. A lead vendor suggested that, as much as possible, program offerings should be consolidated into a single or a few vendors. He explained that it could be difficult for customers and lead vendors to submit paperwork to different vendors if customers were taking advantage of multiple offerings (e.g., COOL SMART program, HES initiative, and the HEAT Loan).

- **Provide additional resources for customers:** Three HPCs wanted Mass Save to provide customers with additional program resources. One of these HPCs requested that Mass Save provide customers with a summary packet instead of or in addition to the individual program information packets it provides during the assessment. Another HPC wanted a Mass Save-sponsored hotline that customers could call with questions, since he cannot always answer their program questions. As he noted: *"We can go over everything, but we are not HVAC experts."* However, this HPC may have been unfamiliar with Mass Save's existing information hotline.
- **Provide additional or more effective customer marketing:** Two HPCs and one lead vendor suggested that Mass Save increase customer marketing or provide more effective promotion, such as making the website easier to navigate or developing more "attention grabbing" marketing materials. The lead vendor said she was surprised that, despite existing program marketing, some customers were still unaware of Mass Save.
- **Enhance digital access to program materials:** Two HPCs and a lead vendor wanted digital access to program paperwork. As one lead vendor noted: *"We're working towards going as paperless as possible… [the process] would be much less cumbersome and easier to navigate if they don't have a packet with 30 sheets of paper."* One HPC suggested a digital portal where customers could also access their assessment recommendations.

Suggested HEAT Loan Improvements

HPCs and lead vendors also suggested these improvements to the HEAT Loan:

- **Expand qualifying measures:** Six interviewees (four HPCs and two lead vendors) suggested that the HEAT Loan cover additional measures, including spray foam, old or damaged double pane windows, and additional pre-weatherization barriers (e.g., asbestos[8]).
- **Allow customers to use the HEAT Loan multiple times:** Three HPCs wanted Mass Save to allow customers to use the loan more than once. They believed that some customers refrained from using the HEAT Loan and making upgrades because they wanted to save the loan for a larger project. One HPC noted that customers were allowed to use the HEAT Loan more than once on a case-by-case basis, but he wanted Mass Save to explicitly allow this for all customers.

[8] Through expanded HEAT Loan offerings funded by the Massachusetts Department of Energy Resources, grants are now available to HES participants for removing asbestos and upgrading knob and tube wiring.

Appendix C. Massachusetts HEAT Loan Assessment: In-Depth Findings from HEHE and COOL SMART Contractor Interviews

Summary of Key Findings

The evaluation team interviewed 27 High-Efficiency Heating and Water Heating Equipment (HEHE) and COOL SMART contractors about their experiences working with the HEAT Loan. Overall, contractors value the HEAT Loan and believe it is very important both to their business and to encourage customers to move forward with energy efficient upgrades, choose higher efficiency equipment, and make upgrades sooner than they would have without the loan.

The team found that most contractors regularly promote the loan to their customers who are installing heating and cooling equipment; they typically introduce the loan during initial contact with customers. However, some contractors explained they sometimes refrain from telling customers about the loan, such as when they think customers can afford upgrades without financing, they need to immediately install equipment, or customers or equipment upgrades are ineligible.

Contractors offered several suggestions for improving the loan. The most commonly cited suggestions included streamlining paperwork processes, providing clearer application instructions and program requirements, expanding eligible equipment and customer types (e.g., commercial customers), and increasing HEAT Loan marketing.

Although contractors had some suggestions for improvements, most contractors believed the loan is one of the most effective ways to encourage customers to install high-efficiency heating and cooling equipment.

Methodology

In support of the 2014 HEAT Loan evaluation, the evaluation team interviewed 27 contractors who deliver the HEHE and COOL SMART programs. We conducted these interviews in October and November 2014 and addressed the following research questions:

- What experience do contractors have with the HEAT Loan?
- How do implementation contractors promote the HEAT Loan option to customers?
- What are contractors' sense of the HEAT Loan's value and influence on HEHE and COOL SMART program participation?
- Do contractors perceive any opportunities for improving the HEAT Loan's marketing and delivery that might result in greater HEHE and/or COOL SMART participation?

Sampling

In September 2014, the evaluation team developed a list of HEHE and COOL SMART contractors from two sources—participating COOL SMART premier contractors listed on the Mass Save website and a list of participating HEHE and COOL SMART contractors listed in the PAs' participant tracking databases. We

defined the contractor population as those who had completed at least 10 jobs through the HEHE and/or COOL SMART programs in 2012 and 2013; this ensured that the interviews were conducted with contractors active in and knowledgeable about the program.

The team assigned contractors to one of four groups, based on which programs they worked with. Table 6 shows the four contractor categories, the contractor populations, and number of respondents in each group.

Table 6. Completed Number of Interviews With COOL SMART and HEHE Contractors

Contractor Category	Contractor Population	Number of Contractor Interviewees
COOL SMART and HEHE	29	18
COOL SMART Premier*	8	4
COOL SMART Only	31	3
HEHE Only	10	2
Total	**78**	**27**

* COOL SMART Premier contractors perform additional services for the program including equipment tune-ups and duct testing, duct sealing, and repairs. Premier contractors also provide all standard Quality Installation Verification (QIV) services and testing.

Detailed Findings

HEAT Loan Promotion

To understand how contractors promote the HEAT Loan to their customers, the team asked them about the following topics:

- How often they discuss the HEAT Loan with their customers
- When during the process they typically tell customers about the HEAT Loan
- If there are times when they do not talk about the loan with customers who are installing Mass Save-eligible heating and cooling equipment
- How often their customers already know about the HEAT Loan

Discussing Loan Options With Customers

The majority of contractors (19 of 27) said they frequently discuss the HEAT Loan with their customers, including ten contractors who said they talk about the loan with every customer. Only one contractor said she rarely discusses the HEAT Loan with her customers and explained it was because she was not very familiar with the loan and did not feel comfortable discussing it with customers who were not already planning to pursue it.

Interviewees explained that they typically discuss the HEAT Loan during their initial contact with the customer—either over the phone or during their first visit to the customer's home. However, the

majority acknowledged that when they discuss the loan depends on the individual customer and that customer's interests or needs. Only two contractors said they usually discuss the HEAT Loan at the end of the process, when providing customers with a quote. One of those contractors said he emphasizes the loan earlier in the process if customers express concerns about financing their project.

The team asked contractors if there are times that they do not talk about the HEAT Loan with customers who are installing Mass Save heating and cooling equipment. Twenty-two out of 27 contractors said there are times when they refrain from discussing the loan. Twelve contractors said they do not discuss the loan with customers whom they believe are ineligible for it. For example, they do not discuss the loan with customers who have a new home, live in a town with municipal electric,[9] or who want to make ineligible upgrades (e.g., ductwork). One contractor said he was unsure if renters were eligible for the HEAT Loan, so he refrained from discussing the loan with those customers. Other reasons included:

- Contractors believe that customers are wealthy or have sufficient funds and do not need financing (five contractors).
- Customers want to install equipment immediately (three contractors).
- Customers are already very familiar with the loan (one contractor).

Home Energy Assessment Awareness and Promotion

We also asked contractors if they were aware of the home energy assessment that customers must complete through the Home Energy Services (HES) Initiative in order to get the HEAT Loan. For contractors familiar with the assessment, we asked if they discussed it with their customers, and, if so, what did they tell their customers about the assessment?

All 27 contractors said they were aware of the assessment. Twenty-four out of 27 contractors said they discussed the assessment with their customers when they are talking about the HEAT Loan. Most said that they occasionally get into specifics, but that they typically just inform customers that they need to complete an assessment to be eligible for the loan. Two contractors said that most of their customers have already had an assessment before seeking contractor services.

Working With Lenders

The evaluation team also asked contractors if they ever worked directly with HEAT Loan lenders (banks and credit unions) to co-promote the loan. Only one contractor said he had worked directly with lenders. He explained that he recommended two lenders to customers because he thought those lenders processed loan applications quickly.

[9] The HEAT Loan eligibility rules state that municipal electric customers that heat with gas do not qualify for any central air conditioning/heat pump upgrades.

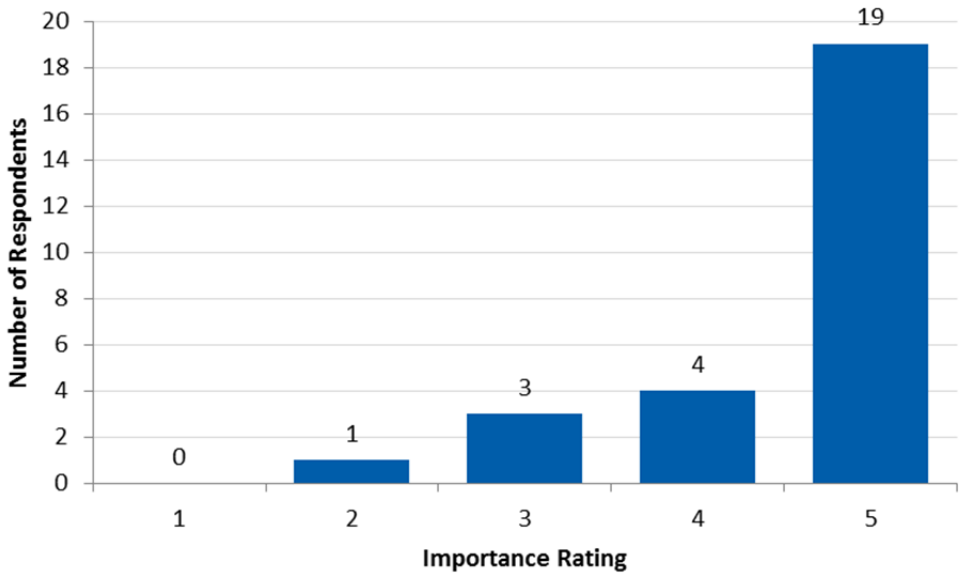
HEAT Loan Effectiveness and Importance

To assess the contractors' sense of the HEAT Loan's value and influence on HEHE and COOL SMART program participation, we asked contractors to provide the following information:

- Rate the importance of the HEAT Loan to their business on a scale from 1 to 5, where 1 is unimportant and 5 is very important.
- Describe how important the HEAT Loan is to their business and for encouraging customers to install measures through the HEHE and COOL SMART programs.

Contractors indicated that the HEAT Loan was highly important to their business and for encouraging customers to install measures through the HEHE and COOL SMART programs. As Figure 3 shows, nearly three-quarters of contractors (19 out of 27) rated the importance of the HEAT Loan to their business as a 5 (very important), with an average rating of 4.5 across contractors.

Figure 3. Importance of the HEAT Loan to Contractors' Businesses



Contractors gave these reasons that the HEAT Loan was important to them and their customers:

- **The HEAT Loan encourages customers to move forward with upgrades in their homes:** One contractor estimated, *"50% [of customers] would not do the job without [the HEAT Loan]."*
- **It encourages customers to choose higher efficiency equipment and to make upgrades sooner:** As one contractor stated, "*Before Mass Save, it was hard. People were only going to fix what was broken. [They were] not thinking about energy efficiency. But Mass Save and the HEAT Loan, they really promote and push people to make energy efficient decisions."* Another contractor said, *"[The HEAT Loan] is pushing the higher energy efficiency models into the market."*

- **The loan has expanded their business:** One contractor explained that *"People having that option… makes us busier—we make more money—hire more people. [It's a] big circle."* Another noted, *"[The HEAT Loan] gives us a ton of business."*

> *"Before Mass Save, it was hard. People were only going to fix what was broken. [They were] not thinking about energy efficiency. But Mass Save and the HEAT Loan, they really promote and push people to make energy efficient decisions."*

Although the majority of contractors believed that the HEAT Loan was very important to their businesses, the four who provided a rating of 3 or lower gave these reasons:

- **The rebate incentives are more important than the loan:** Two contractors said that the rebates available through the HEHE and COOL SMART programs are more important than the HEAT Loan. As one contractor explained, *"[The HEAT Loan] is important, but it's the rebate that draws the people."* They suggested that Mass Save increase rebates for the incentive programs. (Although these two contractors believed the rebates were more important than the loan, another contractor provided the opposite view—he thought that the HEAT Loan was more important than the rebates.)
- **Some contractors may serve more affluent customers:** One contractor explained that the area he services is affluent, and he believed that many of his customers do not need the loan to finance their heating and/or cooling upgrades. He appreciated the loan, but commented that his company did not rely on it for its business.
- **The HEAT Loan is encouraging customers to make energy efficient upgrades, but it may not be the most important factor influencing customer decision-making:** Another contractor acknowledged that the loan *"opens the door for affordability"* and *"motivates 60% to 70% of people to move forward,"* but he did not believe the loan was the most important factor influencing customers to make heating and cooling upgrades.

Contractor Perceptions of Customer Reasons for Forgoing the HEAT Loan

The evaluation team asked all 27 of the contractors if they had any insights into why customers decide not to use the HEAT Loan. As shown in Table 7, 11 contractors said that customers can afford the upgrades without financing, and 10 contractors said that customers do not want to take out a loan or incur debt—these were the top two reasons contractors cited for why customers may not use the loan.

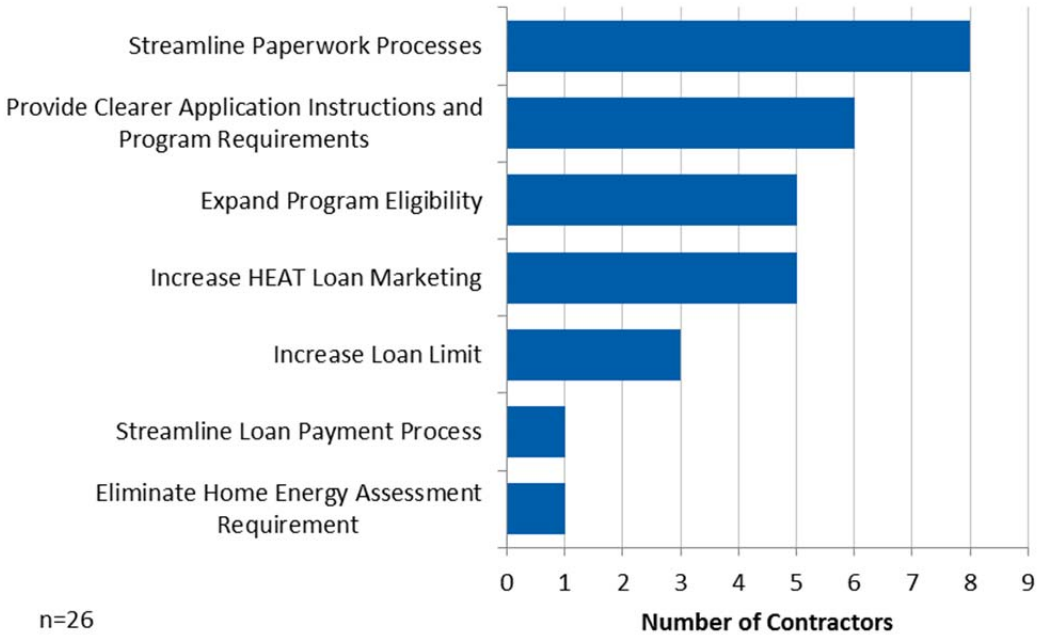
Table 7. Contractor Suggestions for Why Customers May Decide Not to Use the HEAT Loan

Reason	Frequency
Customers can afford heating and cooling upgrades without the loan	11
Customers do not want to take out a loan or are uncomfortable with taking on debt	10
The HEAT Loan process is too cumbersome or time consuming	5

Suggested HEAT Loan Improvements

When asked how Mass Save could improve the HEAT Loan, contractors provided a variety of suggestions, listed in Figure 4.

Figure 4. Contractor Suggestions for HEAT Loan Improvements



Note: Multiple responses accepted.

Each of these suggested improvements are described in more detail here:

- **Streamline paperwork processes:**
  - **Process Paperwork Faster:** Four contractors wanted the PAs, lead vendors, and lenders to process HEAT Loan paperwork faster. (These contractors did not suggest an improved timeframe for processing paperwork.) One contractor believed the application processing times varied by lender.
  - **Make paperwork easier for customers:** Two contractors requested that Mass Save reduce the amount of paperwork required for customers to receive the loan. One contractor suggested that Mass Save provide contractors with easy access to the HEAT Loan

application, so they can provide it to their customers who have misplaced their HEAT Loan materials.

- **Make paperwork easier for contractors:** Two contractors mentioned that the Manual J calculations required for financing central air conditioning equipment through the HEAT Loan were time consuming. One contractor suggested that Mass Save require something simpler to submit. The other requested that contractors provide Manual J calculations only after a customer has committed to working with them.

- **Provide clearer application instructions and program requirements for contractors:** Six contractors wanted clearer application instructions or a better understanding of program requirements. Some were uncertain about application requirements. For example, one contractor requested that Mass Save provide a draft or bid template outlining the exact information and format needed. He recounted making four or five attempts at one of his first proposals before Mass Save accepted it. Another contractor described inconsistencies in the application approval process, noting that Mass Save would occasionally reject a model number on an application that they had previously accepted.
- **Expand eligibility:**
  - **Include ductwork:** Two contractors wanted the HEAT Loan to finance ductwork. One contractor explained, *"[Ductwork is a] huge missed opportunity since they install the high-end equipment but the ducts are leaky."*
  - **Include commercial customers:** Two contractors wanted a HEAT Loan for commercial customers.[10]
  - **Finance solar projects:** One contractor wanted the HEAT Loan to finance solar photovoltaic (PV) projects.[11]
  - **Include lower-efficiency equipment**: One contractor suggested that additional equipment should be eligible for the HEAT Loan, specifically equipment with a lower SEER rating (e.g., SEER-16).
- **Increase Mass Save marketing:** Four contractors suggested that Mass Save increase marketing and advertising to promote the HEAT Loan to customers. These contractors did not provide specific marketing suggestions.
- **Increase the loan limit:** Three contractors requested that Mass Save increase the HEAT Loan limit. One contractor explained that the $25,000 limit was not enough to finance projects when customers needed to install two or more systems. Another contractor mentioned that the $10,000 cap on cooling equipment was not enough to cover the project cost from start to finish. The contractors did not recommend a limit amount.

[10] There is a Mass Save Financing for Business program that serves commercial customers. http://www.masssave.com/business/services-financing/financing-for-business

[11] Under the Green Communities Act, the PAs cannot use ratepayer funds to finance renewable energy projects.

- **Streamline the loan payment process:** One contractor wanted lenders to issue the loan payment to the customer instead of providing two-party checks made out to the customer and contractor. The contractor said this practice complicated the payment process when customers paid a deposit, because she had to reimburse the customers after receiving the HEAT Loan payment.

Other Suggestions

Three contractors suggested improvements to the promotion of other Mass Save offerings that were not specifically related to the HEAT Loan:

- **Improve timing of special offers:** Two contractors described issues with the timing and promotion of the early boiler replacement and early furnace replacement. One contractor learned about these offerings a month and a half after they started, and he requested advanced notification in the future. Another contractor described a frustrated customer who received the home energy assessment two weeks before these offerings were rolled out and, as a result, was ineligible for the early boiler replacement.
- **Promote during off-season:** A third contractor wanted Mass Save to promote rebates for cooling equipment during the off-season, when they were less busy.

Generally, contractors provided positive feedback and indicated that HEAT Loan was one of the most effective ways to encourage customers to install high-efficiency heating and cooling equipment. The following quotes provide examples of this positive feedback:

- *"The best thing is the financing because heating systems are generally hard to finance and expensive to finance through regular bank program. All of our customers who use it love it. Can't think of a better way to do it."*

"The HEAT Loan is a great program for us and the customer. It's a win-win for everybody."

- *"The HEAT Loan is a great program for us and the customer. It's a win-win for everybody."*

Appendix D. Massachusetts HEAT Loan Assessment: Findings from Lender Interviews and Surveys

This memorandum presents the findings from in-depth interviews with a sample of 14 participating HEAT Loan lenders, as well as follow-up online surveys (n=51) with a broader set of lenders (including some that also participated in the interviews). The evaluation team conducted these interviews and surveys as part of the HEAT Loan assessment.

Summary of Key Findings

Overall, lenders highly value the HEAT Loan. They believe it is important for helping bring in new customers/members and is a high-value product for their customers. They also noted that the HEAT Loan increases their overall loan volume and institutions' income, and it is an opportunity to cross-sell other products.

The majority of lenders indicated that they perform some marketing of the HEAT Loan, mainly through their website or through flyers, brochures, and newsletters. They promote the loan directly to their customers and perform limited (if any) marketing or outreach to other market actors (e.g., real estate agents, contractors).

Although pleased overall with the HEAT Loan, lenders offered some suggestions for improvement. Most suggestions focused on clarifying processes for customers, accelerating processes for both lenders and customers, and expanding customer and measure eligibility.

Methodology

In-Depth Interviews

In June and July 2014, the evaluation team conducted 14 in-depth interviews with a sample of participating lenders that were active in 2013. The interviews addressed these research questions:

- What is lenders' perceived value of the HEAT Loan program?
- How do lenders promote the HEAT Loan to customers?
- What are lenders' suggestions for streamlining or improving the program for lenders and customers?

Online Follow-Up Surveys

As a complementary effort to collect data from a larger number of participating lenders, the evaluation team distributed an online survey with a census of lenders in November 2014. These additional surveys allowed the team to:

- Explore how some trends first identified through the interviews span a broader set of lenders

- Ensure that the Massachusetts Electric and Natural Gas Program Administrators (PAs) could establish a robust baseline of lender perceptions that would support longitudinal research[12]

The team explored the following topics through the online lender surveys:

- Lender satisfaction with the lead vendors, the loan processor, the program administrators (PAs), various steps in the loan process, and the HEAT Loan overall
- Marketing and outreach activities performed by the lenders
- Coordination with home performance contractors (HPCs) to promote the loan
- Opportunities for improvement, including gauging interest in transferring some paper forms to an online platform and suggestions for streamlining the process for both lenders and customers

The evaluation team developed the survey instrument, reviewed it with the PAs, and then programmed the survey into Qualtrics, an online survey software tool. To leverage the PAs' existing relationships with lenders, and ensure high survey response rates, the PAs took responsibility for fielding the survey with lenders. The evaluation team monitored progress in the field and managed data collection. The PAs' staff did not have access to the survey findings. All lender organization names and the names of individual respondents remain confidential.

Sampling

For the interviews, the team targeted a mix of banks and credit unions drawing from the lenders listed on the Mass Save website. We assigned these lenders to one of three activity levels based on how many HEAT Loans they issued in 2013 (Table 8).

Table 8. Lender Activity Level Categories

Lender Activity Level	Number of Loans
High	> 150
Medium	> 50 and < 150
Low (Least Active)	< 50

We completed a total of 14 interviews with lenders (Table 9). Because we used 2013 loan participation data to determine lender activity levels, we performed interviews with a sample of lenders that were active in the HEAT Loan in 2013 and still active at the time of drawing the sample (N=54).

[12] This survey represented the first in-depth qualitative research performed among lenders for the HEAT Loan program.

Table 9. Population and Completed Number of Interviews

Size Category	2013 Population			Interview Respondents		
	Banks	Credit Unions	Total Population	Banks	Credit Unions	Total Interviews
High	10	8	**18**	4	2	**6**
Medium	13	4	**17**	2	3	**5**
Low	4	15	**19**	0	3	**3**
Total	**27**	**27**	**54**	**8**	**6**	**14**

For the online surveys, we invited a census of all lenders active in the HEAT Loan in October 2014 (N=71) to provide feedback (note that between 2013 and 2014, 17 new lenders became active in the program so a larger number of lenders were eligible to provide feedback through the survey compared to interviews). We received a 72% survey response rate (51 out of 71 lenders responded to the survey). Table 10 shows the number of lender interview and survey respondents by level of loan activity and lender type.

Table 10. Population and Completed Number of Online Surveys

Size Category	2014 Population*			Survey Respondents**		
	Banks	Credit Unions	Total Population	Banks	Credit Unions	Total Surveys
High	30	41	**71**	8	3	**11**
Medium				10	9	**19**
Low				4	17	**21**
Total				**22**	**29**	**51**

* The team identified 71 lenders from the website in October 2014. Lenders that completed the survey online reported the number of HEAT Loans they had issued from January 1, 2014, through September 30, 2014, which the team then categorized into the same bins used for the interviews.
**Some survey respondents may also have completed a lender interview. However, since the team gave survey respondents the option of completing the survey anonymously (which several lenders took advantage of), we did not map these survey respondents to the interview respondents to determine overlap.

The evaluation team compared survey responses by level of activity (high, medium, low) and lender type (bank or credit union), but we found very few meaningful differences between these groups. As a result, we report the combined lender survey responses throughout the memo, with a few notable exceptions acknowledged in the text.

Detailed Findings

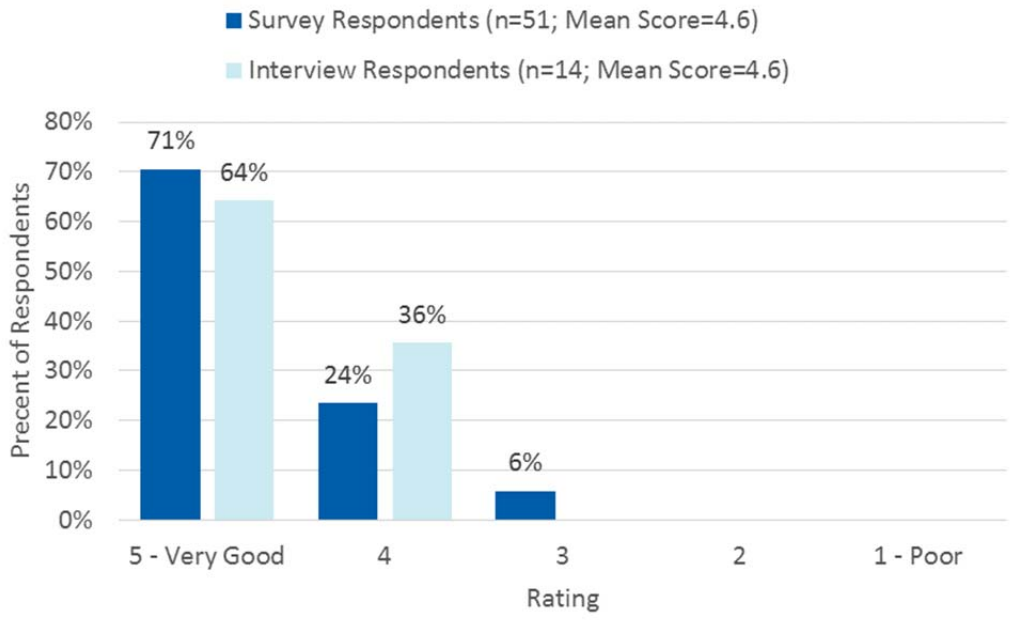
This section presents the combined findings from both the in-depth interviews and online surveys. We discuss in more detail any notable differences in trends between lender type and level of activity.

Value of the HEAT Loan

When we asked lenders to rate the value of the HEAT Loan to their organization on a scale of 1 to 5 (where 1 is poor and 5 is very good), the majority in both the interviews and the online survey rated it, on average, as 4.6. Although subsequent interview and survey questions uncovered some suggestions for improvement (discussed in the Opportunities for Improvement section on page 39), we found that the overall perception of value added is high (Figure 5).

"Excellent service to offer to our members and potential members."

Figure 5. Perceived Value of the HEAT Loan Among Lenders

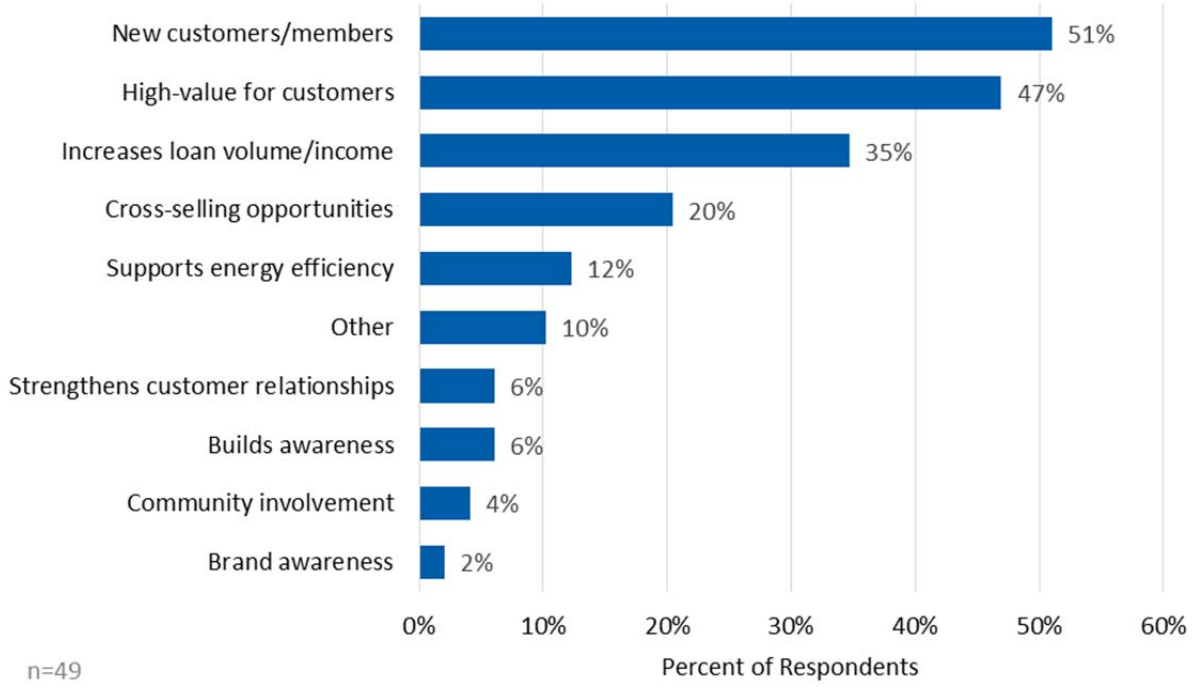


We observed some subtle differences in survey results among levels of lender activity—not surprisingly, the more active lenders rated the value of the HEAT Loan higher than less active lenders. Because the more active lenders happen to consist mostly of banks, we also found that banks rated it as having more value than did credit unions.

As part of the online survey, we asked lenders to describe in their own words what value or benefits the HEAT Loan brings to their institution. Surveyed lenders most frequently said that the HEAT Loan:

- Helps bring them new customers or members
- Is a high-value product for their customers
- Increases their loan volume and institution's income
- Provides an opportunity to cross-sell their other products (Figure 6)

Figure 6. Value of the HEAT Loan to Lenders (Online Survey Results)



Similarly, during the in-depth interviews, 12 of 14 lenders said signing up new customers or members was the biggest value added by the HEAT Loan. Lenders appreciated the new customers and the opportunity to broaden the relationship by cross-selling their other products. One high-volume bank estimated that 90% of its HEAT Loan borrowers are new customers.

Lenders frequently mentioned several other benefits of the loan during interviews:

- **Easy Program**. Four lenders noted that it was easy for them and/or the customers. One lender said that HEAT Loan borrowers are great to work with and are by far the easiest and nicest customers she sees.
- **Community Reinvestment Act Credit.** The federal Community Reinvestment Act (CRA) requires lenders to reinvest in their communities. One high-volume bank noted that HEAT Loans helped them satisfy the CRA guidelines. This benefit could be emphasized by the PAs to encourage more large lenders to participate in the HEAT Loan, since large lenders sometimes find it difficult to meet CRA guidelines.
- **Interest Rate Buydown Pre-Pay Policy.** One lender appreciated that, if a borrower pays off the loan early, the HEAT Loan does not ask for any of the interest rate z payment back.
- **"Green" Image.** One lender liked that the HEAT Loan fits with its "green" positioning.

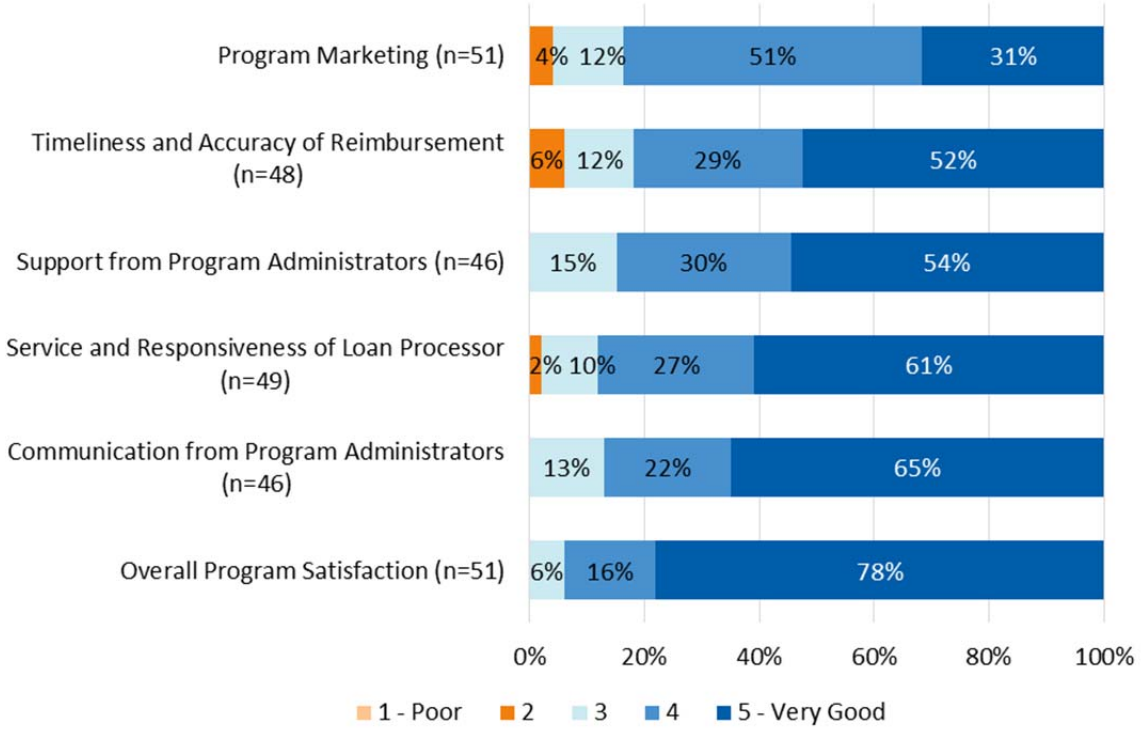
Lender Satisfaction

The team asked lenders to rate their satisfaction with these components, and results are shown in Figure 7:

- The support they received from the PAs (program sponsors)
- Communication from the PAs
- The service and responsiveness of the loan processor
- The timeliness and accuracy of reimbursement from the loan processor
- The loan marketing
- Their overall satisfaction with the HEAT Loan
- The service and responsiveness of each of the lead vendors they had worked with

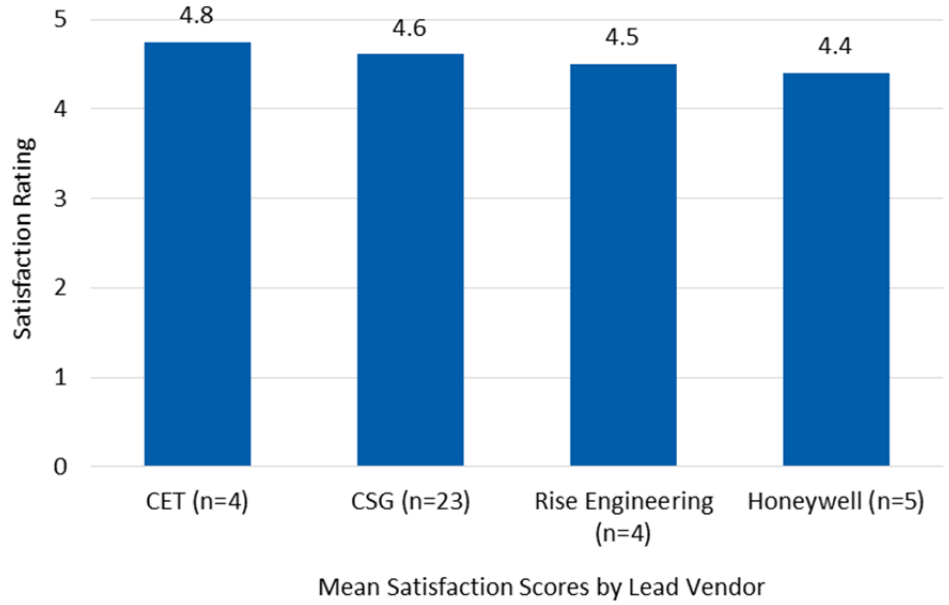
Consistent with earlier findings about the high value to their organizations, lenders gave high overall program satisfaction ratings.

Figure 7. Lender Satisfaction with HEAT Loan Components



Of the lead vendors, lenders most commonly worked with CSG (23 of 51 lenders). Overall, all lenders rated the lead vendors highly, all with mean scores above 4.0 (Figure 8).

Figure 8. Lender Satisfaction with Lead Vendors



Marketing and Outreach

As shown in Figure 7 above, lenders rated the marketing of the HEAT Loan as slightly less satisfactory compared to other components—only 31% of lenders scoring the marketing as "very good" and about half (51%) giving it a "good" rating. Two lenders in the "low" activity level category said the loan marketing needs improvement; one lender stated it was unaware of any loan marketing, and the other lender said, *"It appears that many of the applicants for the HEAT Loan only heard of the program from the contractor."*[13]

To understand how lenders promote the HEAT Loan to their customers, we asked:

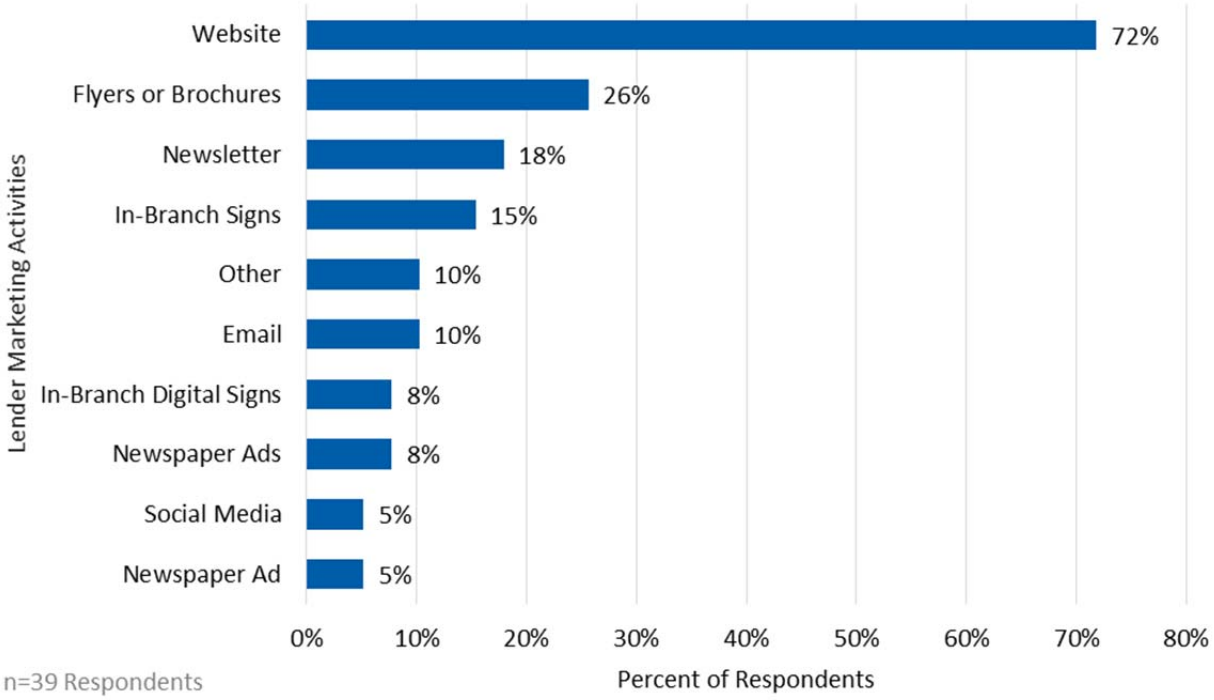
- Did they perform any of their own marketing?
- (If yes) what types of marketing activities did they perform?
- What marketing messages did they think are the most effective?
- What are the lenders' perceptions about why customers choose their organization to finance their project (interviews only)?
- What type of customers did lenders target with their marketing activities?

[13] This lender may be unaware that the program intentionally leverages participating Mass Save program contractors as a HEAT Loan promotion channel.

When asked if they do their own marketing of the loan to customers, three-quarters (75%) of lender survey respondents said they did. Interestingly, and in contrast to other lender perceptions described above that the HEAT Loan marketing needs improvement, one very high-volume lender said it did not do any of its own marketing of the loan.

Lenders market the loan primarily on their website; they also market through flyers, brochures, and newsletters sent to their customers (Figure 9).

Figure 9. Lender Marketing Activities (Online Survey Results)



When the survey asked if lenders targeted specific types of customers in their marketing efforts, most (67%) said they target both new and existing customers, eight (21%) said they target only existing customers, and four (10%) said they do not consider targeting when marketing.

Working with Home Performance Contractors

During the in-depth interviews, we asked lenders if they marketed the HEAT Loan to any contractors, real estate agents, or other parties to encourage them to steer customers to the lenders. As a second step, during the online surveys we followed up with additional questions to gain a more in-depth understanding of how lenders work with HPCs and whether they recommend specific HPCs to their customers.

Only three of 14 interview respondents and four of 51 lender survey respondents said they marketed directly to or worked with HPCs to promote the HEAT Loan to customers. Some of these lenders described these marketing strategies:

- One lender said they coordinated marketing efforts with one high-volume HPC that approached the lender and one medium-volume HPC that was a commercial customer at the bank.[14] They believed this was a successful strategy for marketing the loan to customers.
- Two lenders said they have an in-branch marketing table with contractors on site to speak with customers. (These lenders did not indicate the frequency or duration of these visits.)
- The other two lenders said they received referrals from one high-volume HPC and a medium-volume HPC.

None of the lenders said they recommended that customers use specific HPCs to perform the project work. Unprompted, one lender said it had heard of issues with contractors using high-pressure sales tactics.

Lender Processes

During the in-depth interviews, we asked lenders several questions about the loan process, such as if they offered their customers options for preapproval and closing the loan. Specifically, we asked lenders if they offered instant preapproval over the phone or online and how long the preapproval process typically took. Most lenders offered some form of preapproval to help expedite the process.

Twelve of 14 lenders we interviewed offer preapproval. Seven offer online preapproval, with a turnaround time as quick as 15 to 30 minutes. Five offer preapproval by phone, where the turnaround time is typically 24 hours or less.

During the online surveys, one lender responded with this comment about the preapproval process:

> *"I prefer allowing applicants to go to lenders prior to receiving the HEAT Loan Authorization (preapproval). However, it appears that asking for the intake form and contractor's estimate to verify that they are intending to enter the program is not allowed. Allowing an applicant to get a bank approval earlier prevents the problems caused by the sometimes compressed time-period between an applicant receiving the authorization, submitting an application and their need to close the loan."*

We also asked about lenders' options for customers to close the HEAT Loan. It appears that requiring the borrower to come to the bank for closing is not a significant impediment for the borrower. Lenders prefer in-branch closing because it gives them a chance to build on the relationship and cross-sell other products, which is especially important with new customers.

[14] The evaluation team removed HPC names from this memorandum to preserve confidentiality but used them to assign an HPC size bin (the same size bins used in the Key Performance Indicator analysis).

The lenders said they offer these closing options to their customers:

- None of the lenders offer closing by e-mail, except for one lender that can use DocuSign.
- Only one lender offers closing by fax, but only for existing customers for whom the lender has a signature on file.
- Every lender offers in-branch closing.
- Three lenders offer electronic closing.

Comparison to Other Loan Products

We asked the lenders several questions about how the HEAT Loan compares to other unsecured personal loan products in the market. Note that our intent was to compare the HEAT Loan to other unsecured personal loans. Home improvement loans are secured by equity in the home and are considered by lenders to be in a completely separate class that is less risky. Several of these comparisons between the HEAT Loan and other unsecured personal loans are specific to lending institutions (as opposed to PA requirements) and vary by lender. Although they may not have direct implications for the PAs, these comparisons provide important context for understanding how lenders administer the HEAT Loan.

These are the lenders' responses about five loan factors—underwriting, maximum loan amount, maximum term length, interest rate, and fees:

- **Underwriting.** Most lenders (11 of 14) said they underwrite HEAT Loans the same as other unsecured personal loans, but further probing revealed that what several lenders meant is that they use the same tools (e.g., credit scores, debt-to-income ratio, etc.). In fact, lenders' minimum credit score requirements may be higher for a HEAT Loan because the interest rate is so low (approximately 5%). For other unsecured loans, lenders will charge a higher interest rate for lower credit scores. Several lenders noted that, as a result, the average credit score for HEAT Loans is higher than for other unsecured loans. In contrast, three lenders offer slightly more relaxed underwriting for HEAT Loans. One noted that HEAT borrowers tend to be of a higher caliber—they are more stable, with their own homes and steady jobs.
- **Maximum Loan Amount.** Maximum amounts for HEAT Loans are either the same (eight lenders) or higher (six lenders) than other unsecured personal loans. Maximum amounts for HEAT Loans varied from $15,000 to $50,000 compared to $2,000 to $50,000 for other unsecured personal loans.[15] The higher maximum amounts for HEAT Loans indicate that these lenders perceive them as lower risk than other unsecured personal loans.

[15] The PAs only support the HEAT Loan up to $25,000. Other agencies or organizations, such as the Massachusetts Department of Energy Resources may offer additional funding.

- **Maximum Term Length.** Maximum term length for HEAT Loans varied from four years (one lender) to seven years (10 lenders), with an average of 6.5 years. Other unsecured personal loans varied from three years to six years, with an average of 4.6 years. Again, the longer term reflects an assessment that HEAT Loans are lower risk.
- **Interest Rate.** At the time we performed these interviews, the HEAT Loan interest rate was 5% for lenders (the interest rate to borrowers was 0% after the interest rate buydown). Interest rates for other unsecured loans typically vary with the credit risk, ranging from 7.99% to 14.5% and as high as 9.99% to 18%.
- **Fees.** None of the lenders charge customers fees for HEAT Loans.

Opportunities for Improvement

In the online surveys, most lenders expressed strong to moderate interest in having Mass Save add an online application option to the current paper application format. Specifically:

- Nearly three quarters said they were either "very interested" (34%) or "interested" (36%) in the online option.
- Nearly a quarter were "somewhat interested" (22%).
- Three lenders were "not too interested" (6%).
- One person was "not at all interested."

In closing the interviews and surveys, we asked all of the lenders if there was anything the PAs could do to improve the HEAT Loan for both lenders and customers. Most lenders we interviewed said they are very pleased with the way it is currently run. Several said that they like the quarterly calls with the PAs and that they get the information they need from the calls. Most of the lenders' suggestions focused on clarifying processes for customers, accelerating processes for both lenders and customers, and expanding eligibility.[16]

The following section describes these suggestions in more detail. Note that these suggestions comprise lender opinions and may not necessarily be feasible or reasonable changes. We provide comprehensive recommendations separately in the main report, which take into account context of the HEAT Loan and the diverse perspectives from its managers and the lenders, contractors, and customers. The lenders suggested these improvements:

- **Clarify Process and Forms**
  - Sixteen lenders suggested providing customers with a better explanation of the loan process and forms. For example, on the intake form some crucial instructions are on the back.

[16] Some lenders offered suggestions that the program may already offer and their suggestions may indicate that additional efforts in these areas will ensure lenders are more familiar with the program's offerings.

- One lender suggested making the Mass Save website easier to navigate and to add a page of simple instructions for lenders to print out and give to borrowers.
- Two lenders suggested that Mass Save provide more information to lenders about its rebates so lenders could explain the options to customers.
- One lender said it would like guidance on loan disbursements. For example, the lender asked if it should disburse one-third at closing, one-third at project completion, and one-third at customer sign-off.

- **Accelerate HEAT Loan Processes**
  - **Lender Reimbursement:** Three lenders wanted to speed up the interest rate buydown payment to lenders. Two lenders suggested putting the interest rate buydown payment process online to make it faster for lenders.
  - **HEAT Loan Authorization Form:** Two lenders suggested a quicker response on the authorization form from HEAT Loan Administrator. Another two lenders wanted the HEAT Loan Administrator to send the authorization form directly to the customers' lender of choice. Another two lenders suggested making the HEAT Loan authorization form accessible online so customers can get the document faster. (One lender said if any processes are moved online, it would appreciate training on how to use online forms.)
  - **Home Energy Assessment Scheduling:** Since an assessment is required to be eligible for the HEAT Loan, three lenders suggested scheduling the home energy assessments more quickly because some customers complained about a long wait.[17]
- **Expand Loan Eligibility**
  - Five lenders suggested Mass Save consider a tiered interest rate structure to expand loan eligibility to more customers. One lender said that at the 5% interest rate it has had to turn away some applicants because of lower credit scores.[18] (In contrast, another lender was pleased that it converts 63% of loan applications to closing.)
  - One lender suggested expanding the eligible measures covered by the HEAT Loan, such as solar panels.[19]
  - One of the lenders also said it would like to see the loan opened up to second homes and condos, since they noted 40% of the housing stock in its territory falls in these categories.

[17] Lead vendors track and monitor customer wait times.

[18] It is important to note that the lenders (not the PAs) determine the criteria for accepting or rejecting an applicant at the 5% interest rate.

[19] Under the Green Communities Act, the PAs cannot use ratepayer funds to finance renewable energy projects.

Additionally, a few lenders had some suggestions about the two-party check system:

- Three lenders said they thought Mass Save should eliminate the two-party check system because some borrowers want the check made out just to the borrower. For example, one lender explained that because payments are issued to the customer and contractor up front (and the lender requires proof of vendor payment in order to issue the check to the customer) and sometimes contractors do not finish the work on time, they have a stale dated check, on which they have to put a stop and reissue another two-party check. *"The easiest would be if the check could be made out to the customer and the customer could handle the disbursements…I know this has a downside in terms of possible fraud, but if there was a way to implement it and then have customers upload proof of vendor payment to an online system it would be easier for lenders to track."*
- Another lender suggested informing customers more clearly about the two-party check process.
- One lender said to keep the two-party check system from a *"safety and soundness point of view for lenders."*

Additional Comments

The last question we asked all of the lenders was if they had any closing comments about the HEAT Loan. During interviews, we received these comments:

- One high-volume bank noted that it has done $20 million in loans so far.
- A high-volume credit union noted that it currently has $4 million in HEAT Loans on the books, representing 7% of its loan portfolio.
- Another lender suggested that the HEAT Loan do more marketing to contractors.
- A credit union noted that state-chartered credit unions cannot lend more than $15,000 for unsecured personal loans.

Fourteen of the surveyed lenders made comments—all of which were positive. A few notable responses were:

- One highly active credit union said: *"As a long-time Mass Save lender, we love the program!"*
- A moderately active bank said: *"The Bank is very satisfied with the program and dealing with Mass Save."*
- A less active bank said: *"It is a great program. Many people in our area have taken advantage of it, it has been a great sense of revenue for the bank, and we are creating relationships with some people that may not have reached out to us otherwise."*

> *"As a long-time Mass Save lender, we love the program!"*

Appendix E. Massachusetts HEAT Loan Assessment: AHP Analysis

Overview

The Massachusetts Electric and Natural Gas Program Administrators (PAs) offer programs with a number of measures and incentives to encourage their customers to engage in energy-efficient home improvements.[20] Participants in these programs must decide how to devote their resources and time in making these improvements.

The evaluation team investigated the relative importance of a few factors on the participant decision-making process. These factors are:

- Direct financial incentives provided from Mass Save
- Energy Specialist[21]
- The HEAT Loan
- Tax credits or incentives from sources other than Mass Save

Cadmus chose not to investigate other influencing factors, such as a participant's desire to contribute toward a greener society, because these factors cannot be directly influenced by the PAs nor be easily quantified.

Methodology

The Analytical Hierarchy Process (AHP) is a tool used to inform complex decisions where a number of contributing factors compete with each other to influence the decision-making process. The AHP framework allows the user to understand the relative importance of these contributing factors. The expectation is that this AHP framework analysis can show how well the selected factors influence participants. Stakeholders can then determine where they can make improvements to the process.

We organized the results by PA, delivery channel, and HEAT Loan size. In the following sections, we briefly describe the AHP sampling methodology, then present and discuss detailed results.

Sampling Methodology

As part of the HES initiative and HEAT Loan assessments, the evaluation team surveyed a total of 965 participants. Some of the survey questions were specific to the AHP framework, asking participants

[20] The programs in this study are Home Energy Services (HES) Initiative and the High Efficiency Heating and Water Heating Equipment (HEHE) and COOL SMART programs.

[21] The Energy Specialist may be a lead vendor or contractor who is trained and certified to conduct home energy assessments for participants in the HES program.

to rate the competing influences of various factors by their relative effect on the participant's decision to pursue energy-efficient upgrades.[22]

We stratified the 965 survey respondents by HEAT Loan participation. We asked the 386 respondents who received a HEAT Loan a series of comparative questions. We asked the 579 participants who did not receive a HEAT Loan a subset of those questions.

We then reduced the survey sample sizes for two reasons, as shown in Table 11. If the participant did not receive a major measure through HES, they were excluded from the set of AHP questions during the survey. Twenty-one participants were removed from the HEAT Loan population, and 184 participants were removed from the population that did not receive a HEAT Loan.

Another reason to remove participants was if, during the survey, the participant decided not to answer a question relevant to the AHP analysis. In order for the estimates to be robust, all participants must have given a complete set of preferences for the chosen measures. Thirty-one HEAT Loan participants were removed; 38 participants who did not receive a HEAT Loan were also removed.

Table 11. AHP Survey Sampling

	HEAT Loan Sample	Non-HEAT Loan Sample	Total Sample
Stratified by HEAT Loan participation	386	579	965
Remainder after removing participants who received no major HES measure	365	395	760
Remainder after removing participants who gave an incomplete answer set	334	357	691

In addition, a number of participants did not receive or were unaware of non-Mass Save incentives such as tax credits. These participants could have been removed from the survey sample because they did not answer questions comparing the influence of outside incentives; however, we chose not to remove them. Instead, we decided to infer that the other influencing factors (HEAT Loan, Mass Save incentives, Energy Specialist) were "extremely important," and we assigned those factors a maximum rating of 9 when compared to the non-Mass Save incentives.

Results and Discussion

Table 12 and Table 13 show the AHP results for all participants by whether or not they obtained a HEAT Loan. This factor is weighed against other factors (incentives, Energy Specialist) with their relative influence presented as a percentage. For the purposes of this study, it can be inferred that a measure with a relative weighting of 60% is, on average, twice as influential as a measure with a relative weighting of 30%.

[22] The scale ranged from 1 to 9, with 1 having the least influence and 9 having the most influence.

The results in Table 12 and Table 13 indicate that, on average, Mass Save incentives were twice as influential as the Energy Specialist in the decision of the participant to pursue energy-efficient upgrades. This trend persists whether or not the participant received a HEAT Loan. It indicates that, on average, the HEAT Loan draws evenly from the influence of the Energy Specialist and the Mass Save incentive.

The trend also stresses the robustness of the results because a proportionate impact of the HEAT Loan reinforces the consistency of the aggregate results.

Table 12. AHP Results – Standard, HEAT Loan

Loan Type	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
HEAT Loan	32%	15%	6%	46%	334

Table 13. AHP Results – Standard, No HEAT Loan

Loan Type	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
No HEAT Loan	63%	29%	8%	N/A	357

The evaluation team also investigated the influence on participants' decisions of the delivery channel (lead vendor or HPC) and the size of the HEAT Loan. Results are shown in Table 14. We can make a few important observations.

- For participants who received a HEAT Loan, the influence of the delivery channel does not appear to have a significant effect.
- If the participant did not receive a HEAT Loan and went through the HPC delivery channel, the relative weighting for the Energy Specialist's influence dropped by six percentage points.
- For participants who received a HEAT Loan of more than $13,000, the relative importance of the Mass Save incentives decreased while the relative importance of the Energy Specialist remained constant. This matches our expectation that the loan increases in importance for larger and more expensive upgrades.

Table 14. AHP Results – Strata Results

Delivery Channel	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
By Delivery Channel - HEAT Loan Customers					
HPC	32%	16%	6%	46%	151
Lead Vendor	33%	15%	6%	47%	183
By Delivery Channel - No HEAT Loan Customers					
HPC	66%	26%	8%	N/A	161
Lead Vendor	60%	32%	8%	N/A	196
By HEAT Loan Size*					
<= 6,000	34%	16%	7%	43%	41
<= 13,000 and > 6,000	34%	15%	6%	45%	144
> 13,000	25%	16%	7%	53%	78

* In the survey sample, there were only ten participants who received a micro-loan. The evaluation team did not believe this was a sufficient sample with which to perform the AHP framework analysis, so we cannot say with high certainty that the relative importance of the HEAT Loan for micro-loans is consistent with the ≤$6,000 bin.

In addition, we investigated if PA-specific results significantly differed from those observed when aggregated. Table 15 and Table 16 show PA-specific results by loan type. Table 17 and Table 18 expand upon this by showing results for PA and delivery channel by loan type. Small sample sizes can skew results, therefore PA-specific results are presented only if more than five participants were sampled for the given strata. For example, Berkshire Gas is excluded from Table 15 because of the small sample of HEAT Loan participants who were Berkshire Gas customers.

Table 15 shows relative consistency in results among the PAs for participants who received a HEAT Loan.

Table 15. AHP Results – PA-Specific with HEAT Loan

PA	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
Cape Light Compact	29%	19%	7%	45%	40
Columbia Gas	33%	17%	4%	46%	6
Eversource Eastern Massachusetts*	32%	17%	6%	45%	74
National Grid	32%	15%	6%	47%	191
Unitil	40%	11%	5%	44%	17

* Formerly known as NStar.

Table 16 shows results with some degree of variance by PA. Columbia Gas participants placed less importance on the influence of the Energy Specialist. Berkshire Gas participants placed greater importance on the Energy Specialist influence; however, the small sample size may be contributing to this result.

Table 16. AHP Results – PA Specific with No HEAT Loan

PA	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
Cape Light Compact	61%	33%	7%	N/A	67
Columbia Gas	71%	19%	10%	N/A	27
Liberty Utilities	62%	29%	9%	N/A	8
Berkshire Gas	57%	35%	9%	N/A	8
Eversource Eastern Massachusetts	63%	29%	8%	N/A	40
National Grid	62%	29%	9%	N/A	191
Unitil	65%	26%	9%	N/A	16

Table 17 is presented so that the reader can observe whether there are significant differences by delivery channel for any of the PAs. Both National Grid and Eversource Eastern Massachusetts participants placed slightly higher importance on the influence of the Energy Specialist when services were delivered through an HPC. In all cases, except through the HPC delivery channel for Cape Light Compact (probably due to sample size), participants value the HEAT Loan more than incentives from Mass Save.

Table 17. AHP Results – PA [Delivery Channel]-Specific with HEAT Loan

PA [Delivery Channel]	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
Cape Light Compact [LV]	26%	20%	7%	47%	33
Cape Light Compact [HPC]	46%	14%	5%	35%	7
Eversource Eastern Massachusetts [LV]	32%	15%	6%	47%	35
Eversource Eastern Massachusetts [HPC]*	32%	19%	7%	43%	39
National Grid [LV]	35%	13%	5%	46%	106
National Grid [HPC]	29%	16%	7%	49%	85
Unitil [HPC]	40%	11%	5%	44%	17

Table 18 shows that for both National Grid and Eversource Eastern Massachusetts the influence of the Energy Specialist is higher than the lead vendor delivery channel. This is consistent with the results found in Table 14 and may indicate that the importance of the HPC is not as strong if the participant does not pursue a HEAT Loan. As Table 18 shows, the only PA for which the HPC has a greater influence than the lead vendor is Cape Light Compact.

Table 18. AHP Results – PA [Delivery Channel]-Specific with No HEAT Loan

PA [Delivery Channel]	Mass Save Incentive	Energy Specialist	Other Incentives	HEAT Loan	n
Cape Light Compact [LV]	61%	32%	7%	N/A	51
Cape Light Compact [HPC]	59%	35%	6%	N/A	16
Columbia Gas [LV]	68%	23%	9%	N/A	13
Columbia Gas [HPC]	73%	15%	12%	N/A	14
Liberty Utilities [LV]	62%	29%	9%	N/A	8
Eversource Eastern Massachusetts [LV]	55%	38%	7%	N/A	15
Eversource Eastern Massachusetts [HPC]	67%	25%	8%	N/A	25
National Grid [LV]	59%	32%	9%	N/A	101
National Grid [HPC]	66%	26%	8%	N/A	90
Unitil [HPC]	65%	26%	9%	N/A	16

Appendix F. Customer Survey Demographics

The evaluation team conducted two customer surveys: A participant survey with 965 HES customer participants and an HES nonparticipant survey with 173 customers who participated in the HEHE or COOL SMART programs but did not participate in the HES initiative or HEAT Loan. In both the HES participant and nonparticipant customer surveys, the evaluation team asked respondents the following demographics questions:

- Respondent age
- Highest level of education completed
- Whether respondents own or rent their home
- The approximate square footage of their home
- When their home was first built

Where available, the evaluation team incorporated data from the initiative tracking data provided by each PA, instead of relying on customer self-report data. For assessing home ownership status, the evaluation team used tracking data from Cape Light Compact and Unitil. For identifying approximate square footage of customer homes and age of homes, the evaluation team used tracking data from Columbia Gas, Liberty Utilities, and CSG (on behalf of Eversource Eastern Massachusetts, National Grid, and Berkshire Gas).

The evaluation team did not ask respondents to estimate their income in the survey. Instead, the team incorporated income data for each HES participant survey respondent based on the 2008-2012 American Community Survey (ACS) median household income of each respondent's Census block group.[23]

Survey Respondent Demographics

The evaluation team assessed respondent demographics (age, level of education, ownership status, home size, and home age) for HES participants and nonparticipants. For HES participants the evaluation team also assessed customer demographics by:

- HES Participation Type:
  - **Audit-Only**: Customers who had an HES assessment and received instant savings measures (ISMs) but did not install any of the recommended HES major measures.
  - **Installed Major Measure:** Customers who installed at least one major HES measure, including those who also installed a measure through the HEHE or COOL SMART programs.
- **Financing:** Customers who did or did not obtain a HEAT Loan to finance their projects.

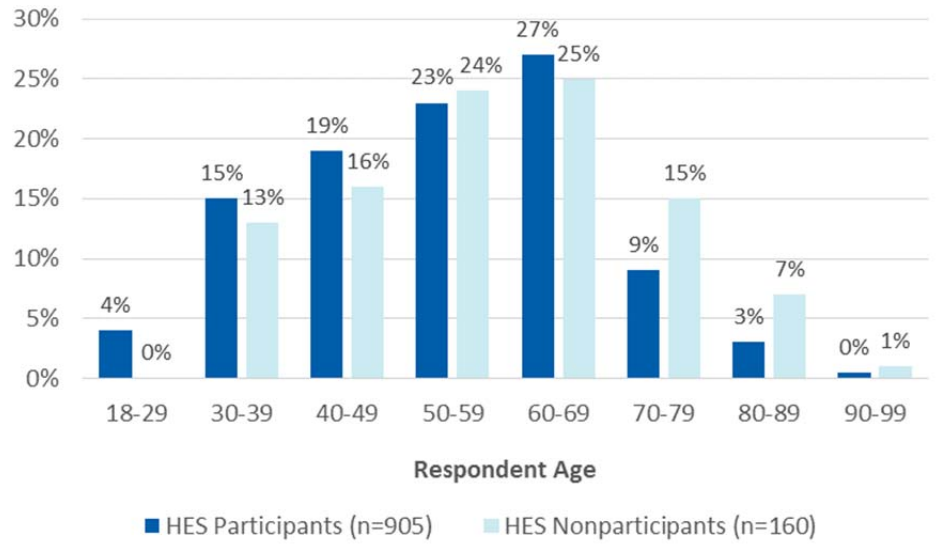
[23] Data source: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

- **HEAT Loan Awareness:** Customer who did not receive the HEAT Loan stratified by those who were aware or unaware of the loan.

Respondent Age

As Figure 10 shows, the greatest proportion of HES participant and nonparticipant survey respondents were age 60-69 followed by those aged 50-59.

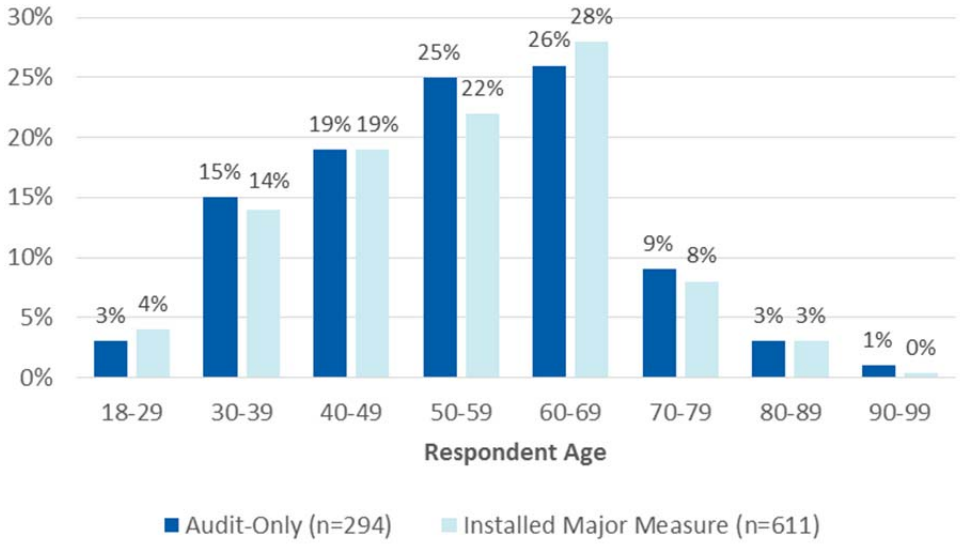
Figure 10. Respondent Age by HES Participation



Notes: Unweighted values.

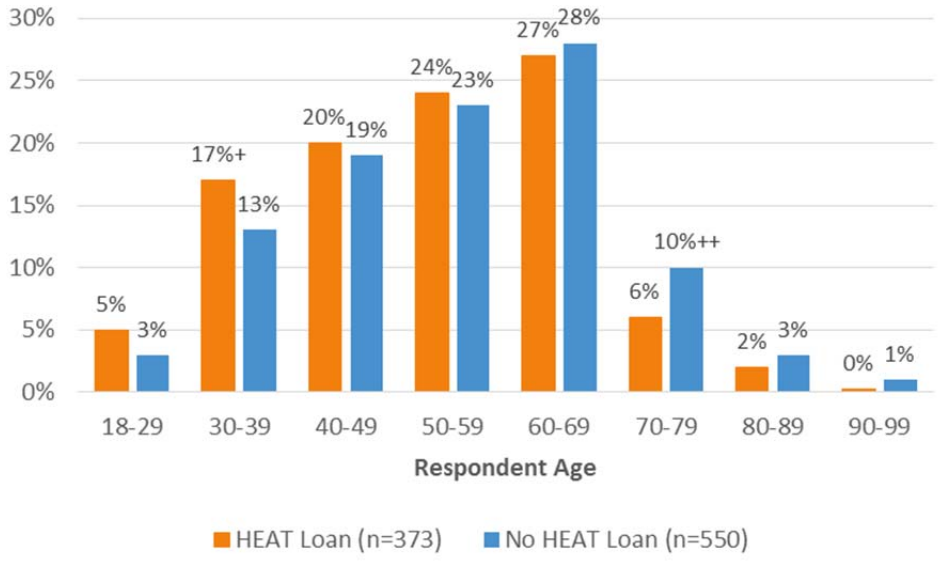
Figure 11 through Figure 13 show respondent age by HES participation type, financing, and HEAT Loan awareness. A significantly greater proportion of respondents who used the HEAT Loan were age 30-39, while a significantly greater proportion of respondents who did not use the HEAT Loan were age 70-79. A significantly greater proportion of those respondents who were aware of the HEAT Loan were age 18-29, while a significantly greater proportion of respondents who were unaware were age 90-99. There were not significant differences in age between audit-only respondents and those who installed major measures.

Figure 11. Respondent Age by HES Participation Type



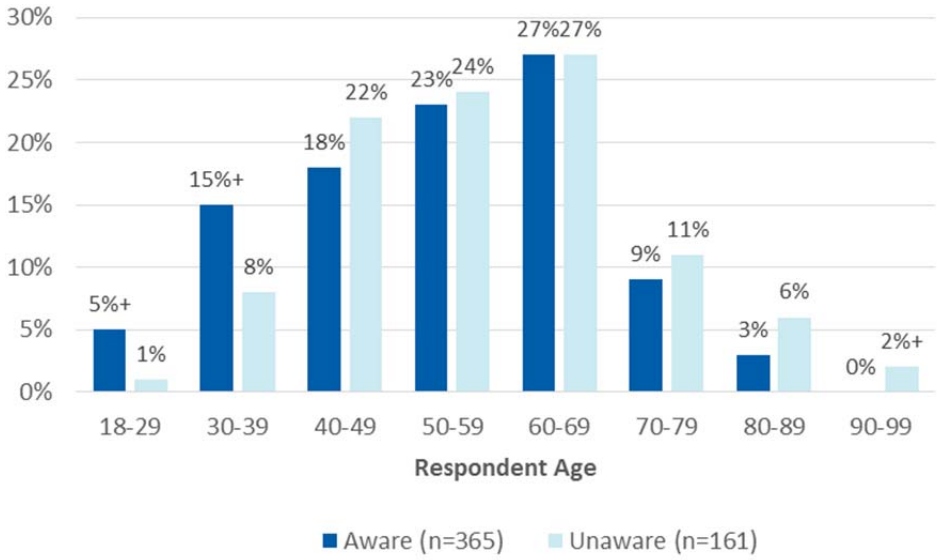
Notes: Unweighted values.

Figure 12. Respondent Age by Financing



Notes: Unweighted values.

Figure 13. Respondent Age by HEAT Loan Awareness

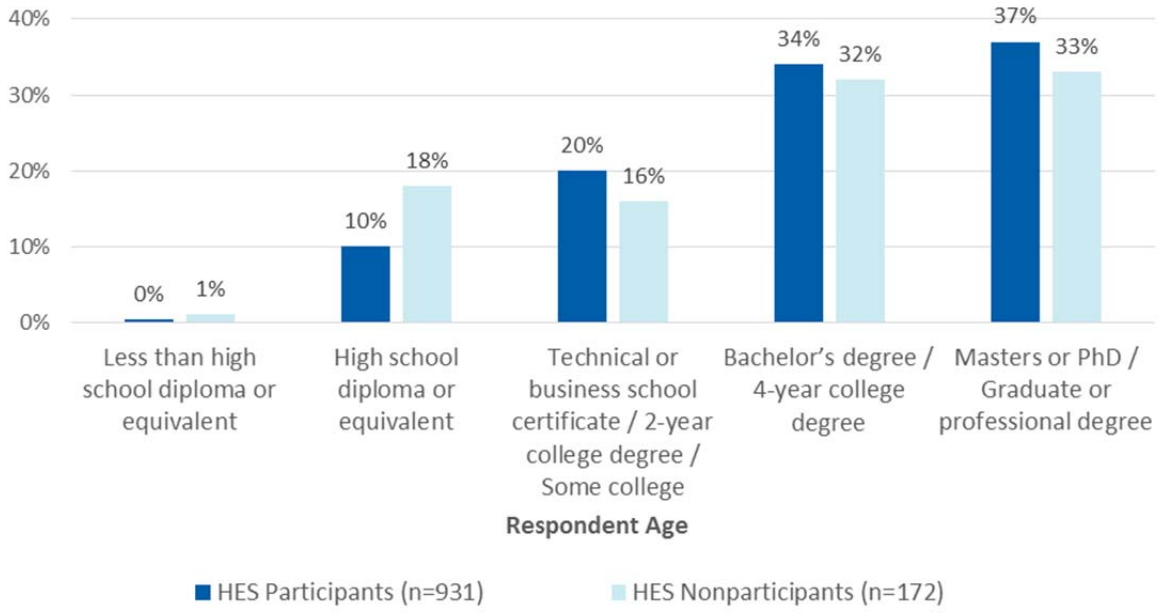


Notes: Unweighted values.

Education

As Figure 15 shows, the majority of respondents (71% of HES participant survey respondents and 64% of HES nonparticipant survey respondents) have a four year, masters, or professional degree.

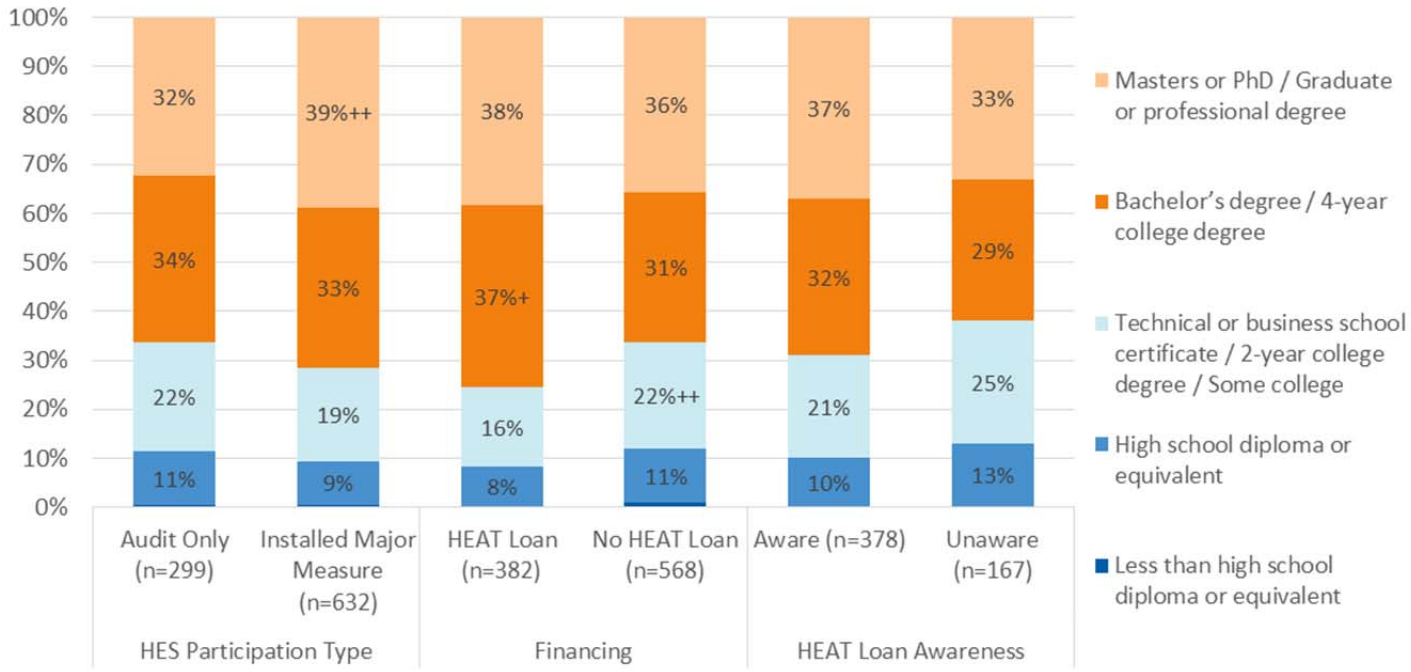
Figure 14. Respondent Education Level by HES Participation



Notes: Unweighted values.

Respondents who installed a major measure through the HES program were significantly more likely to have a masters or professional degree than audit-only respondents (Figure 15). Respondents who did not use the HEAT Loan were significantly more likely to have a technical degree, two year degree, or some college than those who used the HEAT Loan.

Figure 15. Respondent Education Level HES Participation Type, Financing, and Loan Awareness

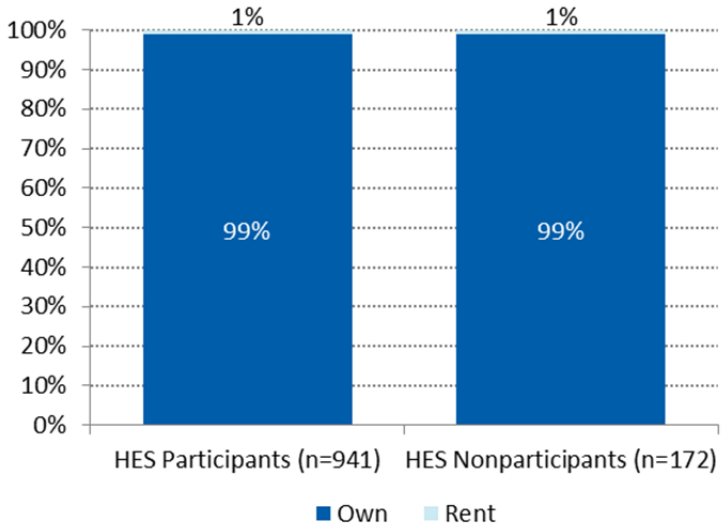


Notes: Unweighted values.

Home Ownership Status

As Figure 16 shows, nearly all of HES participant and nonparticipant respondents (99%) own rather than rent their home.

Figure 16. Home Ownership Status by HES Participation

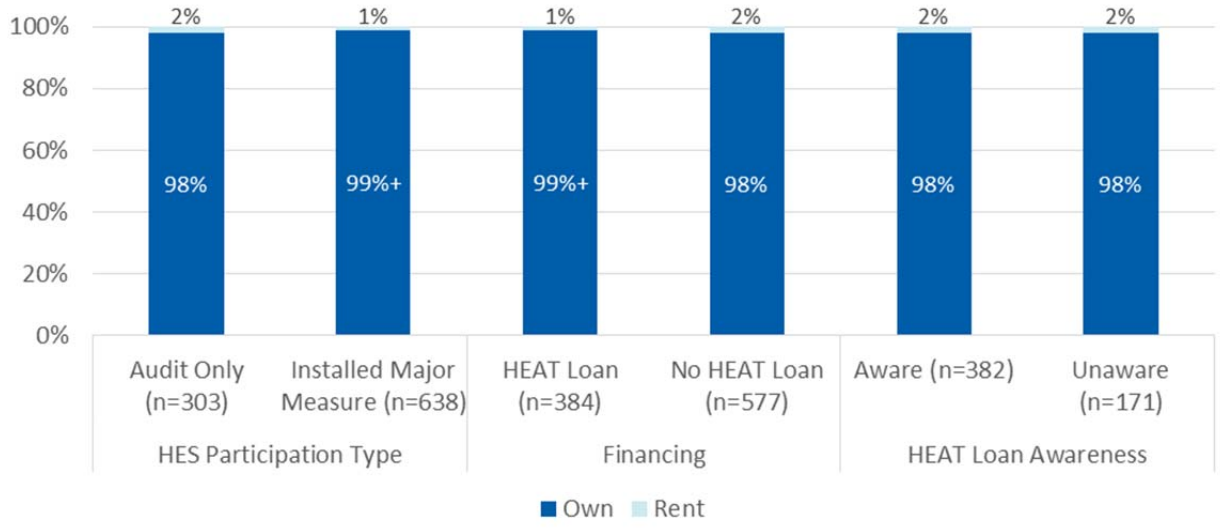


P[

Notes: Unweighted values.

As Figure 17 shows, respondents who installed a major measure and respondents who received the HEAT Loan were significantly more likely to own rather than rent their home. Home ownership status did not differ by HEAT Loan awareness.

Figure 17. Home Ownership Status by HES Participation Type, Financing, and Loan Awareness

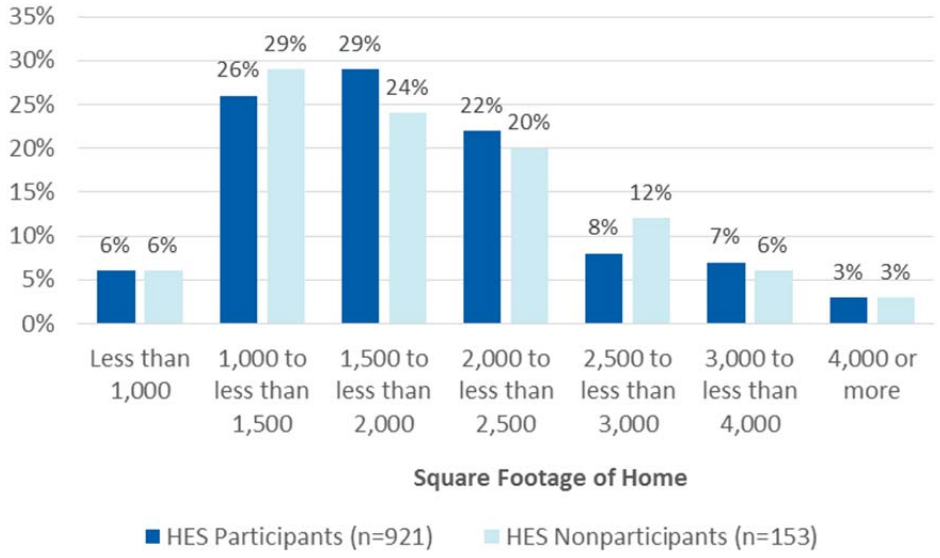


Notes: Unweighted values.

Home Size

As Figure 18 shows, the majority HES participant (77%) and nonparticipant respondents (73%) live in homes between 1,000 and 2,500 square feet.

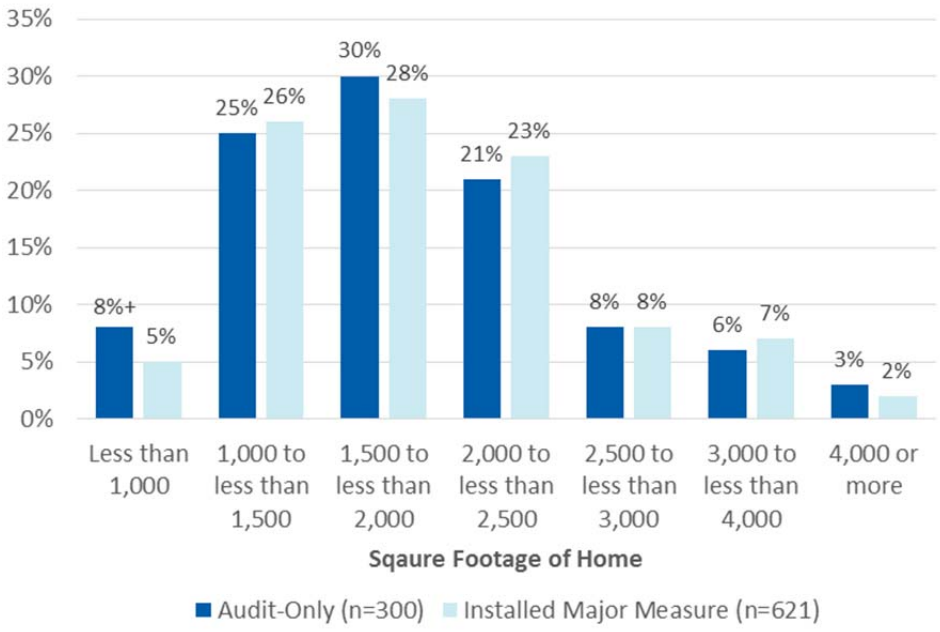
Figure 18. Home Size by HES Participation



Notes: Unweighted values.

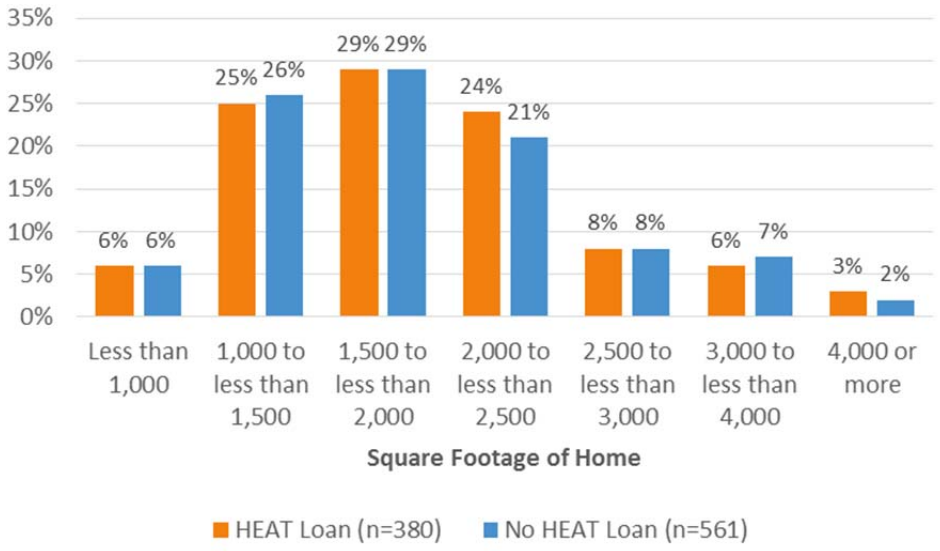
Figure 19 shows that audit-only respondents were significantly more likely to live in homes less than 1,000 square feet. As Figure 22 and Figure 23 show, home size did not differ significantly by HEAT Loan participation or awareness.

Figure 19. Home Size by HES Participation Type



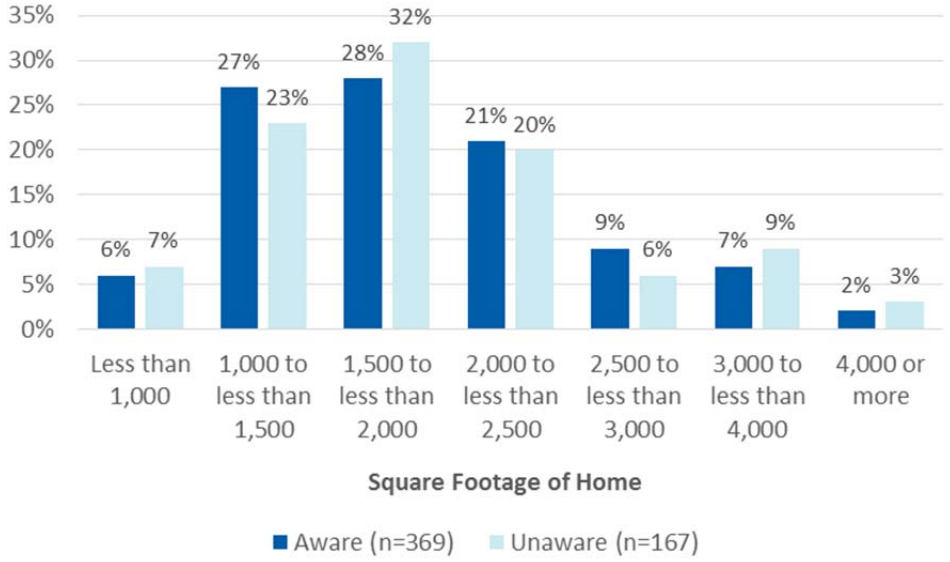
Notes: Unweighted values.

Figure 20. Home Size by Financing



Notes: Unweighted values.

Figure 21. Home Size by HEAT Loan Awareness

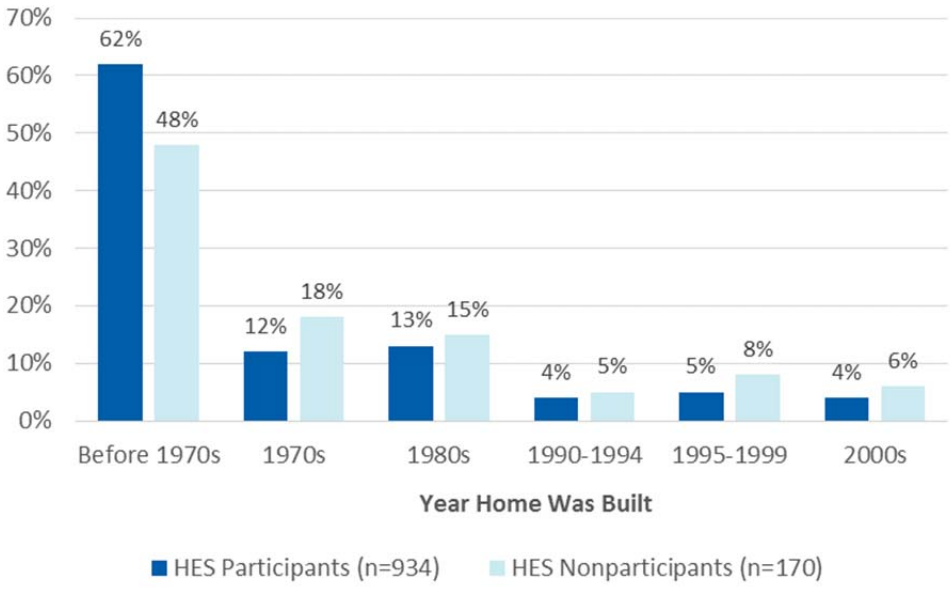


Notes: Unweighted values.

Home Age

Nearly two-thirds of participant respondents and nearly half of nonparticipant respondents live in homes built before the 1970s (Figure 22).

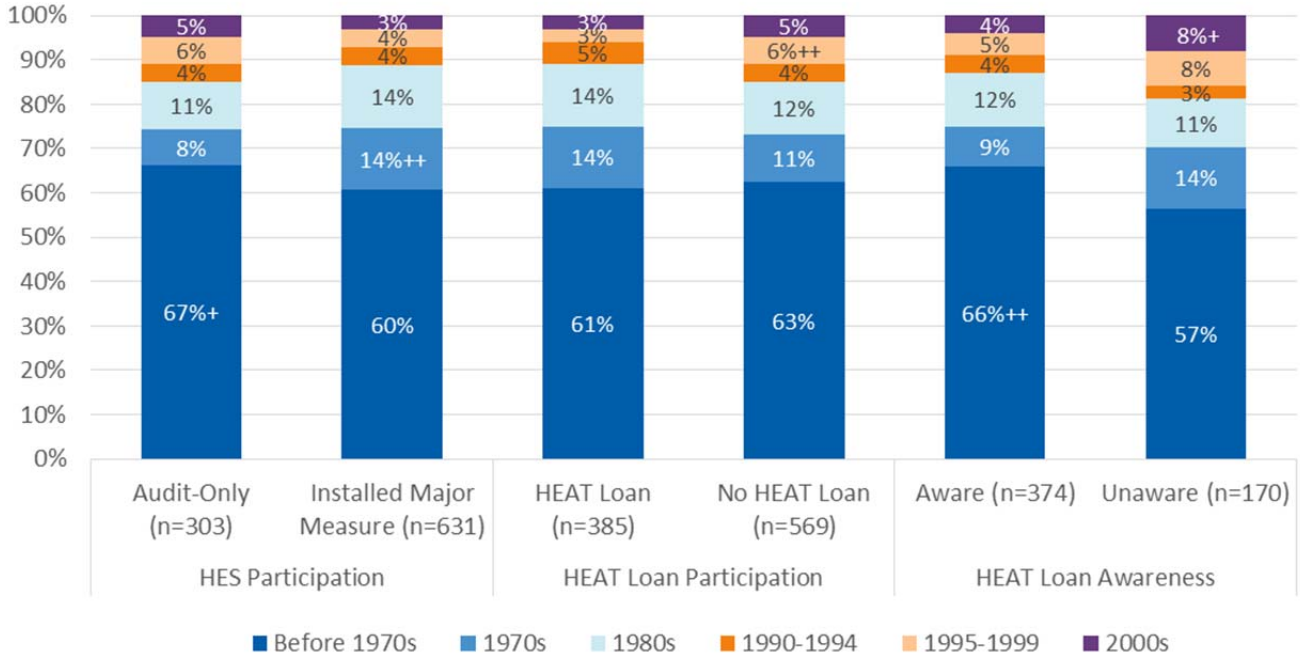
Figure 22. Year Home was Built by HES Participation



Notes: Unweighted values.

As Figure 23 shows, audit-only respondents were significantly more likely to live in homes built before the 1970s; those who installed major measures were significantly more likely to live in homes built in the 1970s. Respondents who did not use the HEAT Loan were significantly more likely to live in a home built between 1995 and 1999. Respondents who were unaware of the HEAT Loan were significantly more likely than those who were aware to live in a home built in the 2000s.

Figure 23. Age of Home by HES Participation Type, Financing, and Loan Awareness



Notes: Unweighted values.

Income

Although the evaluation team did not ask respondents about their income, the team incorporated income data for each HES participant respondent using the 2008-2012 ACS based on each respondent's block group. The team then stratified income data by financing (whether or not respondents used the HEAT Loan) and two program participation categories:

- **HES audit-only and weatherization (Wx) respondents**: Customers who had an assessment but did not install any HES major measures (audit-only respondents) as well as who had an assessment and also installed an HES measure (Wx respondents)
- **Wx and HEHE and WX and COOL SMART respondents**: Customers who installed an HES major measure and installed a measure through HEHE (Wx and HEHE respondents) as well as customers who installed an HES major measure and installed a measure through COOL SMART (Wx and COOL SMART respondents).

Table 19 shows respondent income by financing and program participation. Compared to respondents who used the HEAT Loan:

- A significantly proportion of audit-only and Wx respondents who did **not** use the HEAT Loan were in $60,000 to less than $80,000 income range.
- A significantly greater proportion of Wx and HEHE and Wx and COOL SMART respondents who did **not** use the HEAT Loan were in $80,000 to less than $100,000 income range.

Conversely, compared to those who did **not** use the HEAT Loan, a significantly greater proportion of audit-only and Wx respondents who used the HEAT Loan were in $100,000 to less than $150,000 income range.

Table 19. Respondent Income by Program Participation Type and Financing

Income Ranges	All HES Survey Respondents		Audit-only and Wx Respondents		Wx/HEHE and Wx/COOL SMART Respondents	
	No HEAT Loan (n=578)	HEAT Loan (n=386)	No HEAT Loan (n=395)	HEAT Loan (n=193)	No HEAT Loan (n=183)	HEAT Loan (n=193)
Less than $20,000	1%	0%	1%	0%	0%	1%
$20,000 to less than $40,000	7%	5%	8%	7%	5%*	2%
$40,000 to less than $60,000	21%	19%	22%	19%	17%	19%
$60,000 to less than $80,000	28%	25%	31%*	24%	23%	25%
$80,000 to less than $100,000	18%	17%	16%	20%	23%**	14%
$100,000 to less than $150,000	20%	27%	18%	25%**	24%	30%
$150,000 to less than $200,000	5%	7%	5%	5%	5%	8%
$200,000 or more	1%	1%	0%	0%	2%	1%

Note: Unweighted values.

* Statistically significant difference at 90% confidence with +10% precision.

** Statistically significant difference at 95% confidence with +5% precision.

Appendix G. Key Performance Indicator Analysis

Additional Key Performance Indicators (KPIs)

This appendix includes the KPIs that were calculated as part of the evaluation but that were not published in the main report. Table 20 describes these KPIs. Results for these KPIs follow.

Table 20. Description of Key Performance Indicators

KPI	Description	Location
3. Participation Type	Percentage of customer installing only instant savings measures (ISMs), major measures, or no measures. Shown for both HEAT Loan and non-HEAT Loan customers.	Appendix
5. Participants Installing Insulation, Air Sealing or Both	Percentage of customers installing insulation, air sealing or both. Shown for both HEAT Loan and non-HEAT Loan customers.	Appendix
10. CFL Installations	The percentage of customers receiving at least one CFL and the average numbers of bulbs installed per home.	Appendix
11. LED Installations	The percentage of customers receiving at least one LED and the average numbers of bulbs installed per home.	Appendix
12. Aerator Installations	The percentage of customers receiving at least one aerator and the average numbers of aerators installed per home.	Appendix
13. Showerhead Installations	The percentage of customers receiving at least one showerhead and the average numbers of showerheads installed per home.	Appendix
14. Thermostat Installations	The percentage of customers receiving at least one thermostat and the average numbers of thermostats installed per home.	Appendix
15. Instant Air Sealing Improvement Installations	The percentage of customers receiving at least one instant air sealing improvement.	Appendix
19. Square Footage	The distribution of homes into by square footage.	Appendix
20. Home Age	The distribution of homes by age.	Appendix

KPI 3: Participation Type

This KPI shows the percentage of customer installing instant savings measures (ISMs) only, major measures, or no measures. The results are shown for all customers (Figure 24) and HEAT Loan customers (Figure 25).

Figure 24. HES Participation Type

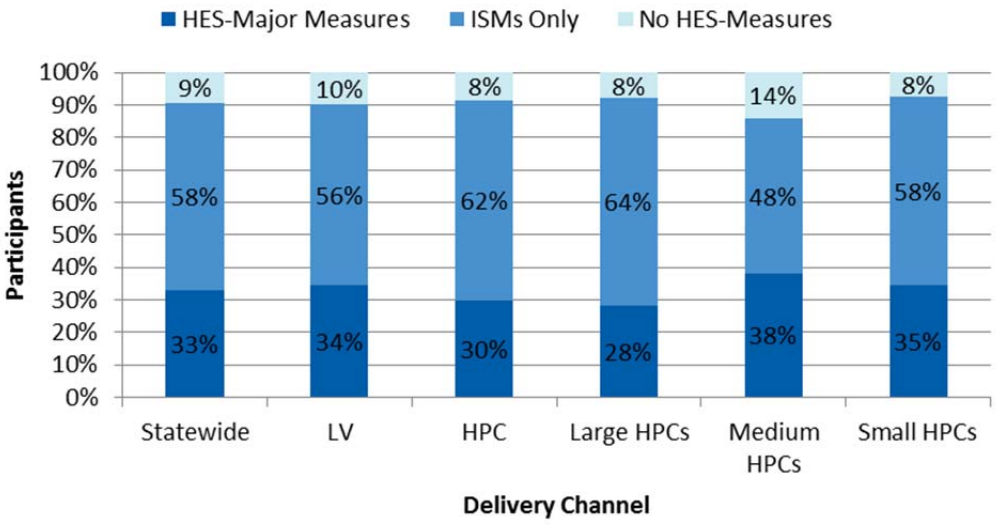
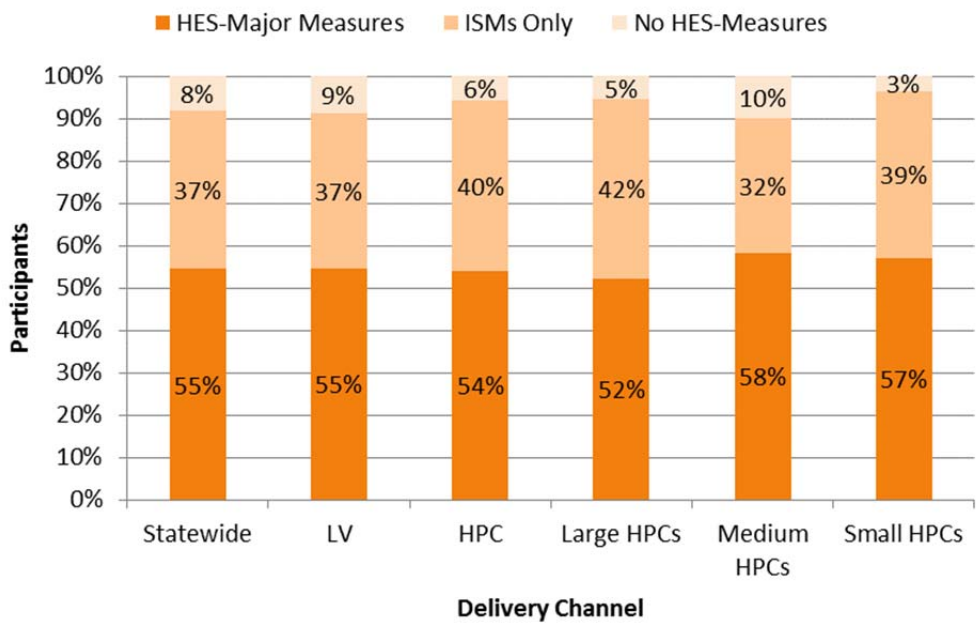


Figure 25. HES Participation Type HEAT Loan Customers



KPI 5: Participants Installing Insulation, Air Sealing, or Both

This KPI shows the distribution of customers installing insulation, air sealing, or both, across participants installing at least one of these measures. This KPI is shown for all customers (Figure 26) and HEAT Loan customers (Figure 27).

Figure 26. Participants Installing Insulation, Air Sealing or Both

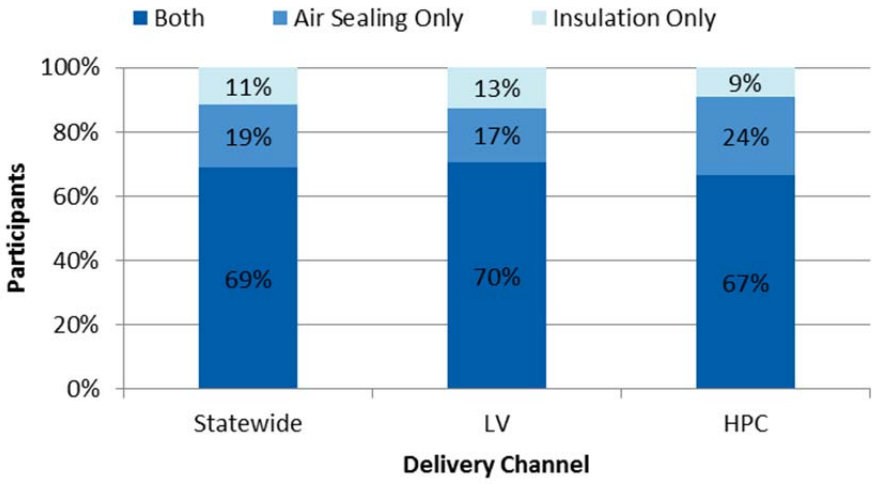
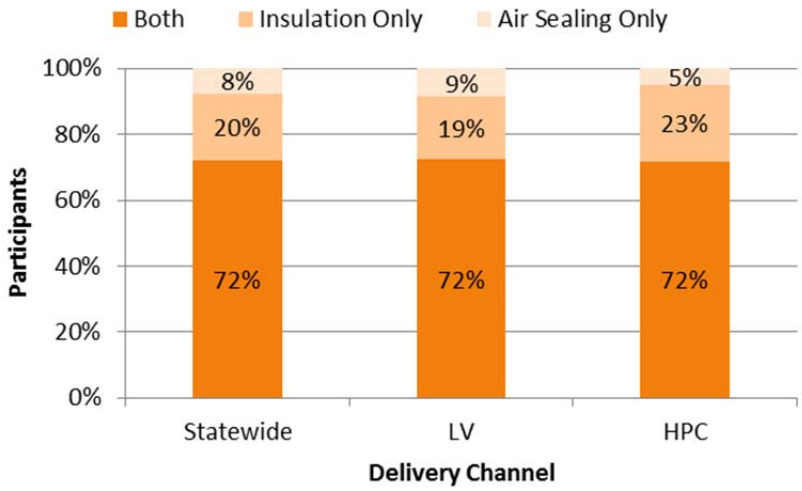


Figure 27. Participants Installing Insulation, Air Sealing or Both, HEAT Loan Customers



KPI 10: CFL Installations

This KPI shows the percentage of customers receiving at least one CFL (Figure 28) and the average numbers of bulbs installed per home (Figure 29).

Figure 28. Customers Installing CFLs

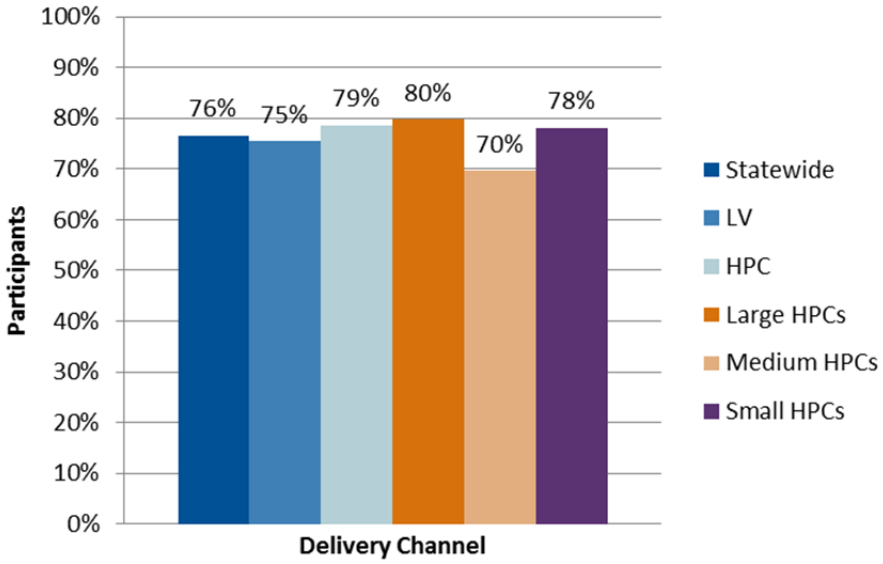
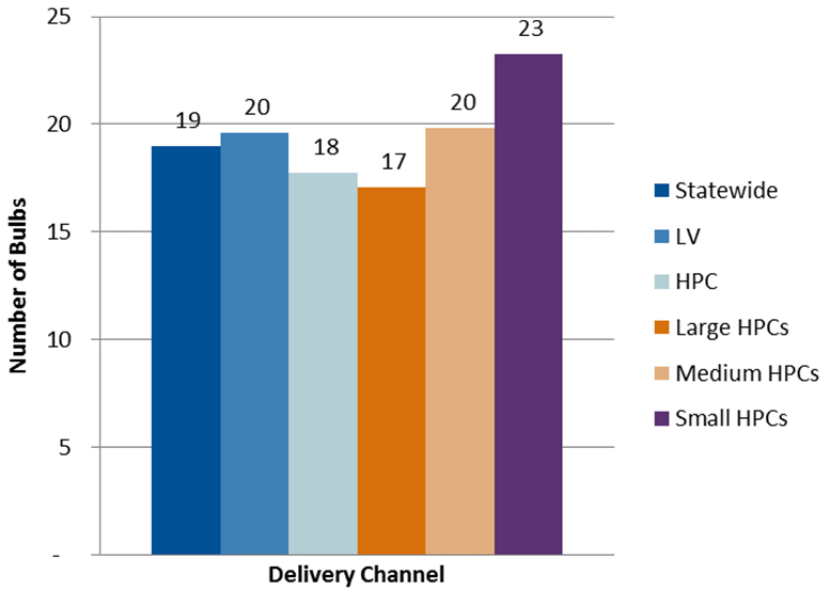


Figure 29. Average Number of CFLs Installed



KPI 11: LED Installations

This KPI shows the percentage of customers receiving at least one LED (Figure 30) and the average number of bulbs installed per home (Figure 31). During the analysis period of this study, program requirements limited customers to one LED per household.

Figure 30. Customers Installing LEDs

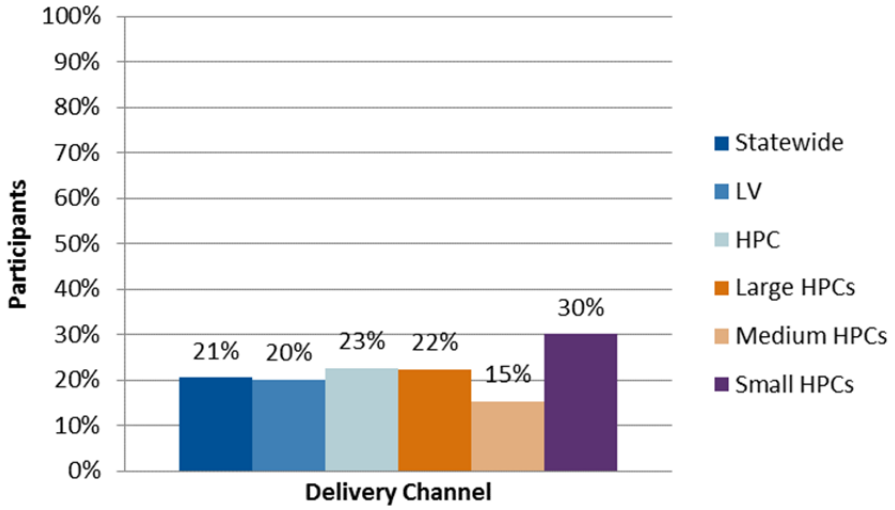
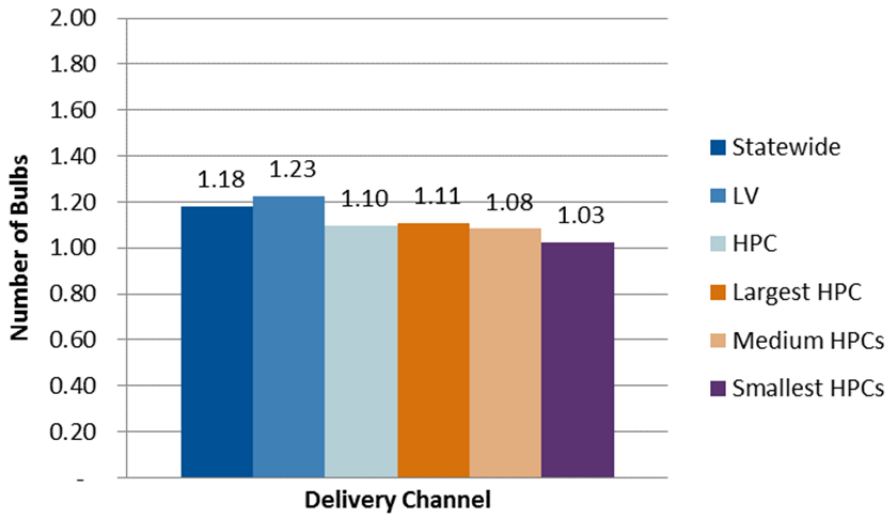


Figure 31. Average Number of LEDs Installed



KPI 12: Aerator Installations

This KPI shows the percentage of customers receiving at least one aerator (Figure 32) and the average numbers of aerators installed per home (Figure 33).

Figure 32. Customers Installing Aerators

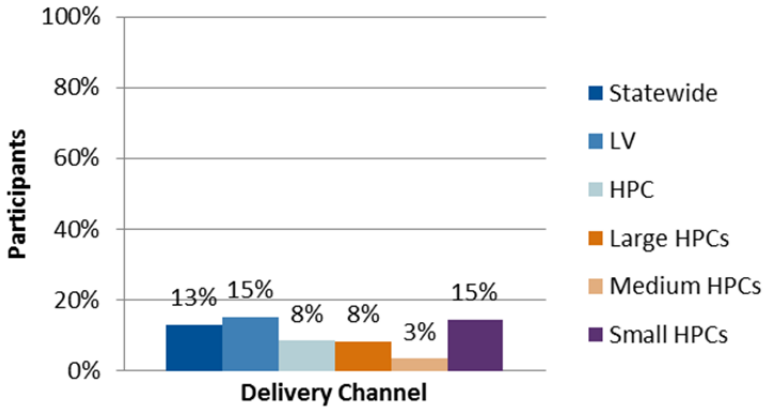
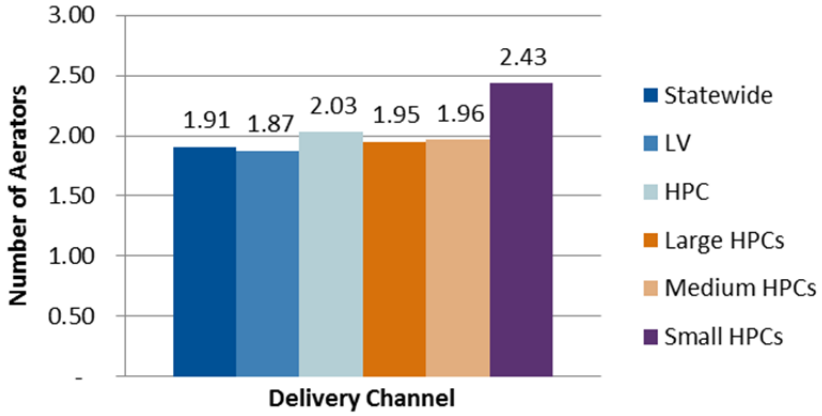


Figure 33. Average Number of Aerators Installed



KPI 13: Showerhead Installations

This KPI shows the percentage of customers receiving at least one showerhead (Figure 34) and the average numbers of showerheads installed per home (Figure 35).

Figure 34. Customers Installing Showerheads

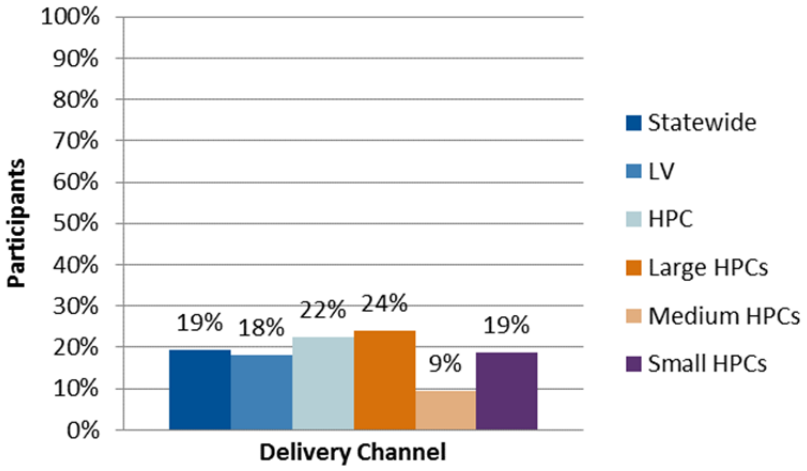
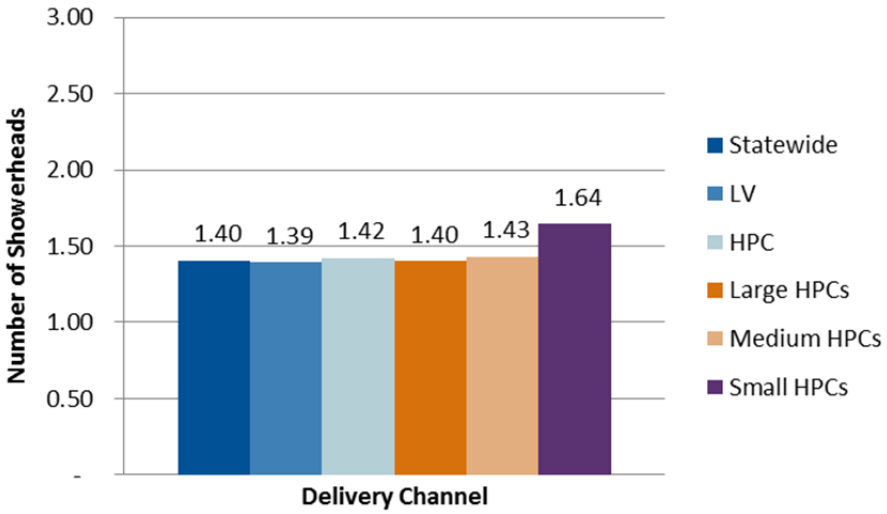


Figure 35. Average Number of Showerheads Installed



KPI 14: Thermostat Installations

This KPI shows the percentage of customers receiving at least one thermostat (Figure 36) and the average numbers of thermostats installed per home (Figure 37).

Figure 36. Customers Installing Thermostats

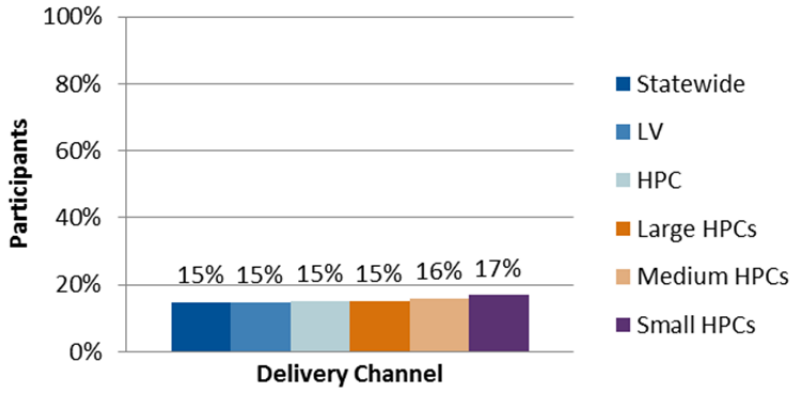
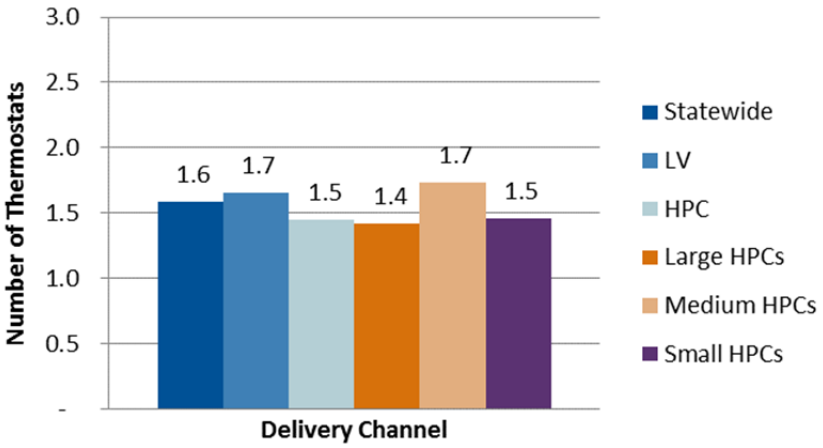


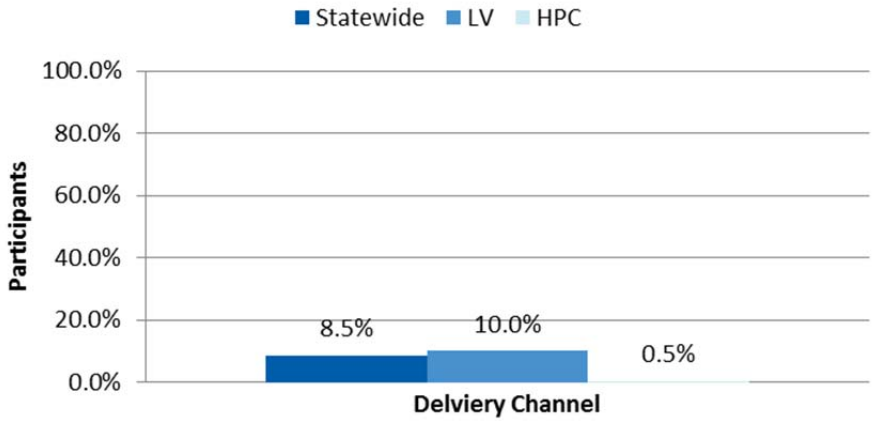
Figure 37. Average Number of Thermostats Installed



KPI 15: Instant Air Sealing Improvement Installations

This KPI shows the percentage of customers receiving at least one instant air sealing improvement (Figure 38).

Figure 38. Customers Installing Instant Air Sealing Measures*

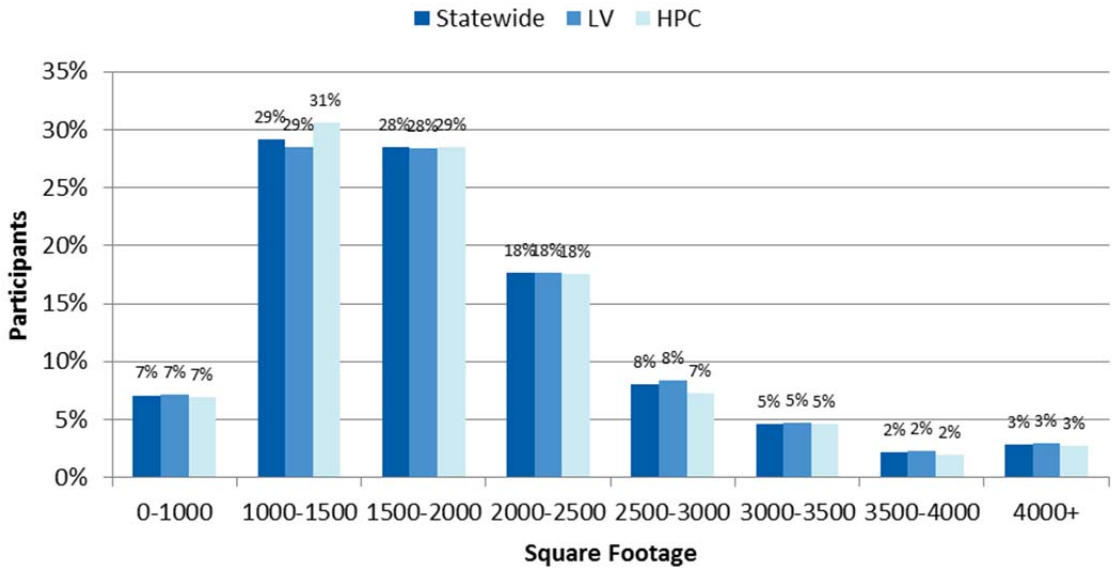


*This measure was only available to Columbia Gas and Liberty Gas customers and percentages are based on the customer populations specific to these utilities.

KPI 19: Square Footage

This KPI shows the distribution of homes by square footage (Figure 39).

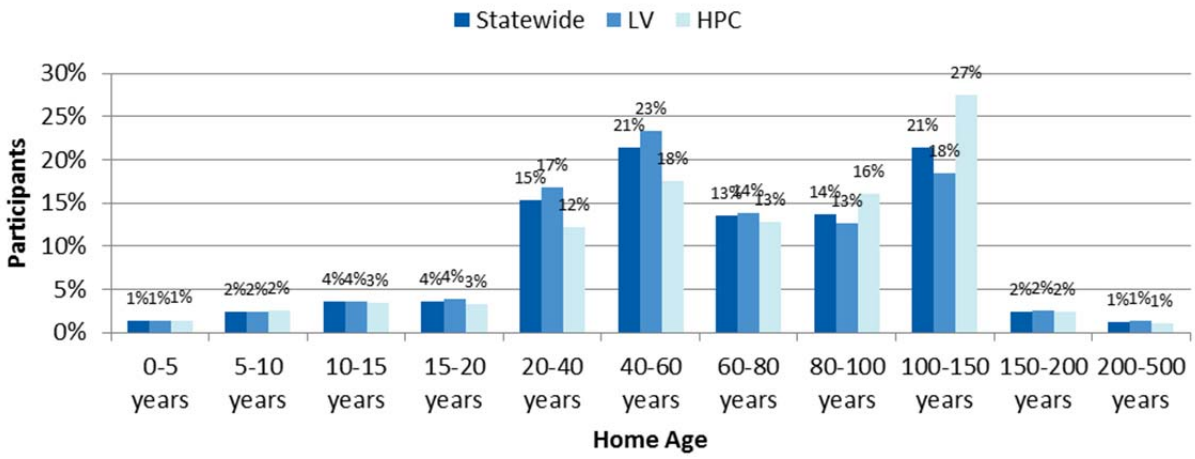
Figure 39. Home Square Footage



KPI 20: Home Age

This KPI shows the distribution of participants by home age (Figure 40).

Figure 40. Home Age



HPC Distribution

The following graphs show the distribution of results for individual HPCs, color-coded by bin size for a select group of KPIs.

KPI 3: HEAT Loan Participation

Figure 41 shows the HEAT Loan participation rate by HPC.

Figure 41. HEAT Loan Participation Rate

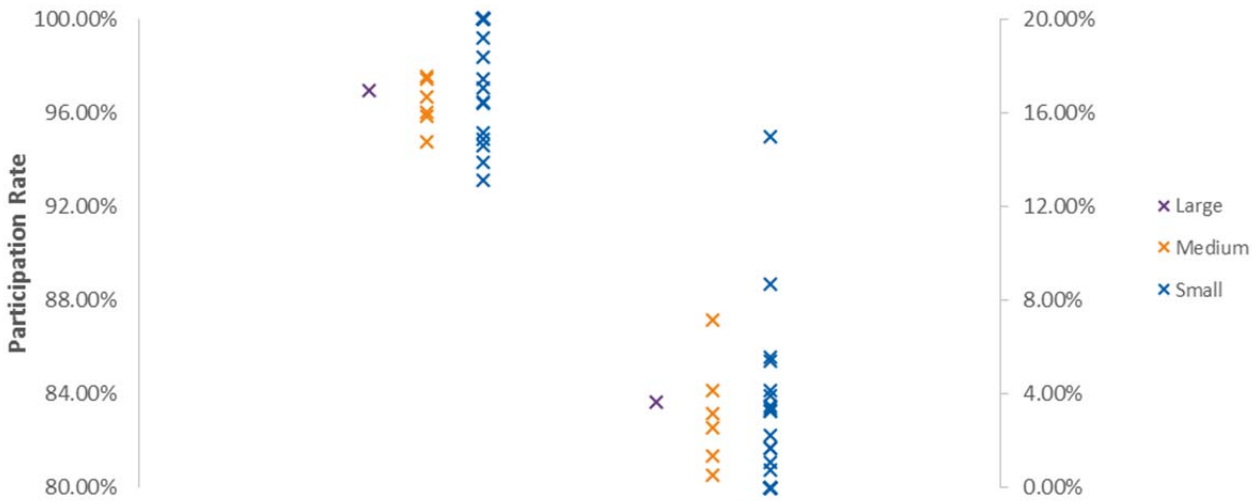
Figure 42 through Figure 45 show the percentage of HES customers by individual HPC who did not install a major HES weatherization measure as well as the HEAT Loan rate by individual HPC. These customers are broken out into four groups:

- Audit-only customers: those participating only in the audit
- Audit-HEHE-COOL SMART participants: those who received an audit and participated in both HEHE and COOL SMART
- Audit-HEHE participants: those who received an audit and participated in HEHE
- Audit-COOL SMART participants: those who received an audit and participated in COOL SMART

Scales on the vertical axes differ between figures.

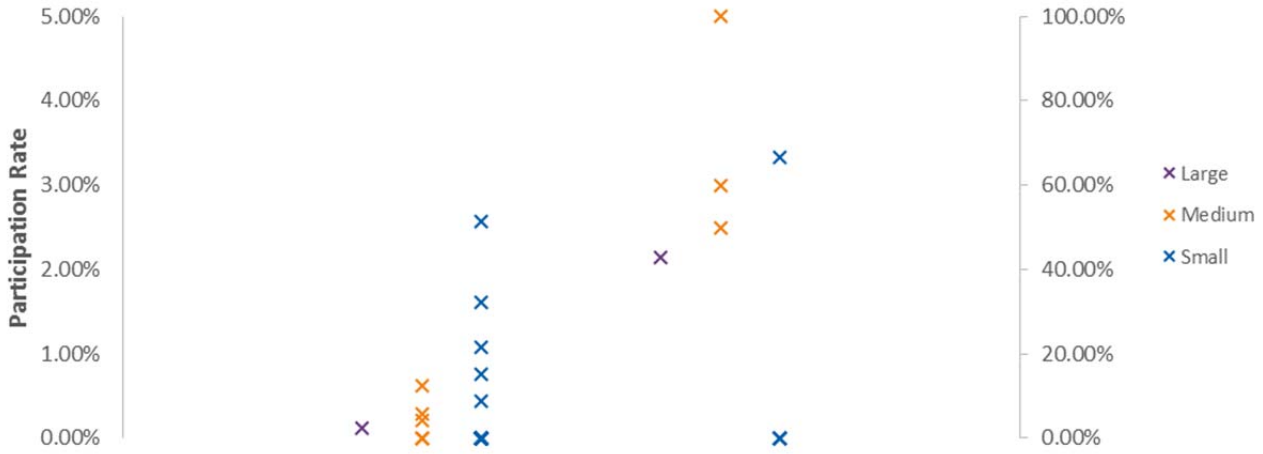
The left vertical axis in Figure 42 shows the percentage of HES audit-only customers, measured as a percentage of audit customers (those who did not install a HES-major weatherization measure) by individual HPC. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. There may be multiple HPCs with values at 0%.

Figure 42. Audit Only Participants and HEAT Loan Participation Rate



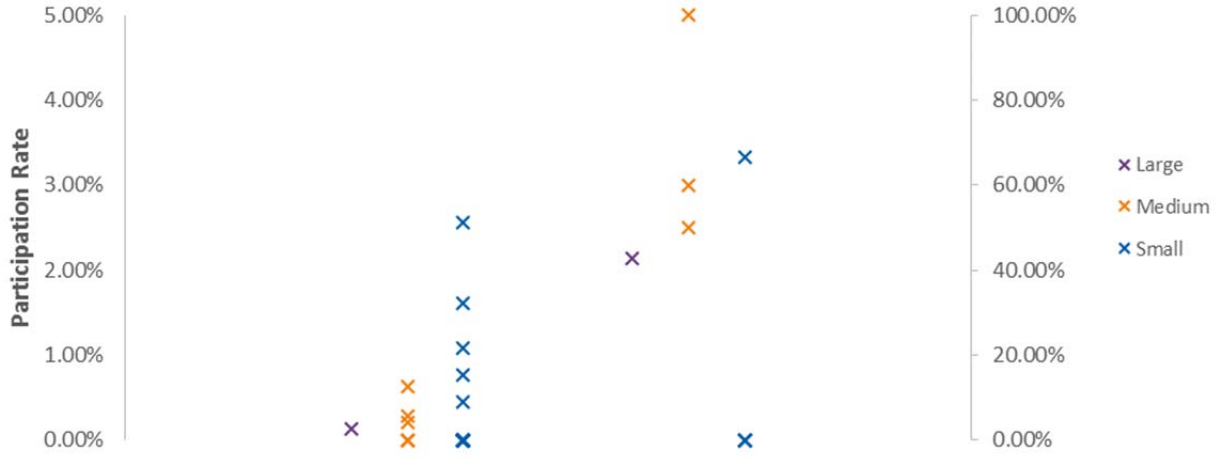
The left vertical axis in Figure 43 shows the percentage of HES audit customers who cross-participated in both HEHE and COOL SMART, measured as a percentage of audit customers. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

Figure 43. Audit-HEHE-COOL SMART Participants and HEAT Loan Participation Rate



The left vertical axis in Figure 44 shows the percentage of HES audit customers who cross-participated in HEHE alone, measured as a percentage of audit customers. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

Figure 44. Audit-HEHE Participants and HEAT Loan Participation Rate



The left vertical axis in Figure 45 shows the percentage of HES audit customers who cross-participated in COOL SMART alone, measured as a percentage of audit customers. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

Figure 45. Audit-COOL SMART Participation, and HEAT Loan Participation Rate

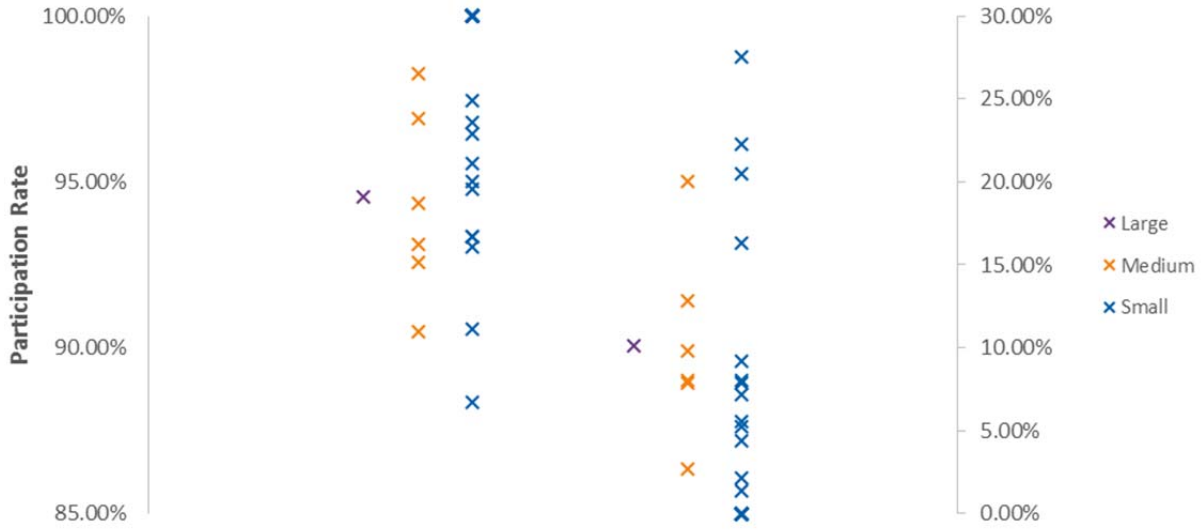
Figure 46 though Figure 49 show the percentage of HES customers by individual HPC who installed a major weatherization measure through HES as well as the HEAT Loan rate by individual HPC. These customers are broken into four groups:

- Weatherization-only customers: those customers installing a HES major weatherization measure
- Weatherization-HEHE-COOL SMART participants: those who installed a HES major weatherization measure and participated in both HEHE and COOL SMART
- Weatherization-HEHE participants: those who installed a HES major weatherization measure and participated in HEHE
- Weatherization-COOL SMART participants: those who installed a HES major weatherization measure and participated in COOL SMART

Scales on the vertical axes differ between figures.

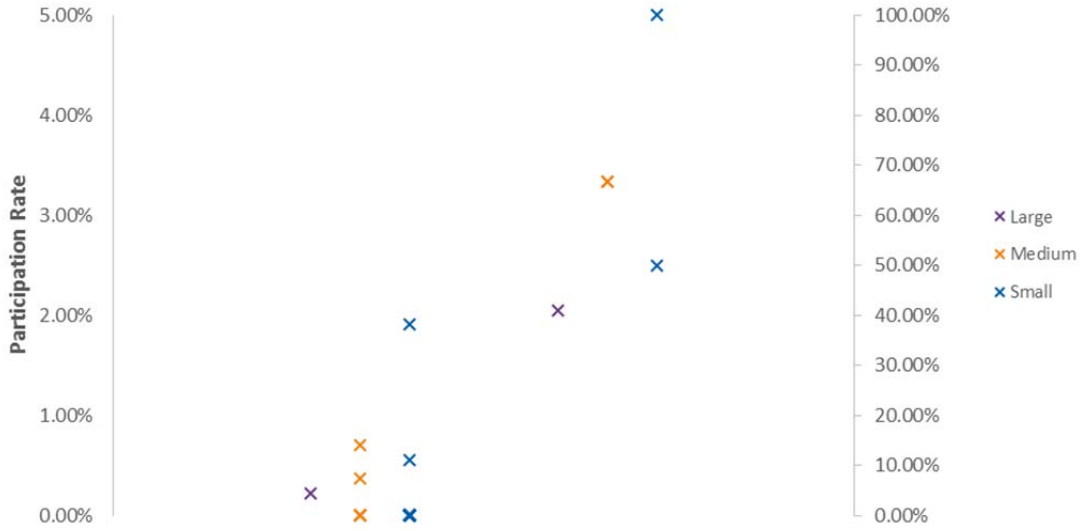
The left vertical axis in Figure 46 shows the percentage of HES-weatherization-only customers by individual HPC. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. There may be multiple HPCs with values at 0%.

Figure 46. Weatherization-Only Participants and HEAT Loan Participation Rate



The left vertical axis in Figure 47 shows the percentage of HES weatherization customers who cross participated in both HEHE and COOL SMART, measured as a percentage of weatherization customers, by individual HPC. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

Figure 47. Weatherization-HEHE-COOL SMART Participants and HEAT Loan Participation Rate

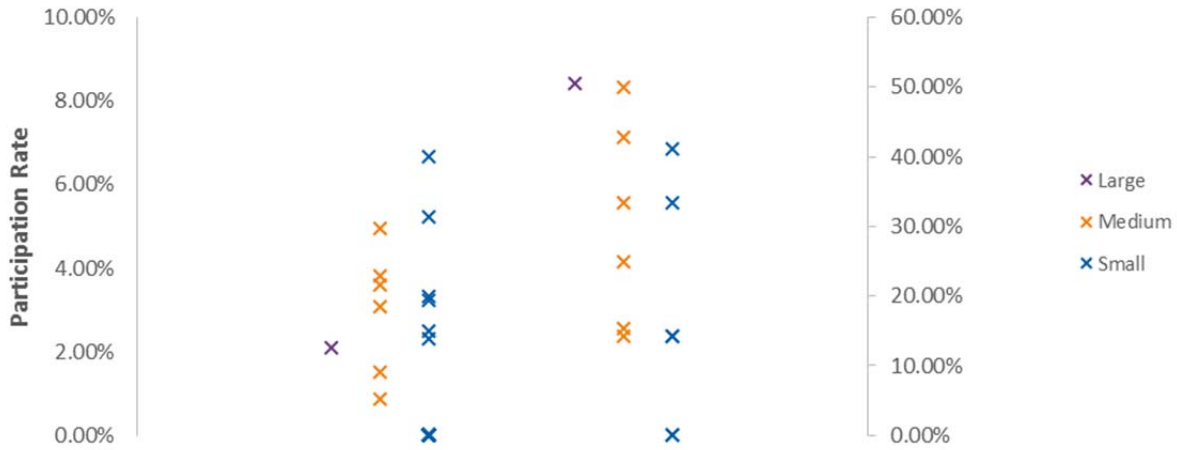


The left vertical axis in Figure 48 shows the percentage of HES weatherization customers who cross-participated in HEHE alone, measured as a percentage of weatherization customers. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

Figure 48. Weatherization-HEHE Participants and HEAT Loan Participation Rate

The left vertical axis in Figure 49 shows the percentage of HES weatherization customers who cross-participated in COOL SMART alone, measured as a percentage of weatherization customers. The right vertical axis shows the percentage of these customers who were HEAT Loan participants. HPCs that did not have any participation in the measured group do not have a recorded HEAT Loan participation rate. There may be multiple HPCs with values at 0%.

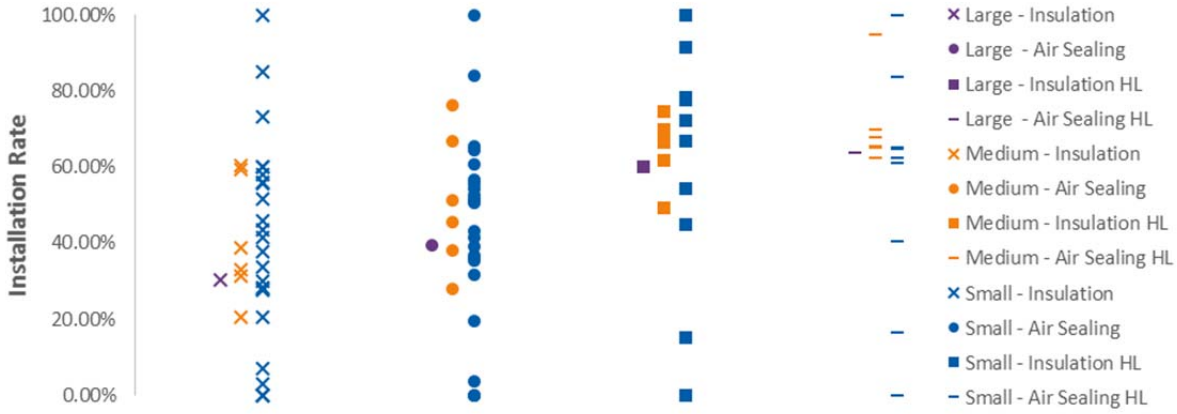
Figure 49. Weatherization-COOL SMART Participation, and HEAT Loan Participation Rate



KPI 4: Installed Savings

Figure 50 shows the installation rate of insulation and air sealing by HPC. Individual HPCs are shown, color-coded by bin size. Installation rates are provided for customers who have or have not received HEAT Loans. The installation rate is defined as the percentage of recommended savings that were successfully installed. There may be multiple HPCs with values at 0%.

Figure 50. Installed Savings



KPIs 6 through 8: Recommended vs. Installed Major Measures

Figure 51 though Figure 56 show the recommendation and installation rate for a selection of major measures. Each figure contains three clusters of data. The left-most cluster is the recommendation rate, measured as the percentage of total participants who were recommended the measure. The center cluster is the installation rate, measured as the percentage of participants who followed through with the recommendation. The right-most cluster shows the percentage of installing customers who received

a HEAT Loan. Individual HPCs are shown, color-coded by bin size. There may be multiple HPCs with values at 0%.

Figure 51. Recommendation and Installation Rate, Attic Insulation

Figure 52. Recommendation and Installation Rate, Basement Insulation

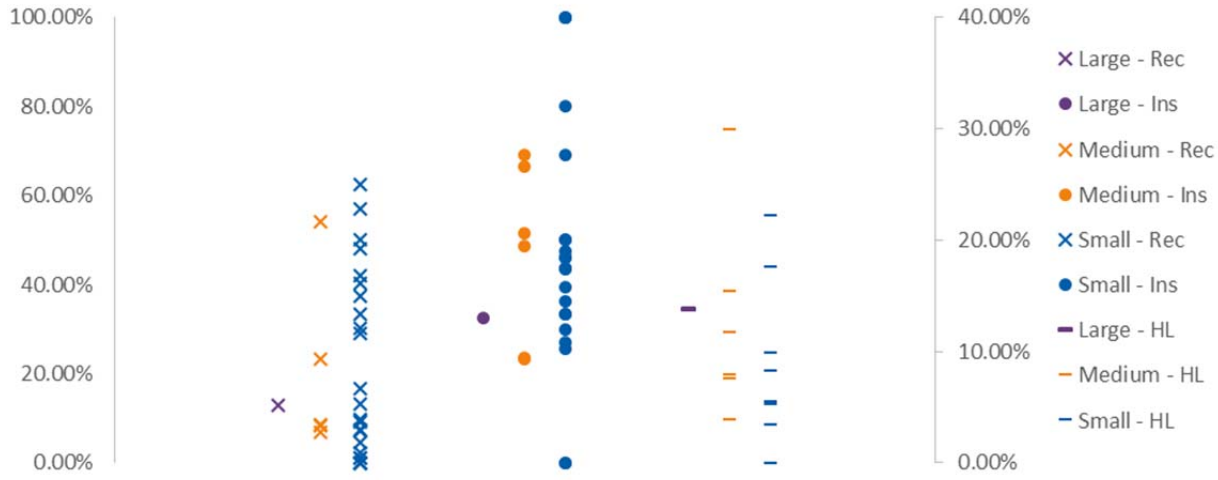


Figure 53. Recommendation and Installation Rate, Wall Insulation

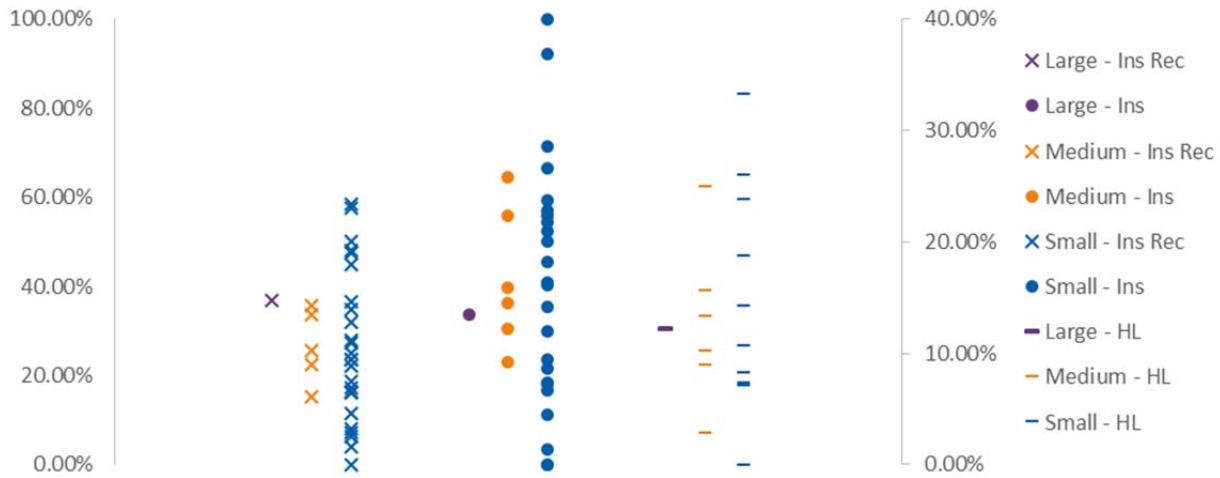


Figure 54. Recommendation and Installation Rate, Air Sealing

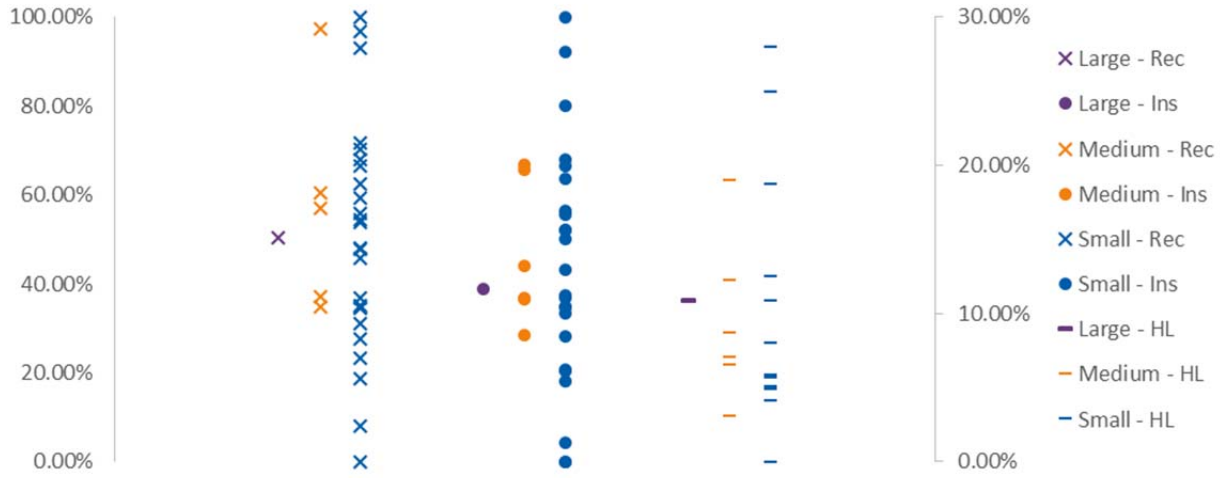


Figure 55. Recommendation and Installation Rate, Heating System through HES

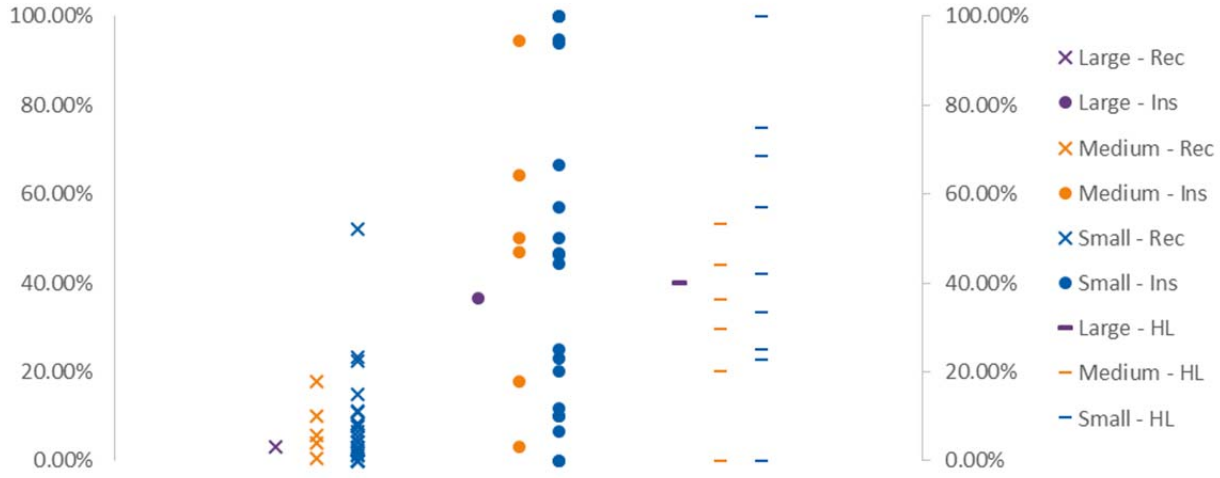
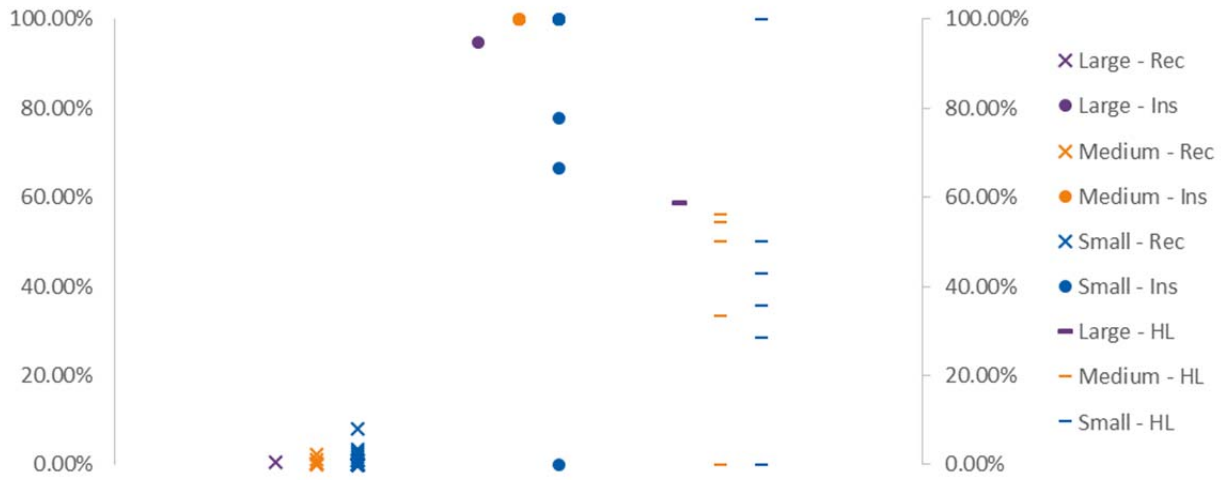


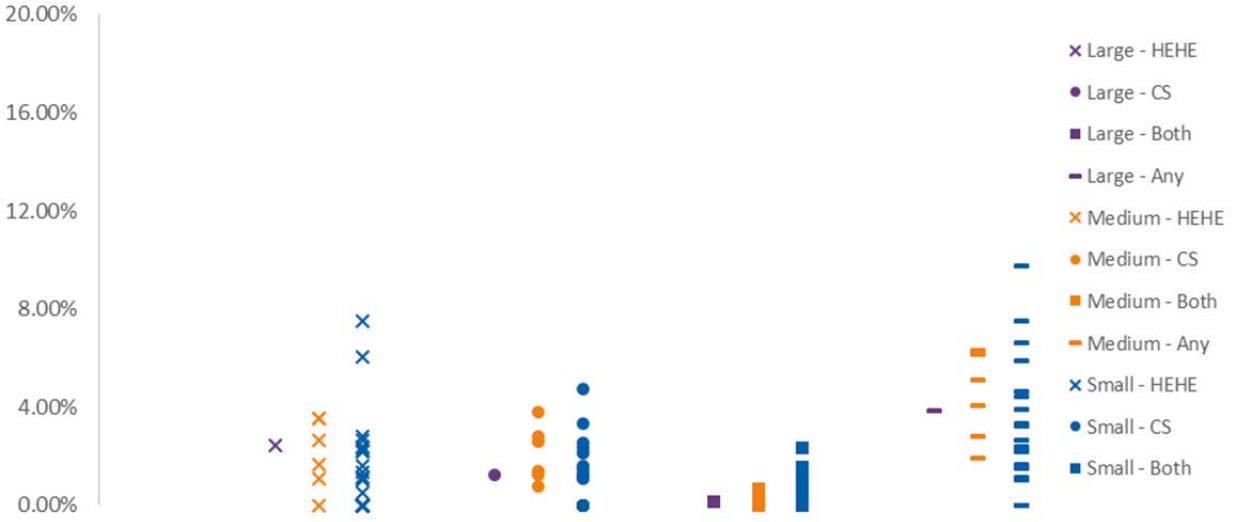
Figure 56. Recommendation and Installation Rate, Water Heating System through HES



KPI 16: Cross-Program Participation

Figure 57 shows the cross-program participation rate by individual HPCs, color-coded by HPC size. Cross-program participation rates are measured as a percentage of total HES participants. There are four clusters of data in the figure—in order left to right are HEHE-only cross-participation, COOL SMART-only cross-participation, HEHE and COOL SMART cross-participation, and cross-participation in either or both program. There may be multiple HPCs with values at 0%.

Figure 57. Cross Program Participation



KPI 17: HEHE Cross-Program Participation by Measure

Figure 58 shows the distribution of HEHE cross-program participation by measure type. Individual HPCs are shown, color-coded by bin size. The left-most data cluster shows the percentage of installed HEHE measures that were heating systems. The right-most cluster shows the value for water heating measures. There may be multiple HPCs with values at 0%.

Figure 58. HEHE Cross-Program Participation by Measure

KPI 18: COOL SMART Cross-Program Participation by Measure

Figure 59 shows the distribution of COOL SMART cross-program participation by measure type. Individual HPCs are shown, color-coded by bin size. In order from left to right, the clusters represent mini-split units, central air conditioners, heat pump water heaters, heat pumps, and dust sealing. There may be multiple HPCs with values at 0%.

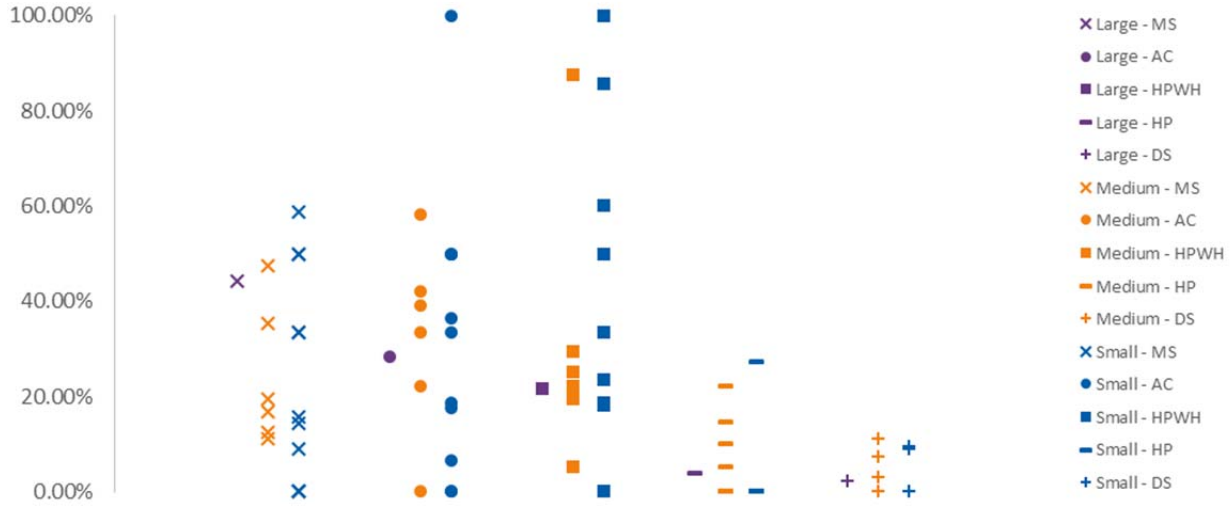



Figure 59. COOL SMART Cross-Program Participation by Measure