

# Moderate Income Market Characterization Survey Findings (RES 40)

**Final Report**

**Prepared for:**

**The Electric and Gas Program Administrators of Massachusetts  
Part of the Residential Evaluation Program Area**

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## EXECUTIVE SUMMARY

### Introduction

The Home Energy Services (HES) initiative targets residential customers living in single family homes (defined as 1-4 units). Sponsored by the Massachusetts Electric and Natural Gas Program Administrators (PAs) under the Mass Save<sup>®</sup> umbrella of programs, HES is a cornerstone of the PAs' residential energy efficiency portfolio. It is the primary mechanism through which most residential customers partner with their PA(s) to improve the efficiency of their home.

Customers that participate in HES receive an in-person home energy assessment (HEA). Through this assessment, an energy specialist or home performance contractor identifies efficiency opportunities in participants' homes and directly installs instant saving measures (ISMs) such as efficient lighting and water heating measures. Customers are also eligible to receive incentives for recommended program-qualifying measures such as heating and cooling equipment upgrades<sup>1</sup> and weatherization measures.

The PAs began providing enhanced incentives to income-eligible households that participate in HES in April 2016. This offering, referred to as the Moderate Income offer, targets customers with incomes between 61% and 80% of the state median income (SMI)<sup>2</sup>. This group will be referred to as "existing Moderate Income". The PAs are also considering expanding the offering to customers with incomes between 80-100% and 100-120% of the SMI. This group will be referred to as "potentially expanded Moderate Income". The enhanced incentives intend to help overcome first cost barriers for income constrained customers that do not qualify for the Low Income program.

All customers receive information about the Moderate Income offer at the end of the HEA, and some receive information by email in advance of the HEA. The packet of information energy specialists and home performance contractors distribute to customers includes a handout describing the enhanced incentives and eligibility requirements. Customers may also find information related to the enhanced incentives on the Mass Save website.<sup>3</sup> To qualify, customers must be income verified. Except for CLC, who does all income verification in-house, the PAs contract with Action for Boston Community Development to conduct the income verification.

The PAs requested the Massachusetts Residential Retrofit evaluation team (Navigant, ILLUME Advising, and Cadeo, hereafter referred to as the evaluation team) to conduct a market study to characterize the population targeted by the Moderate Income offer. The evaluation team designed the study to explore the following research objectives:

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<sup>1</sup> Home Energy Services (HES) offers incentives for oil and propane heating and water heating systems, as well as gas heating equipment retired early. During the HEA, all heating and cooling incentives and rebates are presented to the customer, including those available through the Heating & Cooling program, i.e., rebates for gas heating equipment not retired early and all cooling equipment rebates.

<sup>2</sup> This customer group is not eligible for the low-income program, which serves customers up to 60% of the state medium income (SMI).

<sup>3</sup> Mass Save Energy Assessments, "Enhanced Residential Program," Mass Save, <https://www.masssave.com/en/saving/energy-assessments/enhanced-residential-program/>.

1. Estimate the size of the eligible population within both the existing and potentially expanded moderate income classifications.
2. Describe customer characteristics such as demographics, tenure (rent or own), and awareness and participation in HES and the Moderate Income offering.
3. Assess customer response to the current Moderate Income offering and its requirements.
4. Assess differences between the moderate income groups and those that are income ineligible for the enhanced offering, but could participate in the HES initiative.

The next section describes the evaluation team's approach.

## Research Approach

To address the stated research objectives, the evaluation team used four primary data sources: 1) a residential web-based customer survey; 2) in-person interviews; 3) HES initiative tracking data, and; 4) data collected through the *Massachusetts Residential Baseline Study (RES 1)*.

The evaluation team completed 978 web-based customer surveys. The survey categorized customers by income as follows:

- Low income eligible (up to 60% of SMI)
- Moderate income eligible (61%-80% of SMI)
- Potentially expanded Moderate income eligible (81%-100% and 101%-120% of SMI)
- Income ineligible but able to participate in HES (121% and greater SMI)

To complement the quantitative survey results, the evaluation team completed 22 in-person interviews with a sample of moderate income survey respondents. These interviews probed more deeply into customer's needs, experiences with HES, and perception of the Moderate Income offering.

## Summary of Findings

This summary captures the most notable conclusions resulting from the Moderate Income Market Characterization study, organized by two topics: 1) population characteristics, and; 2) response to the Moderate Income offering.

### *Population Characteristics*

The five points below summarize notable characteristics of the population based on survey responses.

- 1. Just under half (43%) of the population in Massachusetts self-identifies as qualifying for either the existing Moderate Income offer or one of the potentially expanded moderate**

**income groups.** Approximately 299,000<sup>4</sup> Massachusetts households qualify for the existing Moderate Income offering. This represents 16% of Massachusetts’ residential population. Slightly fewer households are in each of the potentially expanded moderate income groups; 14% of Massachusetts’ residential population have income between 81%-100% of SMI, and 13% have income between 101%-120% of SMI (Table 1.).

**Table 1. Estimated Number of Households by Income Group**

Income Group	Income Level	Estimated Number of Households	
Low Income	<60% SMI	492,625 (27%)	
Existing Moderate Income	61%-70% SMI	163,798 (9%)	299,076 (16%)
	71%-80% SMI	135,278 (7%)	
Potentially Expanded Moderate Income (Group 1)	81%-90% SMI	126,050 (7%)	262,205 (14%)
	91%-100% SMI	136,155 (7%)	
Potentially Expanded Moderate Income (Group 2)	101%-110% SMI	132,269 (7%)	244,057 (13%)
	111%-120% SMI	111,788 (6%)	
Income Ineligible (HES Eligible)	121% SMI and greater	520,218 (29%)	
<b>Total</b>		<b>1,818,181</b>	

*Sources: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017) and American Community Survey and American Public Power Association population estimates*

- 2. Customers that fall within the existing moderate income group face greater economic and energy challenges than the higher income households surveyed.** Customers currently classified as moderate income are more likely to report difficulties paying their bills and sacrificing comfort in their home to save on energy costs than households that report higher income levels.
- 3. The existing moderate income group is as likely to receive a HEA and install recommended measures as those with higher incomes.** The survey analysis indicates that other factors, such as homeownership and age of household members, are more likely to influence participation decisions than income. With that said, there may be bias in the survey data resulting from survey mode and/or the source of the selected sample (discussed at the end of this summary and in the Methodology section).
- 4. The existing moderate income group is more likely to cite “affordability” as a participation barrier than those that report higher income.** However, there is limited evidence that affordability may inhibit lower income customers’ ability to install recommended equipment. Customers within the existing moderate income group are more likely to cite affordability as a barrier to participation than customers within higher income groups.

<sup>4</sup> The evaluation team determined the statewide eligible household count from the American Community Survey (ACS), Table B25032, 5-year estimate (2011 – 2015) of Massachusetts Residential Households residing within 1-4 unit buildings (N= 2,020,203), adjusted by 10% to account for population served by municipalities (Massachusetts estimate per American Public Power Association). Income level obtained through customer surveys which used household size and income ranges to define a household’s SMI. The evaluation team used the proportion of customers within each income level to calculated estimated number of households.

5. **Participants’ life stages may correspond with program awareness more than income.** The survey found that there are higher awareness and participation rates by households with individuals 65 and older (potential retirees) than households with children. These survey results corroborated the unique characteristics of the subgroups identified in the in-person interviews (discussed below). Whereas participation rates correlated with income for households with children, there was no such pattern for those with older (65+) household members, indicating income may not be as much an indicator of action for this group at their stage of life. The survey also found that home-ownership and the amount of time in their homes are more influential on HEA participation than income.
6. **Household characteristics other than income may be a greater determinant of whether customers install energy efficiency measures.** The 22 in-person interviews provided deeper insight into customers’ situations and experiences. These qualitative interviews did not reveal any meaningful differences in interview responses across the three income classifications (61%-80%, 81%-100%, and 101%-120% of SMI); however, the research corroborated the survey findings and highlighted that customers’ individual characteristics drive their perceptions and decision-making processes more than income. For example, the evaluation team observed that customers’ disposable income and amount of free time affected energy efficiency decisions more than their income.

To illustrate this point, Table 2 compares two demographic subgroups identified through the in-person interviews: retirees and young heads of households. These households may have similar income levels, but they have unique financial and household characteristics that affect their attitudes, awareness, and receptivity to program participation and their energy efficiency decisions.

**Table 2. Moderate Income Subgroups and Associated Characteristics**

Subgroup	Common Characteristics
Retirees/senior citizens	<ul style="list-style-type: none"> <li>• Have planned savings and budgets</li> <li>• Have more free time</li> <li>• Are more aware and likely to participate in an HEA</li> <li>• Report being open to income verification processes if they know it will help them save money</li> </ul>
Young heads of households (with and without children)	<ul style="list-style-type: none"> <li>• Have little disposable income</li> <li>• Have minimal free time</li> <li>• Are generally aware of energy efficiency; however, efficiency decisions often take a back seat to other priorities</li> <li>• Are not as aware of the HEA</li> <li>• Indicate that the decision to participate is dependent on the perceived value they will receive for their time</li> </ul>

Source: Evaluation team analysis of in-person interviews

### **Response to Moderate Income Offering**

The following three points highlight the findings from survey respondents related to the Moderate Income offering.

**7. Customer time and availability, perception of their need for energy efficiency, and need for more information are the greatest barriers to participation in the Moderate Income offering.**

Participating in an HEA requires customers to be home for the assessment. Customers most frequently mentioned this time and availability requirement as a barrier to participation. The concern around the time it would take to participate in the assessment also emerged through the in-person interviews, particularly from younger interviewees who wanted to make sure the value they receive is worth the amount of time they need to commit to the process.

The most notable barrier to installation of recommended measures is customers' belief that they do not need the equipment. Additionally, the incentive for appliances may not be sufficient to encourage installation. The in-person interviews found that customers appreciate the higher value incentive, particularly the high incentive for insulation. However, for appliances, many interviewees expressed that the rebate value is not worth their time to go through with purchasing the equipment through the program.

**8. The income verification process and perception of eligibility may be a barrier to participating in the Moderate Income offering. Personalized and more in-depth discussion on the requirements may help to overcome that barrier.**

About one-third of customers that responded to the survey said they would be unlikely to go through the income verification process after learning about the enhanced incentive offerings. In addition to thinking that they would not qualify, they cited privacy concerns. The in-person interviews indicated that having someone explain the process to them could be useful to overcoming concerns. The HES Process Evaluation currently under way (RES 35) found that energy specialists and home performance contractors do not typically address the Moderate Income offering at the end of an HEA. Rather, they provide the information in a packet with a cursory reference to the offering. It may be valuable to provide these contractors specific training, guidance, and tools to communicate the enhanced incentive offering and explain the income verification process to HEA recipients.

**9. Customer trust in their PA and positive prior experiences drive willingness to participate.**

Trust is a theme that came out of the in-person interviews and the open-ended comments in the survey. Trust often results from positive prior experience with a PA and/or PA programs. In-depth interviewees that had positive experiences seemed more willing to participate in an HEA and less hesitant to complete the income verification process. This finding impresses the importance of engaging with sources trustworthy to these customers to communicate relevant information and encourage participation in the Moderate Income offering.

## Next Steps

This Moderate Income Market Characterization study found high awareness of the HEA (approximately 70%). The *2016 Massachusetts Statewide Marketing Campaign* post-campaign study<sup>5</sup> found similar levels of awareness for customers that responded to the web-based survey. However, the *Statewide Marketing Campaign* study also found significantly lower awareness for customers that responded to the survey via telephone. These findings indicate that awareness and participation results identified within this Moderate Income Market Characterization study may be upwardly biased due to the online survey format (documented in Section 1.2, "Study Methodology").

<sup>5</sup> Ellen Steiner, "2016 Massachusetts Statewide Marketing Campaign: Post-Campaign Report," Opinion Dynamics, March 14, 2017, <http://ma-eeac.org/wordpress/wp-content/uploads/PY2016-Mass-Save-Awareness-Campaign-Report-1.pdf>.

The evaluation team is coordinating with the Massachusetts' Cross-Cutting Evaluation Team to leverage the next Statewide Marketing Campaign study to assess program awareness and participation by income level. Using the same multi-mode methodology, this survey should be sufficient to validate whether modal bias exists in this Moderate Income Market Characterization study.

It is also important to remember that this Moderate Income study sampled from a group of customers that already responded to a survey related to their energy use, the RES 1 Baseline survey. The Res 1 Baseline survey clearly mentioned energy efficiency issues and Mass Save. It is possible that this baseline survey groups' awareness (and subsequent participation) was higher than the general population. If so, using those survey respondents as the basis of this study's sample frame would inherently introduce bias. Further, there may be some additional bias resulting from re-surveying customers from that prior study if awareness and participation increased *due to* their interaction with the survey.

Additionally, this Moderate Income Market Characterization study explored, but did not conclusively identify, the effectiveness of the enhanced incentive on customers' decisions to install recommended measures. The upcoming survey planned for the HES Process Evaluation will capture data related to the enhanced incentive's influence on Moderate Income offering participants' decisions to install recommended measures. This analysis will serve as another reference point for PAs' consideration when developing or revising implementation strategies.

The 2017 Statewide Marketing Campaign and HES Process Evaluation surveys should be complete by mid-February 2018. The evaluation team will share the findings with the PAs once the data is available.

## 1. INTRODUCTION

The Home Energy Services (HES) initiative is a cornerstone of the Massachusetts Program Administrators' (PAs) residential energy efficiency portfolio. It is the primary mechanism through which most residential customers partner with their PA(s) to improve the efficiency of their home. Through the initiative's home energy assessment (HEA), the PAs identify efficiency opportunities such as heating and cooling equipment upgrades,<sup>6</sup> weatherization measures, and direct installation of instant saving measures (ISMs) including efficient lighting and water heating measures.

Under the HES initiative, the PAs began providing enhanced incentives to income-eligible households through the Moderate Income offer in April 2016. The PAs designed this offer to help overcome first cost barriers for income constrained customers that do not qualify for the Low Income program.

This offer targets customers with incomes between 61% and 80% of the state median income (SMI is based on income and the number of household members) that reside in 1-4 unit buildings. This report refers to this group as *existing Moderate Income customers*. The PAs are also considering expanding the offering to customers with incomes between 80-100% and 100-120% of the SMI. This report refers to this group as *potentially expanded Moderate Income customers*.

Customers generally receive information related to the Moderate Income offer's enhanced incentives and participation requirements at the end of the HEA or in emails prior to the HEA. The energy specialist or home performance contractor who conducts the HEA provides each customer a packet of information including a description of this offering. Customers may also find information related to the enhanced incentives on the Mass Save website.<sup>7</sup>

Except for CLC, who does all income verification in-house, the PAs contract with Action for Boston Community Development to conduct the income verification. To qualify for the enhanced incentives, customers must complete this income verification process.

At the time this study began, the offer provided qualifying customers the enhanced incentives shown in Table 1-1, which include weatherization measures, efficient refrigerators, and efficient clothes washers. Consequently, the web survey presented these incentive levels to respondents. Since the team completed the survey, the PAs modified their enhanced insulation incentive to cover a higher portion of the insulation. At the time of this reporting, Berkshire Gas, Liberty, and Columbia Gas cover 100% of the insulation costs up to \$3,000. Unitil covers 90% of the cost of insulation up to \$3,000. The remaining PAs cover 100% of the cost of insulation with no cap (no cost to customers).

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<sup>6</sup> Home Energy Services (HES) offers incentives for oil and propane heating and water heating systems, as well as gas heating equipment retired early. During the HEA, all heating and cooling incentives and rebates are presented to the customer, including those available through the Heating & Cooling program, i.e., rebates for gas heating equipment not retired early and all cooling equipment rebates.

<sup>7</sup> Mass Save Energy Assessments, "Enhanced Residential Program," Mass Save, <https://www.masssave.com/en/saving/energy-assessments/enhanced-residential-program/>.

Table 1-1. Moderate Income vs. Standard HES Incentives\*\*

Upgrade	Enhanced Offer Rebate (for Income Qualified Customers)	Standard Offer Rebate
Insulation	90% of the cost of approved insulation (up to \$3,000)	75% of the cost of approved insulation (up to \$2,000)
Refrigerator Replacement*	\$200 rebate	\$150 rebate
Clothes washer replacement*	\$400 rebate	\$350 rebate

\*The enhanced refrigerator and clothes washer replacement rebates are only available to customers who complete insulation recommendations.

\*\* This table reflects rebate values shown to survey respondents. The PAs modified the insulation rebate values since survey implementation. Please refer to the report text for details on rebate values at the time of this reporting.

## 1.1 Study Goals and Research Objectives

The PAs engaged the evaluation team to provide this market characterization study with two primary objectives. First, the PAs sought to estimate the market size of customers eligible for both the existing Moderate Income offering, as well as the two potentially expanded Moderate Income offerings (between 80%-100% and 100%-120% of SMI). Second, the PAs wanted to explore customers' response to the Moderate Income offering. Participation in the Moderate Income offering has been lower than expected, as indicated by the number of customers taking advantage of the Moderate Income offerings and through the *HES Process Evaluation (RES 35)* currently underway.

To address these needs, this market characterization study aimed to provide a deeper understanding of moderate income customers within the income classifications described above and to identify their awareness of utility energy efficiency programs and their specific energy efficiency needs. The evaluation team designed this study to meet the following objectives:

- Estimate the size of the eligible population within both the existing and potentially expanded moderate income classifications.
- Describe customer characteristics, such as demographics, tenure in home, and awareness and participation in HES and the Moderate Income offering.
- Assess customer response to the Moderate Income offering and its requirements.
- Assess differences between the three moderate income classifications and those that are income ineligible for the enhanced offering, but could participate in the HES initiative.

Considering these objectives, this study sought to answer the specific research questions described below, classified into two categories: 1) population characteristics and 2) program awareness.<sup>8</sup>

### 1.1.1 Population Characteristics

- Approximately how many Massachusetts residents residing in 1-4 unit homes could qualify for the existing Moderate Income offering?

<sup>8</sup> Note that this report includes a slightly revised version of the research questions. The team revised questions for brevity and clarity and to remove minor elements not addressed due to prioritizations in the survey design process.

- How many of the residents fall within the existing moderate income level (61%-80% of SMI), the two potentially expanded levels (81%-100% of SMI and 101%-120% of SMI), and more granular levels of SMI (e.g., 110%-120% of SMI)?
- What proportion of all customers eligible for the existing Moderate Income offer fall within the following market segments: 1) urban vs. rural; 2) renter vs. owner; and 3) single family vs. two to four unit buildings? How do these characteristics differ by the income segments?

### 1.1.2 Program Awareness, Participation, and Needs

- What is the level of awareness of the Moderate Income offering and HES initiative?
- What proportion of the customers received an HEA? If they participated after April 2016, were they made aware of the Moderate Income offering?
- What proportion of existing Moderate Income offer-qualifying participants installed measures through the HES and Moderate Income offering?
- What are the barriers to participating in the Moderate Income offering?
- What are moderate income customers' relative priorities related to energy? How do they rate and rank expenditures relative to each other?
- What proportion of customers utilize social programs and energy assistance programs?
- How does concern over energy costs differ between the groups?

## 1.2 Study Methodology

Two data collection efforts informed this study: quantitative customer surveys and qualitative in-person interviews. The following subsections detail the sampling and research approach for each activity. The research also leveraged survey results captured through the *Residential Baseline Study (RES 1)* and HES participant tracking data from 2014 through 2016.

### 1.2.1 Customer Survey

The team completed customer surveys to estimate the SMI levels of Massachusetts' residential customers in 1-4 unit homes, gauge customer awareness and participation in an HEA, and gather information on customers' energy concerns and priorities.

#### 1.2.1.1 Sampling

The evaluation team designed this study to achieve a precision of  $\pm 10\%$  at the 90% confidence interval within the income levels (<61% of SMI, 61%-80% of SMI, 81%-100% of SMI, 101%-120% of SMI, and 121% or greater of SMI). The sampling strategy described below documents the data source and selection process to achieve this level of precision. This report documents where differences of statistics are statistically significant at the 90% confidence level.

The evaluation team is currently leading a *Residential Baseline Study*, which included a survey of Massachusetts PAs' residential customers. The baseline survey collected information related to

household characteristics and equipment usage from over 6,800 customers. Customers completed this survey via the web.

The evaluation team used the pool of completed surveys from the Residential Baseline Study as a sample frame for this study. This was ideal for several reasons.

- The evaluation team could leverage already collected data including household size, income ranges, contact information, and email addresses to support sampling, data collection, and analysis.
- The starting sample size was sufficiently large to ensure sufficient responses to produce statistically valid results.
- These customers recently completed a Massachusetts PA-sponsored survey and would likely respond to a similar request, making the survey more cost- and time-efficient.

Starting with the full population of *Residential Baseline Study* completed surveys, the evaluation team removed potential survey participants for the following reasons:

- **Household reports residing in 5+-unit buildings:** Removed as customers that reside in multi-family properties (defined as 5+ units) are ineligible for HES.
- **Respondents did not report income and/or number of household members when completing the *Residential Baseline Study* survey:** Removed given the refusal or inability to characterize their potential income qualification eligibility, which is a critical data point for this study.
- **Household participated in an onsite visit as part of the *Residential Baseline Study*:** Removed to reduce respondent burden given the considerable time they dedicated to the *Residential Baseline Study*.

Table 1-2 documents the starting sample pool from the *Residential Baseline Study*, the count of those removed for each of the above reasons and resulting number of respondents remaining in the sample pool. The evaluation team selected the Moderate Income study sample from this population.

**Table 1-2. Reasons Cases Removed from *Residential Baseline Study* Data Prior to Sampling**

Potential Survey Population and Reason for Removal	Respondents
Residential Baseline Study Completed Surveys	6,858
Reside in 5+ Unit Building	- 688
No Income and/or Household Size Reported	- 2,091
Included in the Onsite Sample	- 233
<b>Final Adjusted Population for Moderate Income Survey</b>	<b>3,846</b>

Source: Evaluation team analysis of *Residential Baseline Study* survey data

The evaluation team used household size, income range data, and the Massachusetts guidelines for calculating a household's SMI to identify customers that may potentially qualify at or below 120% of the SMI from the final adjusted potential starting sample. Table 1-3 documents the criteria identified for classifying these households as potentially income-eligible and the count of respondents within the sample population.

The evaluation team took a census of customers that fall within the three income eligible classifications to maximize the potential for speaking with income-qualifying customers. The team also selected a random sample of the remaining households estimated to be income ineligible to ensure representation of this HES-eligible group that had incomes below 120% SMI. This higher income serves as a comparison to the lower income counterparts.

**Table 1-3. Sample Frame by Income Range and Household Size**

Potential Group	Income and Household Size Criteria	Group Size*	Sampling Strategy
Income-Eligible (Potentially at or below 120% SMI)	Income <\$75,000	1,613	Census
	Income \$75,000-\$99,000 with two or more household members	611	Census
	Income \$100,000-\$150,000 with four or more household members	241	Census
Income-Ineligible 121% SMI and higher (HES-Eligible) **	All other households (likely not income-eligible but HES-eligible)	1,381	Random
<b>Total</b>		<b>3,846</b>	

\*Within the final Moderate Income Market Characterization sample frame.

\*\*HES-Eligible includes all customers living in 1-4 unit buildings who the evaluation team estimated would not qualify for low or moderate income offers.

Source: Evaluation team analysis of Residential Baseline Study survey data

The team estimated population sizes reflected in Table 1-3 based on the *Residential Baseline Study* survey data responses. The team used the Moderate Income survey to verify each customer’s SMI using discrete income ranges and household sizes. This allowed the team to estimate each responding household’s percentage of the SMI within 10% increments (see the Section 1.2.1.2, “Survey Methodology,” for more details on this approach).

The Moderate Income Market Characterization survey population was inherently biased toward lower income customers given the sampling strategy—which included a census of all customers that classify at or below 120% of SMI.<sup>9</sup> Therefore, the evaluation team post-weighted the survey to correct for this overrepresentation. Appendix A presents the weighting approach.

### 1.2.1.2 Survey Methodology

The evaluation team notified customers of the Moderate Income survey through both an advanced postcard and an email. The notification informed potential respondents that the research would focus on household characteristics and familiarity with current energy programs to support their PA’s efforts to better-design energy programs that meet their needs and offered an incentive for completing the online survey.

<sup>9</sup> Assuming the *Residential Baseline Study* survey was representative of the Massachusetts population in terms of household size and income.

The advanced postcard invited customers to complete the survey online;<sup>10</sup> however, the postcard also offered an option to call a member of the evaluation team if they preferred to complete the survey via telephone. All customers that completed a survey received a \$25 Amazon gift card.

The evaluation team received quick responses to the survey invitation. The survey, which ran from August 25 to September 8, solicited 978 total responses, a 25% response rate.

To classify customers' SMI, the survey asked respondents how many individuals live in the home. The survey then auto-populated with income ranges relevant to SMI levels based on reported household size. Table 1-4 shows the associated SMI level, categorization and number of completed surveys by income group.

**Table 1-4. Survey Completes by Income Group**

Categorization	SMI Level	Number of Survey Completes
Low Income	At or below 60% of SMI	210
Moderate Income	61%-80% of SMI	186
Potentially Expanded Moderate Income Eligible Group 1	81%-100% of SMI	176
Potentially Expanded Moderate Income Eligible Group 2	101%-120% of SMI	169
Income-ineligible, Home Energy Services (HES) eligible	121% of SMI and greater	237
<b>Total</b>		<b>978</b>

Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

### 1.2.1.3 Potential Bias in Survey Results

In analyzing data and reporting study results it is always important to critically assess and document where biases may exist. Bias can occur at any stage of research. The types of biases include, but are not limited to, selection bias, interviewer or survey bias, non-response bias, and recall bias.

Through analysis of the data collected for this Moderate Income Market Characterization study, the evaluation team identified that there may be survey modal bias in the quantitative survey which may affect the findings around awareness and participation. In other words, bias will exist if the survey mode tends to exclude customers that are systematically different from the respondent group.

Customers responded to the Moderate Income Market Characterization survey online. There is evidence that customers that complete surveys online are more likely to be aware of Massachusetts programming. Specifically, the 2016 Massachusetts Statewide Marketing Campaign post-campaign study<sup>11</sup> used multiple modes to survey residential customers (telephone and online surveys). The report found significant differences in program awareness based on survey mode, with the online survey reporting

<sup>10</sup> Navigant programmed the survey using Qualtrics software.

<sup>11</sup> Ellen Steiner, "2016 Massachusetts Statewide Marketing Campaign: Post-Campaign Report," Opinion Dynamics, March 14, 2017, <http://ma-eeac.org/wordpress/wp-content/uploads/PY2016-Mass-Save-Awareness-Campaign-Report-1.pdf>.

significantly higher levels of awareness of Mass Save. Note that the reported level of awareness among online respondents in the report is similar to levels found in this study (see Section 2.3, “HEA Awareness, Participation, and Measure Installation”).

**Table 1-5. Awareness of Mass Save by Survey Mode  
(per 2016 Statewide Marketing Campaign Report)<sup>a</sup>**

Mode	Percent Aware of Mass Save
Telephone survey, inbound calls (n=76)	49%
Telephone survey, outbound calls (n=220)	58%
Online survey (n=311)	70%

Source: 2016 Massachusetts Statewide Marketing Campaign Report, page 14

<sup>a</sup> Differences between telephone survey and online survey awareness are statistically significantly different.

Given the results of the 2016 Massachusetts Statewide Marketing Campaign, there is reason to suspect that the percentage of survey respondents from this study who reported awareness of (and subsequently participation in) an HEA may be artificially high.

It is also important to remember that this Moderate Income study sampled from a group of customers that already responded to a survey related to their energy use, the RES 1 Baseline survey. The Res 1 Baseline survey clearly mentioned energy efficiency issues and Mass Save. It is possible that this baseline survey groups’ awareness (and subsequent participation) was higher than the general population. If so, using those survey respondents as the basis of this study’s sample frame would inherently introduce bias. Further, there may be some additional bias resulting from re-surveying customers from that prior study if awareness and participation increased *due to* their interaction with the survey.

The Massachusetts PAs plan to complete another statewide marketing campaign study starting in January 2018. The study will employ multiple modes to collect survey data. The evaluation team is coordinating with the marketing cross-cutting team (led by ILLUME) to gather information to determine customer’s SMI level using the same approach as this study. As a result, the evaluation team will be able to analyze awareness and participation rates by SMI grouping. The results of the marketing study will be useful in providing an additional resource to compare awareness and participation for the income groups of interest.

### 1.2.2 In-Person Interviews

The evaluation team completed 22 in-person interviews out of the 25 scheduled.<sup>12</sup> The on-line customer survey included a series of questions at the end, soliciting interest in the in-person interviews and serving as source of customer recruitment. The in-person interviews targeted four geographic areas: Springfield, Worcester, Cape Cod, and Greater Boston. The evaluation team selected these areas as they collectively offered the appropriate balance of statewide representation and cost-effective travel logistics. Customers received a \$75 incentive as compensation for their time to complete the approximately 1 hour in-person interview.

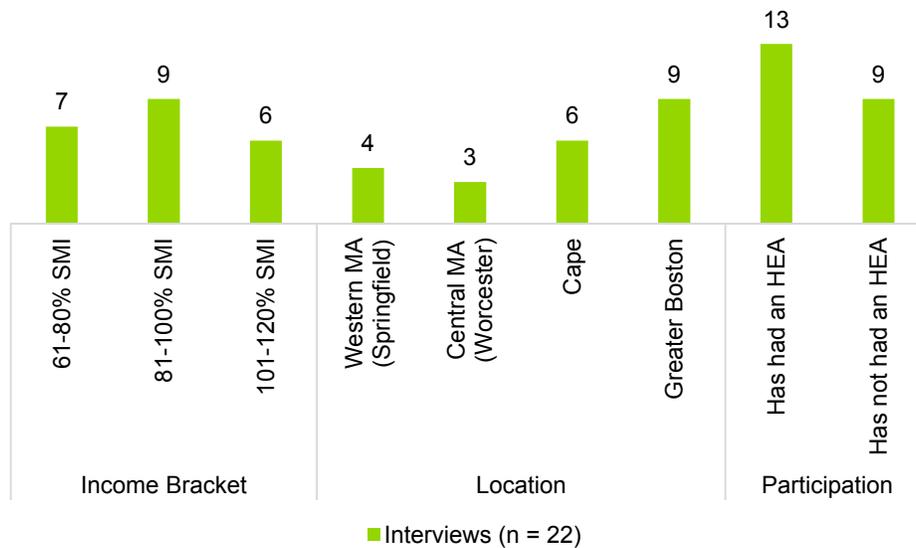
<sup>12</sup> Three scheduled interviews cancelled due to either a change in the customer’s schedule, the customer not showing up at the meeting time and place, or the customer deciding not to go forward with the interview once the interview team was onsite.

The qualitative in-person interviews expanded on the quantitative customer survey research to more fully explore customers’:

- Relationship with energy;
- Preferred channels for receiving information;
- Awareness of HES;
- Response to Moderate Income incentives and offer structure, and;
- Perception of the income verification process.

The in-person interviews yielded qualitative findings. In other words, the team completed the interviews to learn customer anecdotes and narratives, which offer an important complement to the quantitative survey, but are not statistically representative of the population. Figure 1-1 summarizes interviewed customers by their moderate income classification, where they live, and whether they previously completed an HEA.

Figure 1-1. In-Person Interview Distribution



Source: In-person Interviews

## 2. RESULTS

This section presents the overarching findings and detailed results gleaned from the customer survey and in-person interviews, organized within the following research areas:

- Population size and characteristics
- HEA awareness, participation, and measure installation
- Awareness and perception of Moderate Income offering
- Customer finances and relationship with energy

### 2.1 Summary Results by Research Questions

This section presents a brief response to each of the research questions. The following sections provide the detailed data supporting these take-away results.

**How many Massachusetts residents residing in 1-4 unit homes could qualify for the existing Moderate Income offering?** According to the team's analysis, approximately 299,000 households have incomes between 61%-80% of SMI. Except for Liberty, there are no statistically significant differences in proportion of customers eligible for the existing Moderate Income offering by PA. Liberty has a significantly low proportion of customers eligible for the Moderate Income offering; however, it is worth noting that they also have significantly high proportion of customers that are low income (at or below 60% of SMI).

**How many residents fall within the other income segments (81%-100% of SMI and 101%-120% of SMI)?** Approximately 255,000 and 236,000 customers could qualify for the Moderate Income offering if expanded to 81%-100% of SMI and 101%-120% of SMI, respectively.

**What proportion of current Moderate Income customers fall within urban/rural, renter/owner, and single family/multi-family segments?** Most customers eligible for the Moderate Income offer reside in urban or clustered urban regions, own their homes, and reside in single family (1-unit) properties. This is also the case for low-income and non-income eligible residents. The percentage of owners increases slightly at higher income levels, although differences are not statistically significant across income groups.

**What is the level of awareness of the Moderate Income offering and HES initiative?** The survey, which we have noted may be biased towards awareness, found high awareness of HES; over 70% of customers said they are aware of the initiative. Income ineligible customers—those above 120% SMI—are more likely to be aware than other income categories, but only by about 10 percentage points.<sup>13</sup>

**What proportion of customers previously received an HEA? If they participated after April 2016, were they made aware of the Moderate Income offering?** About half of the online survey respondents reported previously receiving an HEA, and all in-person interview participants confirmed their participation

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<sup>13</sup> The evaluation team continues to investigate whether the high awareness is accurate or could represent modal or other bias.

in an HEA. Of those that reported incomes between 61%-120% SMI that received an HEA after April 2016 (n = 83), about 56% said their energy specialist informed them of the Moderate Income offering.

**What proportion of Moderate Income program-qualifying participants installed measures through the HES and Moderate Income offering?** Nearly half of HEA participants installed a recommended measure.<sup>14</sup> Customers in the lower income range are as likely to install insulation and air sealing measures as their higher income counterparts; installation rate did not vary significantly by income levels.

**What are the barriers to participating in the Moderate Income offering?** The most commonly stated barriers to participation are time and availability requirements for the HEA assessment. Customers also commented that they do not need the equipment and that the value of the rebate is not worth their time. The income verification process may also be a barrier. About 30% said they would be unlikely to go through the income verification process<sup>15</sup> citing reasons such as they do not think they would qualify and are concerned about privacy. The in-person interviews, which probed on this issue, indicated that having a trusted advisor (such as their PA, the HES Energy Specialist or Home Performance Contractor, or a community-based organization) explain the process may have been important to overcome any concerns.

**What are customers' relative priorities related to energy? How do they rate and rank energy affordability, comfort, health, and security concerns relative to each other?** Customers cite energy costs as a relatively high priority compared with many expenses. Mortgage or rent and groceries are the only expenses that ranked higher than energy costs. This finding remained true across all customers, regardless of income group.

**What proportion of customers utilize social programs?** Few customers with incomes over 60% SMI participated in social service programs. Customers eligible for the existing Moderate Income offering most commonly reported receiving social security income and government housing assistance (7% and 6%, respectively).

**How does concern over energy costs differ between the groups?** Customers that qualify for the existing Moderate Income offering reported more economic constraints than the other groups interviewed. Customers in the 61%-80% of SMI income group are significantly more likely than other income groups to report choosing to be uncomfortable in their home to reduce energy costs. Additionally, these customers reported more difficulty paying their expenses.

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<sup>14</sup> This analysis only includes customers included in the 2014–2016 HES tracking data. The HES tracking data provided to the evaluation team represents 2014–2016 installs only. The survey did not capture installation date; therefore, it is likely unmatched cases are outside of the tracking data range.

<sup>15</sup> Rating their likelihood on a 1 or 2 on a 5-point scale where 5 is very likely.

## 2.2 Population Size and Characteristics

This section describes the population size of the income groups and details the demographic characteristics of each.

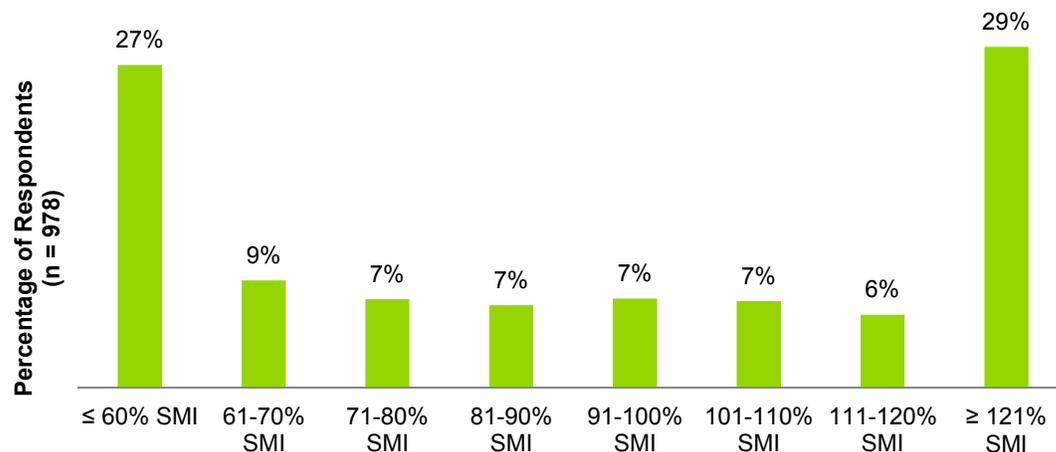
### 2.2.1 Population Size by Income Groups

The evaluation team gathered data through the survey to estimate the size of Massachusetts' population by the following SMI groupings:

- ≤60% of SMI
- 61%-120% of SMI, in 10% buckets (e.g., 61%-70%)
- ≥121% of SMI

Under half of single family residential customers (43%) report incomes within the 61% to 120% SMI group (Figure 2-1). About 16% of customers likely qualify for the existing Moderate Income offering, with incomes falling between 61%-80% of SMI. Similar percentages categorize the two potential moderate income categories up to 120% of SMI. The remaining two customer groups, low income eligible and income ineligible groups, are relatively evenly split. As a reminder, these statistics only represent households residing in 1-4 unit buildings.

Figure 2-1. Income Group Distribution



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

The evaluation team used the percentages derived from the survey to calculate the total number of eligible households per income group. To do so, the evaluation team referred to the American Community Survey (ACS) 5-year estimate (2011 – 2015), which provided housing count estimates by the number of units in a building structure.<sup>16</sup> The ACS estimates 2,020,203 Massachusetts households that occupy 1-4 unit buildings. However, the Massachusetts PAs do not serve all households in the state; public utilities

<sup>16</sup> American Community Survey (ACS), 5-year estimate (2011–2015), Table B25032, accounting for 1-4 unit households only.

service a portion of customers. Based on Massachusetts-specific estimates reported by the American Public Power Association (APPA), the evaluation team reduced the population by 10% to account for these customers.<sup>17</sup>

Applying the survey-estimated percentages to population counts derived from the ACS and APPA data resulted in population size estimates for each of the income groups. According to the team’s analysis, approximately 299,077 households are eligible for the existing Moderate Income offering. The team also found that expanding the offering to include customers up to 120% of the SMI would increase the eligible population by approximately 500,000 households (Table 2-1).

**Table 2-1. Estimated Number of Households by Income Group**

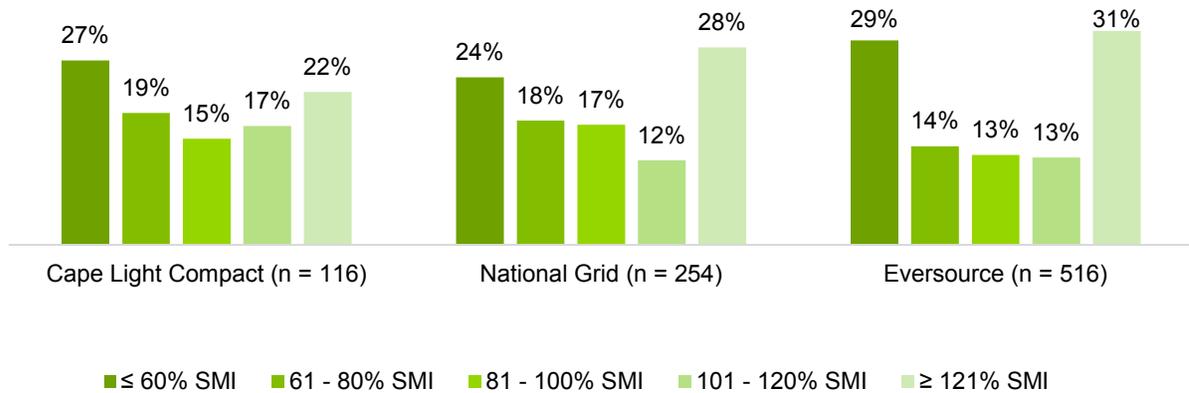
Income Group	Income Level	Estimated Number of Households	
Low Income	<60% SMI	492,625 (27%)	
Existing Moderate Income	61%-70% SMI	163,798 (9%)	299,076 (16%)
	71%-80% SMI	135,278 (7%)	
Potentially Expanded Moderate Income (Group 1)	81%-90% SMI	126,050 (7%)	262,205 (14%)
	91%-100% SMI	136,155 (7%)	
Potentially Expanded Moderate Income (Group 2)	101%-110% SMI	132,269 (7%)	244,057 (13%)
	111%-120% SMI	111,788 (6%)	
Income Ineligible (HES Eligible)	121% SMI and greater	520,218 (29%)	
<b>Total</b>		<b>1,818,181</b>	

Sources: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017) and American Community Survey and American Public Power Association population estimates

Of the electric PAs, Cape Light Compact and Eversource have the highest percentage of customers who qualify for the existing Moderate Income offers, at 19% and 18%, respectively (Figure 2-2). However, the differences between these PAs and the differences between PA for the existing and expanded moderate income groups are not statistically significant.

<sup>17</sup> Massachusetts estimate per American Public Power Association

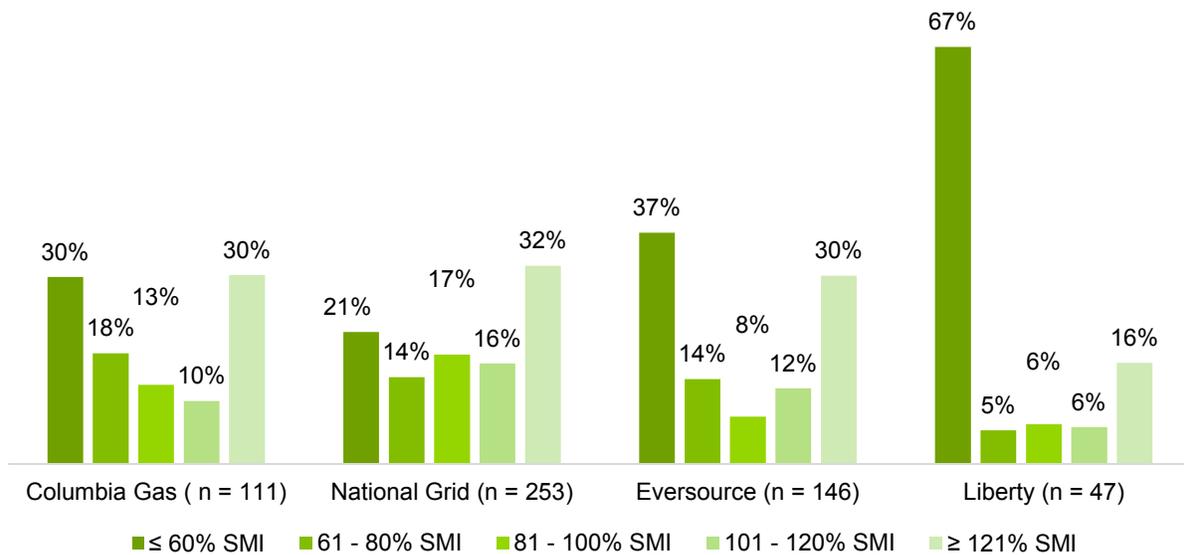
Figure 2-2. Income Distribution by Electric PA



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

Of the gas PAs, Columbia Gas has the highest percentage of customers who qualify for the current Moderate Income offers at 18% (Figure 2-3). Again, these differences are not statistically significant. The income groups where there is the greatest variation in population between the gas PAs are the low income eligible (≤60% of SMI) and income ineligible (≥121% of SMI) groups with Liberty capturing the highest proportion of low income respondents.

Figure 2-3. Income Distribution by Gas PA<sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> The percentage of Liberty's customers claiming incomes in the existing moderate income category (61-80% SMI) is statistically significantly different from the other PAs.

The survey includes few customers for Berkshire and Unitil (10 and 6, respectively). Sample sizes for these two PAs are not sufficient represent results within the targeted confidence and precision (90% ± 10%); therefore, these PAs' results are excluded from the above analysis.

## 2.2.2 Demographics by Income Groups

In characterizing the populations, the critical questions that arose include: are there differences by characteristics based on where populations are located, their tenure (rent/own), what type of housing they live in, and years living in home. The evaluation team further reviewed the populations by select segments, including households with children, households with individuals 65 years and older (assumed to be retirees or close to retirees), households with mid-aged adults and no children, and single-parent households.

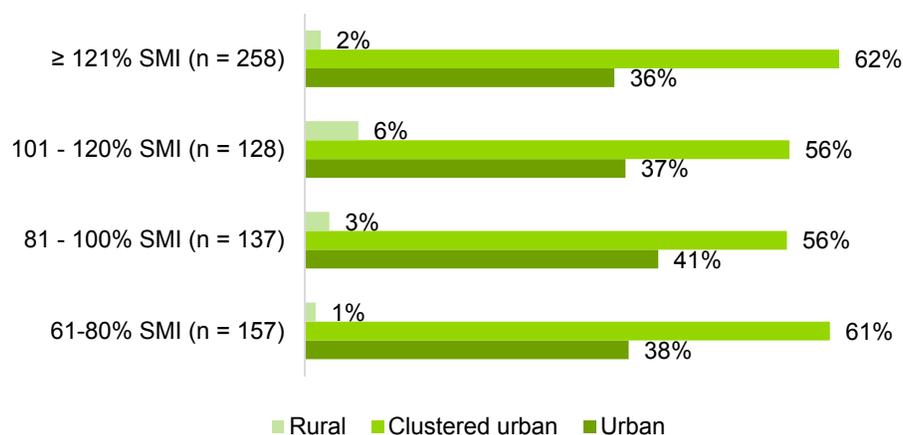
### 2.2.2.1 Urban and Rural Locations

The evaluation team classified Massachusetts cities and towns as urban, clustered urban, or rural, according to US Census Bureau specifications. The team used city-level population estimates from the US Census Bureau's 2016 population estimates to classify customers within one of these three groups:

- Urban areas having populations of more than 50,000 residents
- Clustered urban areas having populations between 2,500 and 50,000 residents
- Rural areas having populations of fewer than 2,500 residents<sup>18</sup>

Customers within each income classification exhibit similar distributions across urban and rural areas (Figure 2-4). A minority of surveyed customers live in regions defined as rural, while the majority across all income groups live in regions defined as clustered urban.

Figure 2-4. Urban/Rural Designations Across Income Groups



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>18</sup> Geography, "Urban and Rural," US Census Bureau, <https://www.census.gov/geo/reference/urban-rural.html>.

2.2.2.2 Homeownership

As expected, higher income respondents are more likely to be homeowners than renters (albeit slightly higher). This variation is not significant within any of the three moderate income groups (existing or proposed); however, the income ineligible ( $\geq 121\%$  SMI) group's rate of ownership is significantly higher than each of the other three groups, individually and collectively.

Figure 2-5. Rent/Own Designations Across Income Groups<sup>a</sup>



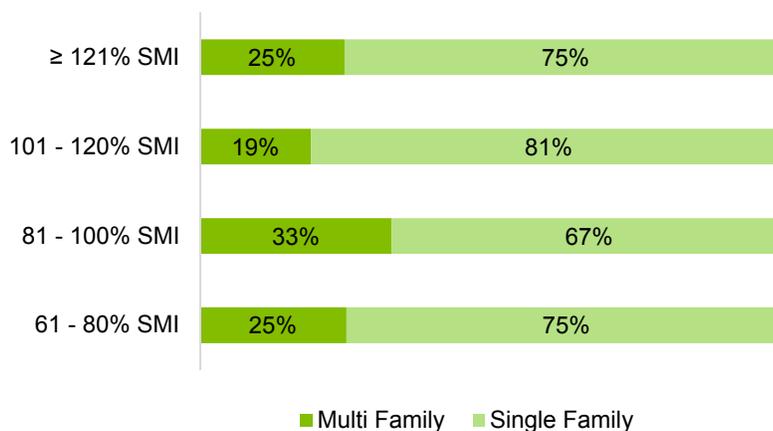
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in homeownership rate for households with incomes at or above 121% of SMI are statistically significantly different.

2.2.2.3 Housing Type

There is no correlation between income and housing type. The proportion of customers that reside in single-family (1-unit) and multi-family (2-4 units) buildings randomly vary by income groups (Figure 2-6).

Figure 2-6. Single/Multi-Family Designations Across Income Groups



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

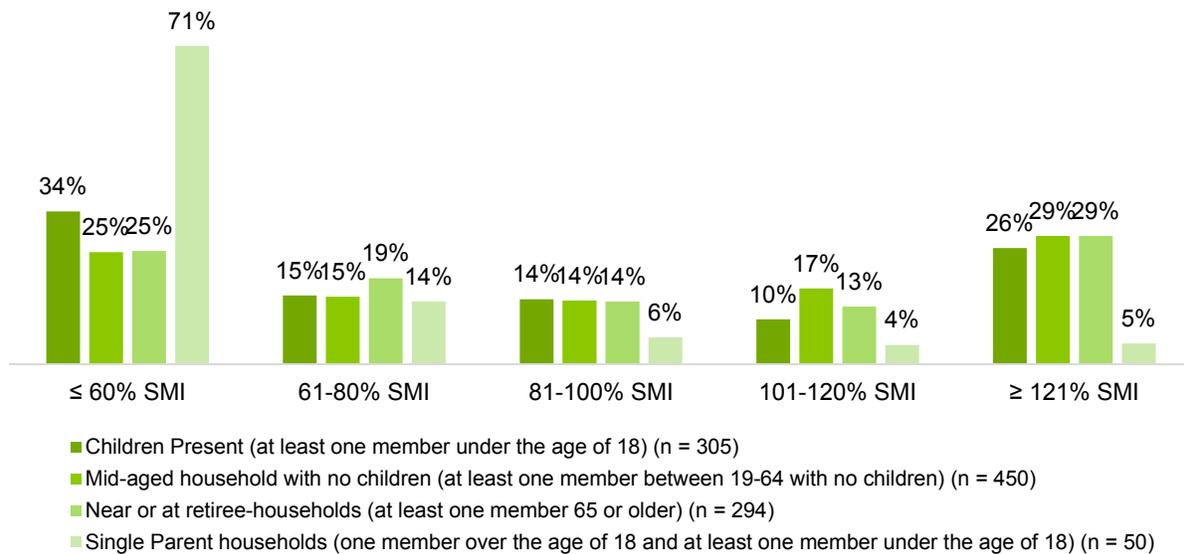
2.2.2.4 Household Composition

The evaluation team also reviewed income levels within four distinct household types:

1. Children present (at least one member under the age of 18, no distinction in number of adults)
2. Mid-aged household with no children (at least one member between 19-64 with no children)
3. Near or at retiree-households (at least one member 65 or older, no consideration to children present)
4. Single parent households (no more than one member over the age of 18 and at least one member under the age of 18).

Compared to the other household compositions analyzed (Figure 2-7), single-parent households—traditionally a group that struggles more than others to make ends meet due to their single income with children—are significantly more likely to have incomes of  $\leq 60\%$  SMI.<sup>19</sup> Aside from this finding there are no statistically significant differences in income levels by these groups, although near or at retiree households are slightly more likely to be in the lower 61%-80% SMI level than the other household segments. Removing the low income population from the analysis retains this story, with at or near retiree age respondents slightly more likely to be in the 61%-80% SMI range.

Figure 2-7. Household Characteristics by Income<sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Single parent households are significantly more likely to have incomes equal to or less than 60% SMI, and significantly less likely to have incomes above 100% SMI, than other groups of households.

<sup>19</sup> While these numbers are statistically significant, the sample size for single parent households (n=50) is relatively small. A larger sample would be necessary to confidently draw inference from these numbers.

## 2.3 HEA Awareness, Participation, and Measure Installation

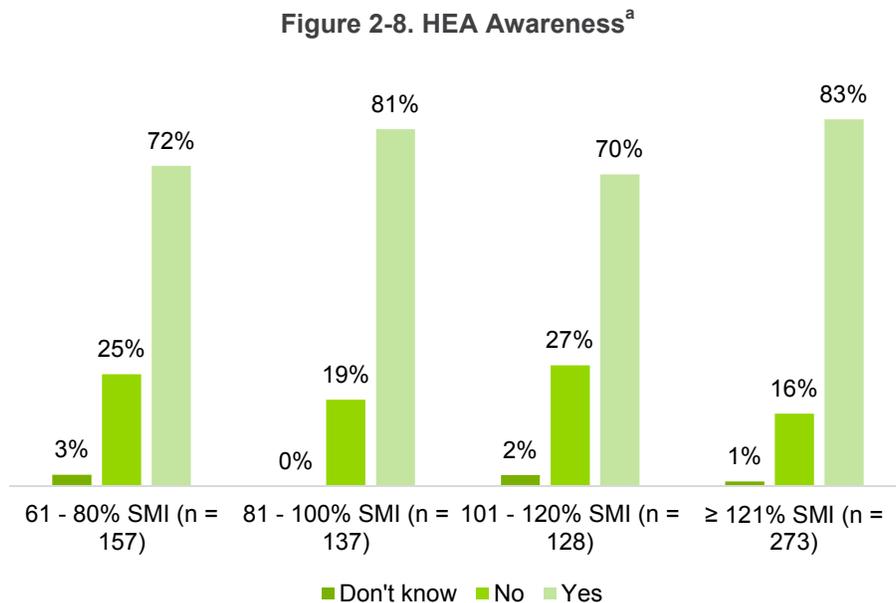
HEA awareness, participation, and especially installation of recommended measures are key metrics for characterizing the market. This section details the findings related to awareness, participation, and installation of equipment. In addition to using the moderate income survey data, this analysis leverages the HES tracking data (from 2014–2016) and data captured for the *Residential Baseline Study*.

As the quantitative and qualitative analysis discusses throughout this section, there appears to be limited correlation in income, HEA awareness, HEA participation, and installation rates. In fact, customers' household characteristics are more likely to influence their HEA awareness and participation than income. When reviewing results, it is important to remember that there is concern about potential modal bias that may be affecting these results (discussed in Section 1.2.1.3, "Potential Bias in Survey Results").

### 2.3.1 HEA Awareness and Participation by Income Group

Awareness of the HEA is high among customers surveyed. Nearly three-quarters of customers surveyed (74%) said they are aware the PAs offer assessments. HES is a long-standing and well-promoted initiative; therefore, one would expect awareness of its core component, the HEA, to be high.<sup>20</sup>

There is no discernable correlation between income groups and awareness of the HEA. Although awareness is statistically significantly higher in the 81%-100% SMI group than the 61%-80% SMI group, the results trend does not hold when comparing the 81%-100% SMI group to the 101% to 120 SMI% group (Figure 2-8).



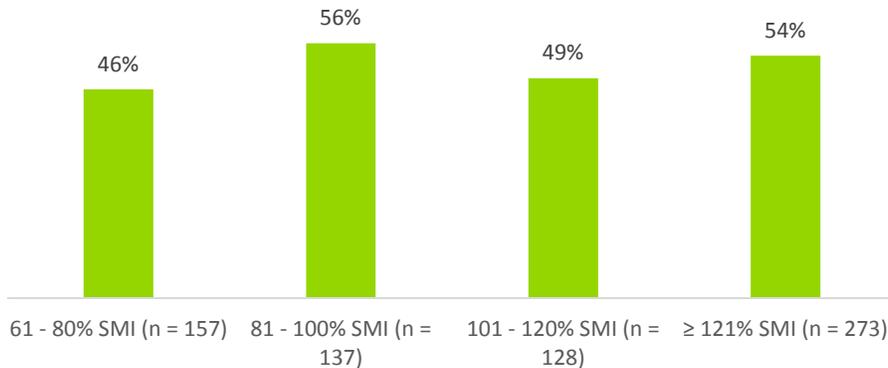
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Awareness among the 61-80% of SMI and 101-120% of SMI households are statistically significantly lower than awareness of households in the 81-100% of SMI and at or greater than 121% of SMI.

<sup>20</sup> However, as documented in the survey methodology section in the introduction, upward bias may exist in the awareness results.

About half of customers interviewed said they received an HEA at some point in the past (Figure 2-9).<sup>21</sup> The HEA may have been at their current home or another home. Participation is highest among the 81%-100% SMI group, and lowest among those with incomes between 61%-80% SMI, with no correlation by income.

Figure 2-9. HEA Participation Overall

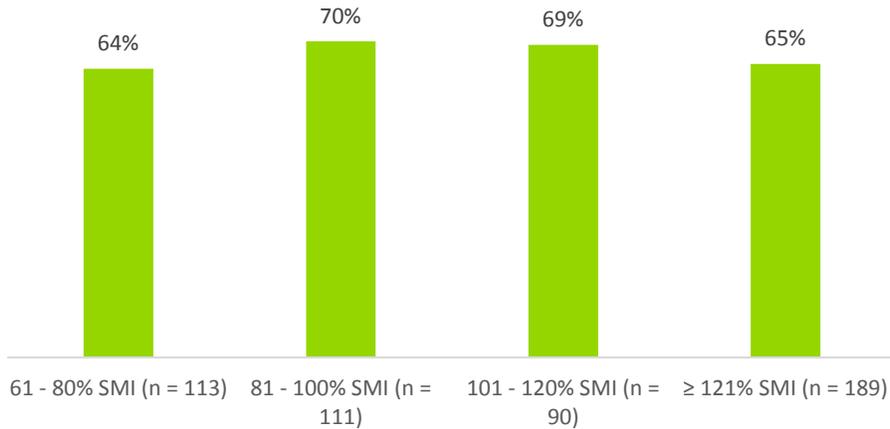


Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

Figure 2-9 illustrates HEA participation within the overall population regardless of awareness. Figure 2-10 refines the above analysis, documenting participation for only those customers that said they are aware of the HEA. This analysis continues to reinforce that there is no apparent relationship between participation and income.

<sup>21</sup> The team cross-referenced survey data with HEA tracking data using both names and addresses to verify the seemingly high participation rates. The team was able to match roughly 60% of survey respondents with tracking data information. Considering potential issues, including typos in addresses, shortening/lengthening of name, different household members completing surveys than those on the bill, the team feels this 60% match sufficiently verifies the high number of stated participants.

Figure 2-10. HEA Participation Among Those Aware of HEA



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

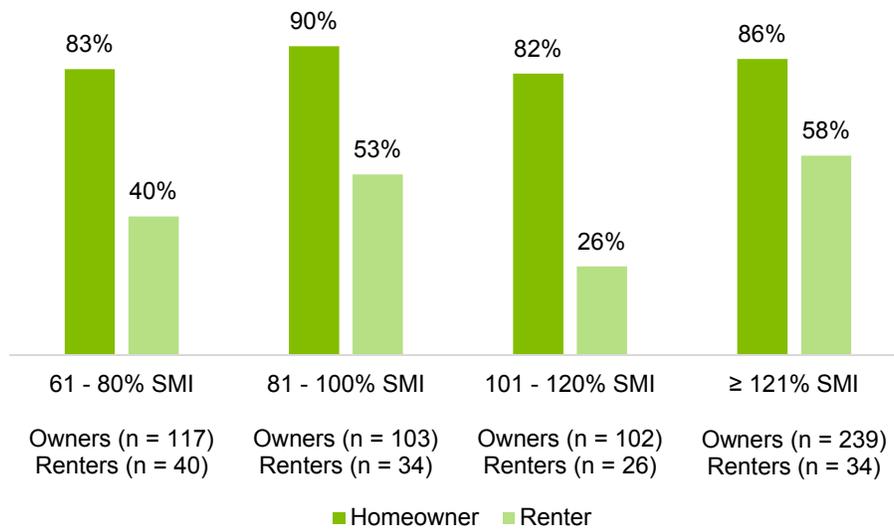
### 2.3.2 HEA Awareness and Participation by Select Demographics

This section describes HEA awareness and participation by the following demographics: homeownership, time in home, and household composition.

#### 2.3.2.1 Homeownership

Homeowners are statistically more likely to be aware of the HEA than renters. Again, there is no statistical difference or distinguishable trend in awareness across the income groups (Figure 2-11).

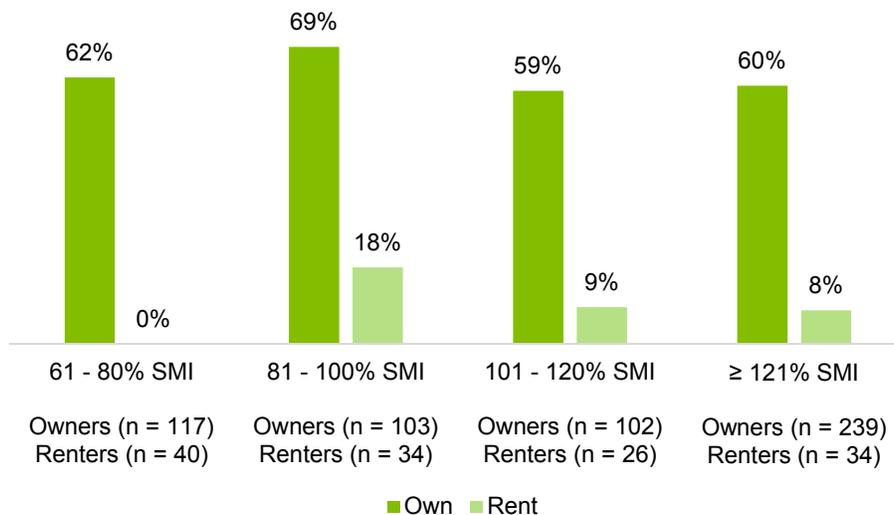
Figure 2-11. HEA Awareness by Homeownership Status



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

As expected, renters are significantly less likely to receive an HEA than homeowners. In fact, none of the 40 renters identified in the 61%-80% SMI level reported that they previously had received an assessment (Figure 2-12). When looking only at homeowners, there is no longer a significant difference in HEA participation between the 60%-80% SMI group and the 81%-100% SMI group, suggesting that participation among renters is the driving force behind the discrepancy in participation overall between these groups.

Figure 2-12. HEA Participation by Home-ownership Status by Income Category <sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in awareness between owners and renters are statistically significantly different.

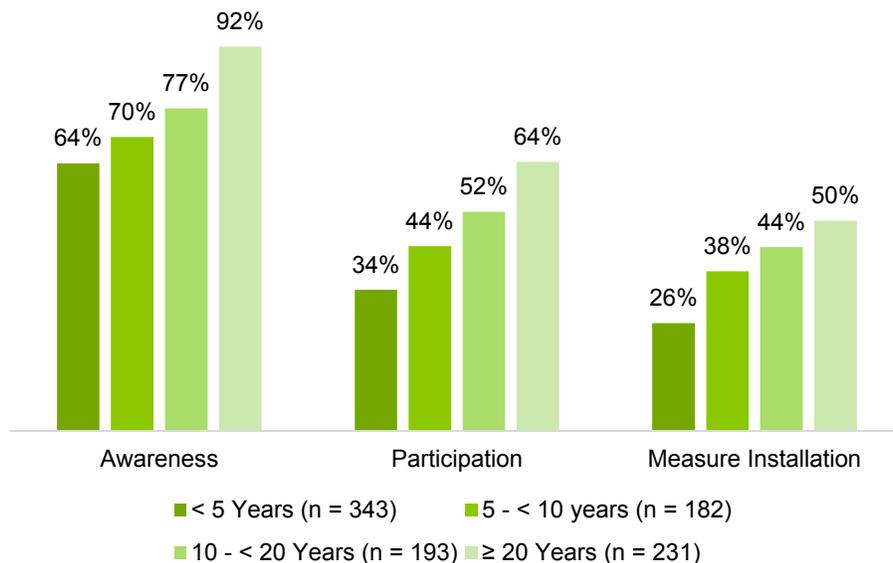
The in-person interviews further reinforced that renters, although potentially interested in an HEA in the future, were unlikely to participate due to mobility (or higher likelihood to move homes) and/or split incentive<sup>22</sup> issues. Three renters interviewed who had not received an HEA expressed interest in an assessment, but said that would be something the landlord would deal with. All agreed that they would be interested in participating in the future once they own a home.

### 2.3.2.2 Time in Home

The observably lower (though not significantly lower) levels of HEA participation among the 61%-80% SMI income group may be a function of their higher likelihood to have recently moved, and their lower rates of home-ownership.

There is a positive correlation between the number of years since a customer has moved and awareness of, participation in, and measures installed through the HES initiative (Figure 2-13). There is a similar correlation between years since a customer has moved and home-ownership rates (home-ownership rates increase with years since move) (Figure 2-14). Furthermore, as Figure 2-15 shows, customers in the 61%-80% SMI are significantly more likely to have moved in the past 5 years than households reporting incomes above 100% of SMI.

Figure 2-13. HEA Awareness and Measure Installation by Years Since Move<sup>a</sup>

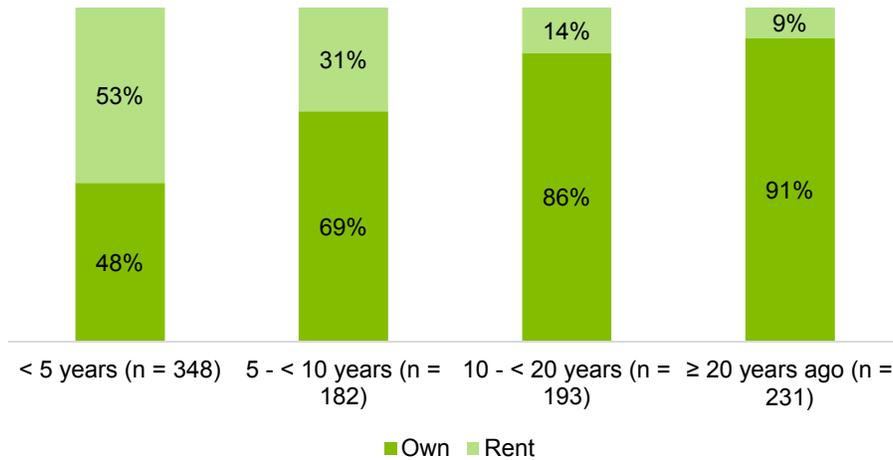


Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Awareness, participation, and measure installation rate for customers that reside in their home less than 5 years is statistically significantly different from those that reside in their homes 10 to less than 20 or at or greater than 20 years.

<sup>22</sup> Split incentive refers to situations where tenants are not responsible for paying their utility bills and thereby have little or no incentive to conserve energy. Split or misaligned incentives refers to transactions where the benefits do not accrue to the person who pays for the transaction.

Figure 2-14. Rent-Own Status by Years Since Move<sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in homeownership status are statistically significantly different across years in home, with customers that are within their homes less than five years statistically significantly more likely to rent than those households in their homes five or more years.

Figure 2-15. Years Since Move<sup>a</sup>



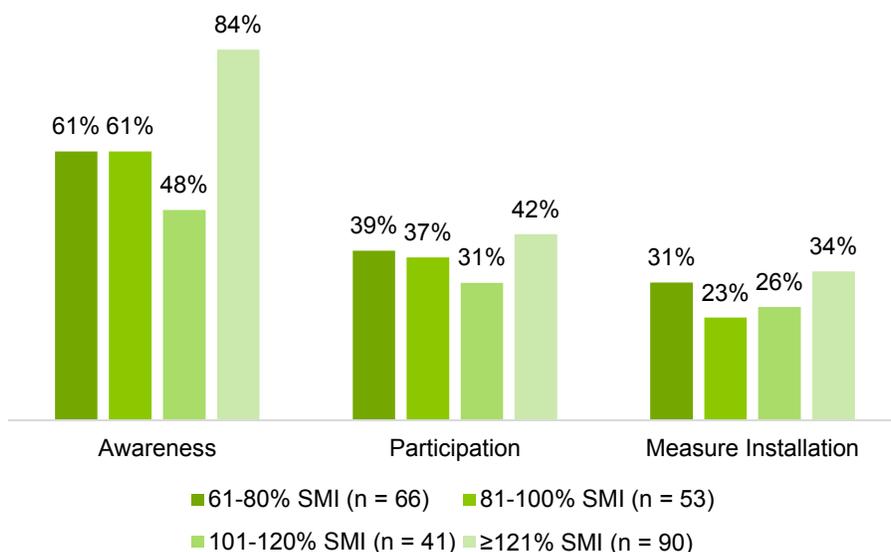
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in households that moved within the past five years is statistically significantly different between 61-80% of SMI and households reporting incomes above 100% of SMI.

Looking more closely at customers who moved in the past 5 years, there are no significant differences in HEA participation or measure installation across income groups (Figure 2-16), though customers with incomes greater than 120% of SMI display significantly greater levels of HEA awareness. This reinforces

the observation that factors other than income, namely home-ownership and time since move, are more influential on HEA participation.

**Figure 2-16. HEA Participation of Recent Movers (Past 5 Years)**



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

### 2.3.2.1 Household Composition

Reviewing the household composition of the population provides some insight into how customers' life stages may affect awareness and participation. Assessing responses within three segments—children present, mid-aged household with no children, or those with members at or near retirement—illustrates that households with older members are statistically more aware of the HEA than those with children, and of those with mid-aged members and without children. Households with older members are also significantly more likely to participate in an HEA than those with children (Table 2-2).

**Table 2-2. Participation and Awareness by Household Composition<sup>a23</sup>**

	Aware of HEA	Participated in HEA (if aware)	Installed Measures (if received HEA)
Children Present	74% (n=305)	59% (n=225)	77% (n=132)
Mid-aged households (18-64) with no children	70% (n=372)	62% (n=259)	81% (n=161)
At or near retiree (households with 65+ members)	82% (n=294)	68% (n=241)	83% (n=163)

<sup>23</sup> Because the analysis is characterizing the residential population, this table includes households that are in the low income group (≤60% SMI).

Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in awareness and participation significantly higher among households with at or retiree members (age 65+)

There are no statistically significant differences when reviewing these household characteristics across income groups, primarily due to the low sample sizes. However, while not statistically significant, there does appear to be a slight correlation between income, awareness, and participation in an HEA with lower income households with children present.

**Table 2-3. Participation and Awareness by Household Composition  
(Households with Children Only)**

	Aware of HEA	Participated in HEA (if aware)	Installed Measures (if received HEA)
≤60% SMI	58% (n=104)	33% (n=61)	65% (n=20)
61%-80% SMI	75% (n=47)	63% (n=35)	85% (n=22)
81%-100% SMI	83% (n=44)	67% (n=37)	70% (n=24)
101%-120% SMI	80% (n=30)	72% (n=25)	79% (n=18)
≥121% SMI	86% (n=79)	71% (n=68)	81% (n=48)

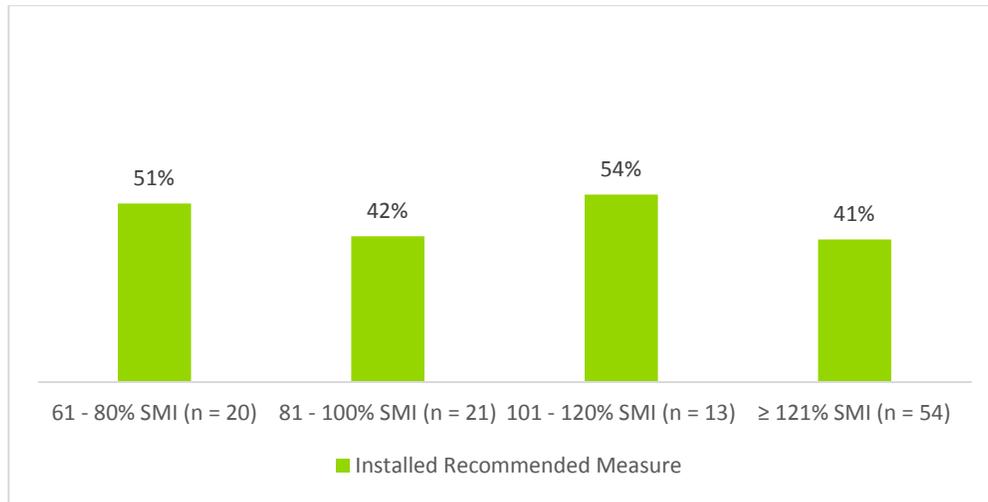
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

### 2.3.3 Recommended Measure Installation

Analysis of the survey and HES tracking data indicates that nearly half of HEA participants installed a recommended measure (Figure 2-17). There is no difference by income group.

The survey asked HEA participants whether they installed measures. The evaluation team then compared the survey data with the HES tracking data to confirm installations of recommended measures versus receiving ISMs only. Based on this review, 45% of all HEA participants installed recommended measures.

Figure 2-17. Installed Measures (of those that Received an HEA)



Sources: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017) and HES participant tracking data (2014–2016)

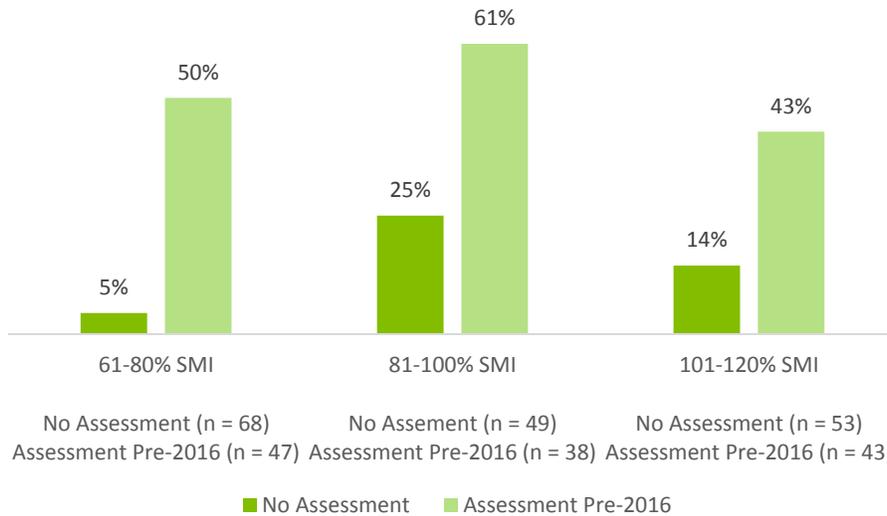
## 2.4 Awareness and Perception of Moderate Income Offering

Among those customers classified between the 61%-120% SMI, the research explored awareness of and barriers to participating in the Moderate Income offering. This section documents those findings.

### 2.4.1 Awareness

Awareness of the Moderate Income offering is significantly higher among customers who received an HEA prior to 2016 than among those who have never received an assessment. As in the case of HEA awareness, the evaluation team again observed that the 81%-100% SMI group possess the highest levels of awareness (Figure 2-18).

Figure 2-18. Awareness of HES Moderate Income Offering<sup>a</sup>

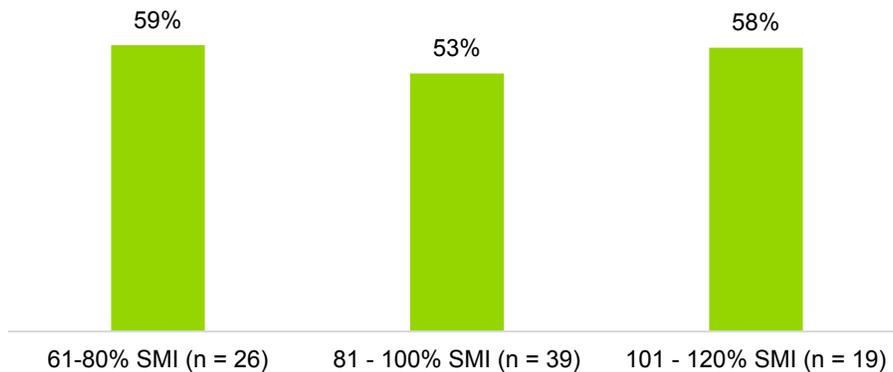


Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in awareness between those that had and did not have an HEA are statistically significant.

Over half of customers that received an HEA after April 2016 said the assessor informed them of the Moderate Income offering (Figure 2-19). There is no statistical difference in results by income group.

Figure 2-19. Percentage of HEA Participants Informed of Moderate Income Offering Since 2016



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

## ***2.4.2 Barriers to Participation***

There are several reasons why customers may not participate in the Moderate Income offering. Surveyed customers most commonly cited the time commitment, their availability, and their perceived need for initiative measures. The income verification process and customer priorities may also be barriers. This section describes each of these issues in turn.

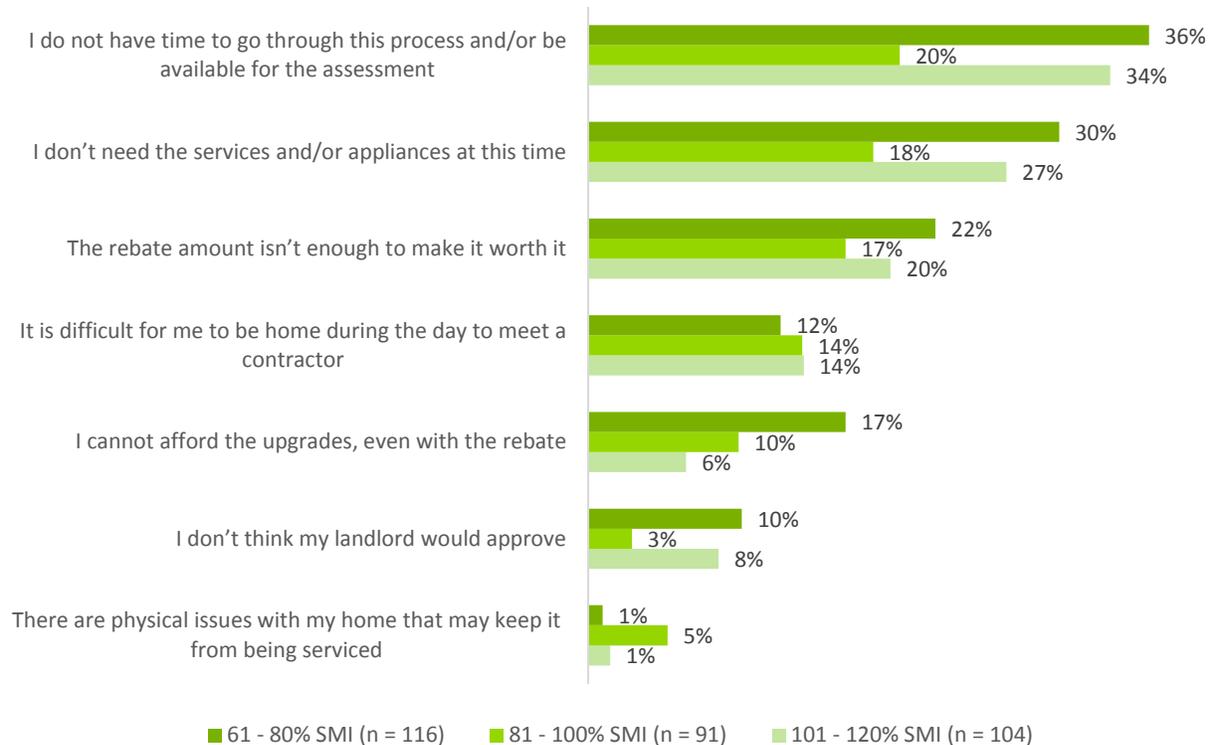
### ***2.4.2.1 Reasons for Non-Participation***

The survey offered customers a list of issues or concerns that may prevent them from participating in the Moderate Income offering. As Figure 2-20 shows, customers in the 61%-80% SMI groups are significantly more likely to state that they “cannot afford upgrades, even with the rebate,” when compared to the 101%-120% SMI group (the difference between the 61%-80% and 81%-100% SMI groups is large but not significant). Similarly, the 61%-80% SMI group was the most likely to report that “The rebate amount isn’t enough to make it worth it,” though these differences are not significant.

About one-third of respondents cite their availability and/or the time to go through the process as the primary barrier to participation. The question did not isolate availability for the meeting versus time, but given relatively fewer customers cited difficulty being home during the day to meet a contractor one could surmise that time is more of an issue for these customers.

Overall, about a quarter of customers also said they did not need the specific services or appliances offered by the Moderate Income offering at the time. Relatively few customers noted concerns with landlord approval or the condition of their home.

Figure 2-20. Reasons for Non-Participation<sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

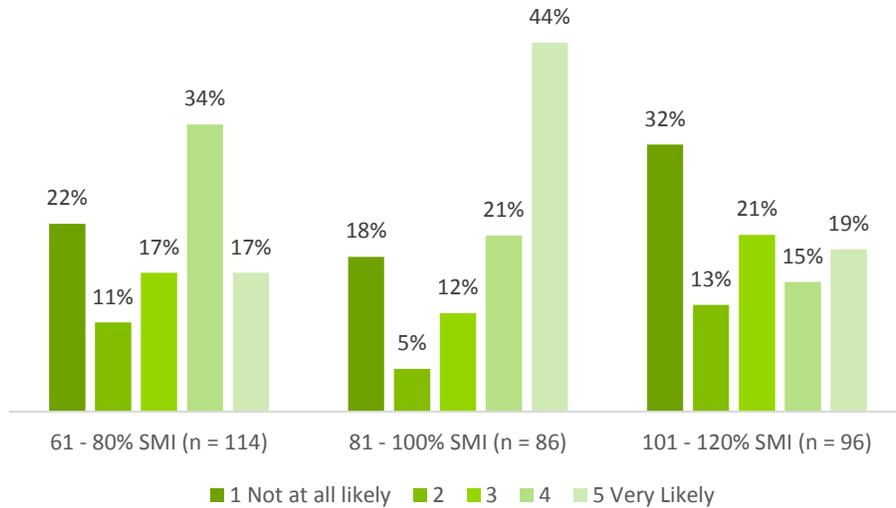
<sup>a</sup> Differences in percent of customers that say they cannot afford the upgrades and report incomes at 61-80% of SMI are statistically different than those with incomes between 101-120% of SMI..

#### 2.4.2.2 Income Verification Process

Participants need to verify their income to qualify for enhanced incentives for the moderate income customers. The survey assessed whether the income verification process is a barrier to participation by asking customers on a 5-point scale (where 1 is not at all likely and 5 is very likely) if they would go through the described income verification process. The survey only asked this question of customers that never received an HEA or received an HEA prior to offer availability in April 2016.

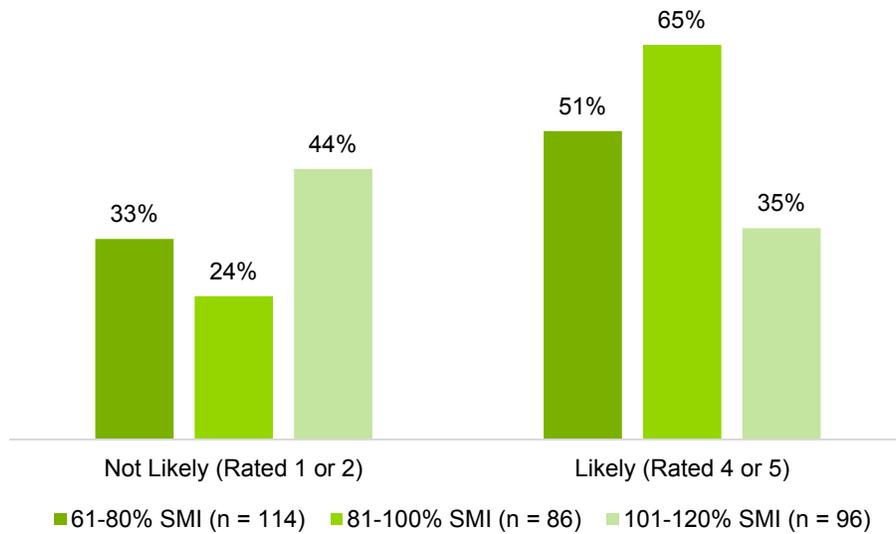
About one-third of customers said they would not be likely to go through the process after it was explained to them (rating their likelihood a 1 or 2) (Figure 2-21). Customers in the 81%-100% SMI income range report significantly higher likelihood to have their income verified (Figure 2-22).

Figure 2-21. Likelihood to Participate in Income Verification Process (Overall)



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

Figure 2-22. Likelihood to Participate in Income Verification Process (by Income Group)<sup>a</sup>



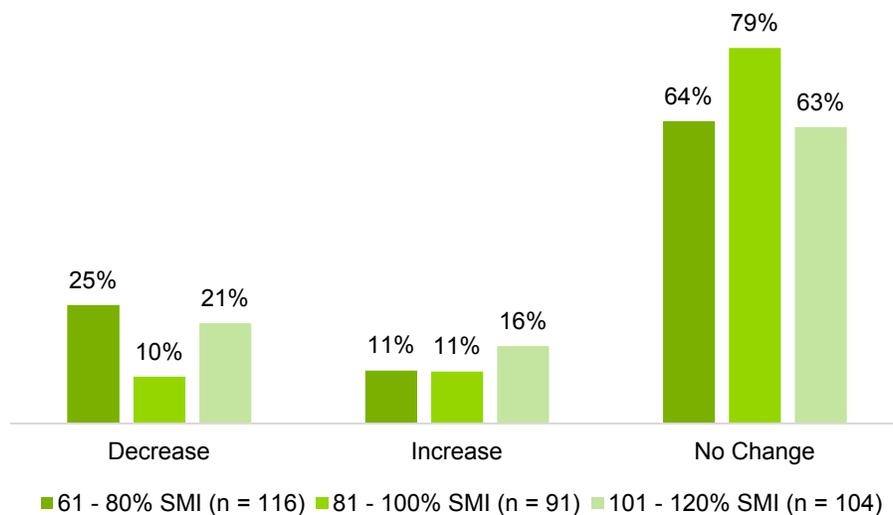
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in likelihood by income levels are significantly different.

The relative value of the incentive when considering the effort to go through the income verification process may also be a barrier to participation. The survey showed respondents the rebate values available to them through both the standard and income qualified offers, allowing them to see the precise benefit that income verification would offer. Upon review of these details, the survey asked respondents to restate their likelihood to participate in the income verification process.

Figure 2-23 illustrates that most of customers' responses did not change based on this information and, in fact, more customers in the 61%-80% of SMI and 101%-120% of SMI levels decreased rather than increased their likelihood to engage in the income verification process.

Figure 2-23. Change in Likelihood to Verify



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

The in-person interviews probed customers on their perceptions of the income verification process, including whether they had any concerns. In their stated responses, interviewees generally indicated that it would be worthwhile to complete the verification to become eligible for enhanced weatherization incentives. The interviewees had mixed feelings about whether the enhanced appliances incentives were large enough to merit undertaking the income verification process.

Customer experience with programs or services that require similar income verifications may increase customers' comfort level with the income verification process. Several interviewees had gone through other income verification processes before; stating they had positive experiences and that the process was smooth. These interviewees said they were very likely to go through a similar verification process in the future as part of an energy program. Interviewees that had not completed a verification for other programs or services expressed more concerns—usually about privacy, how long it would take, and what information they would need to provide. However, the interviews revealed that these concerns were rarely deal breakers, just hesitations. After hearing more about the income verification process, most of these customers indicated they were also likely to complete the verification process.

In general, the team found that the interviewed customers fell into one of two camps:

**Eager and willing:** “If it saves me extra money, of course I’ll do it.”

- Older (or retired)
- Handles the home budget, but has a working spouse
- Has more time to spare

**Hesitant:** “I might look into it to see how hard the verification process is.”

- Younger
- No prior experience with the HEA or experience with the PAs in general
- Balanced incentive value against time required of them; would need to be worth their time

Only one interviewee was outright against an income verification. He felt income details were too personal to share with an energy company that is providing a totally different service. The team asked him about his specific concerns and if there was anything that could overcome them. The interviewee said he would be more open to participating if the utility provided a clear explanation of the third party doing the income verification, the benefits he would receive from completing it, and if he was confident that the process would be “very easy to complete.”

The take-away that most interviewees would participate in the income verification process appears to contradict the low likelihood found in the survey data. However, it is important to recognize that the customers that partook in the in-person interviews had the benefit of a person explaining the process and benefits to them.

There is an issue of trust at play. The interviewer was able to build rapport with the customer while onsite, verbally conveying information that allowed for questions and answers. The team believes this rapport alone likely influenced those that were hesitant to say they would go through the process. And in fact, the more hesitant interviewees seemed assured and more likely to participate through the discussion process.

Similarly, energy specialists and home performance contractors that provide HEAs have an opportunity to interact directly with the customer and potentially overcome any barriers present within the income verification process. The *HES Process Evaluation* currently underway found that these contractors do not often spend time discussing the Moderate Income program or income verification process as they do not want to seem insensitive or probe into personal financial issues. There may be opportunities for the Energy Specialists to better encourage participation with more of a concerted focus on this offer, although it is worth noting that there are customers that will not go through the income verification process regardless of their experience with the Energy Specialist.

#### ***2.4.2.3 Value of Incentive against Income Verification Requirements***

Whether customers perceive the value of the incentive worth the effort of the income verification process is a question of interest. As described in the introduction, the offering covers 90% to 100% of insulation costs (depending on PA), up to a maximum of \$3,000. The offer also provides an additional \$50 for refrigerators and clothes washers.

Interviewees were overwhelmingly positive about the enhanced insulation incentive offering, at both the 90% and 100% incentive levels. They felt the incentive would be sufficient for them to go through the process.

The additional \$50 for appliances did not elicit the same response as insulation. While they were still mostly positive about the offer, their enthusiasm was more tempered for these measures. In fact, several interviewees expressed hesitation or surprise at the \$50 difference between the standard and enhanced incentives, feeling that the \$50 difference was not large enough to compel them to complete the income verification process.

Five interviewees said the difference between the standard and enhanced incentive was not enough to motivate them to engage in the income verification requirement for the appliances alone. However, if paired with the insulation (which is the intent of the program) they would be more inclined to go through the process.

The interviews probed customers regarding the magnitude of the appliance incentives necessary to get them to complete the verification process. All interviewees were more responsive to a \$100 difference between the standard and enhanced incentives and indicated that amount would encourage them to go through the income verification process.

## 2.5 Customer Finances and Relationship with Energy

Customers' finances and perceptions of energy expenses may affect their decision-making processes related to program participation and home improvements. This section explores customers' financial priorities and energy concerns.

### 2.5.1 Priorities of Monthly Expenditures

Customers' priorities related to how they spend their money and how energy costs fit in is an important barrier to program participation. Energy costs, while important, are not always a higher priority compared with other expenses. There is insignificant variation in the relative priority of various household expenses across income groups.

The survey asked customers to rank their top 5 priorities when it comes to paying for expenses. Mortgage, groceries, and utilities are the most common expenses ranked in the top 5 (no statistically significant difference by each of these items). Gasoline, medical expenses, and health insurance are the next highest mentions, but are considerably less likely to be within the top 5 priorities.

Table 2-4 shows the average ranking of expenses (ranked with the top 5) by income group and across all incomes. Customers unanimously ranked utilities third, behind both mortgage and groceries, an observation which holds true across all income ranges. While the analysis shows the average ranking of medical expenses, health insurance, and auto payments as high (or higher than) utilities, the number of customers who ranked those elements in the top 5 are fewer. Note, however, that life stages may affect the importance of these items; households with individuals at or near retirement age are more likely to rank health expenses in the top 5 and less likely to their rank mortgage, while households with children are more likely to rank their mortgage in the top 5.

Table 2-4. Expense Priority Ranking, Where Rank 1 is Highest Priority

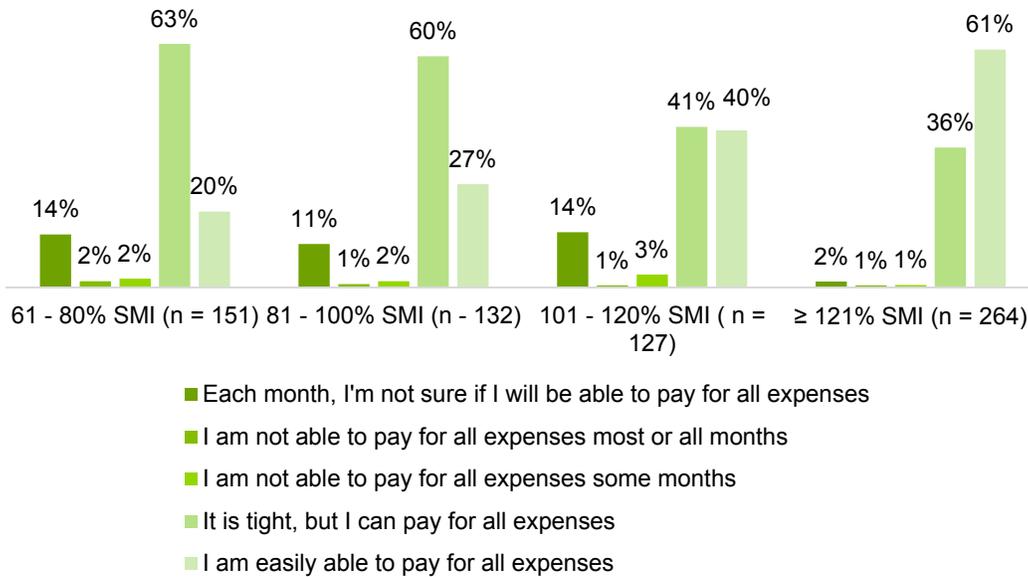
	Percent Ranked in Top 5	n Who Rated in Top 5	61%– 80% SMI	81%– 100% SMI	101%– 120% SMI	Mean (Across Incomes)
Mortgage	77%	324	1.7	1.7	1.7	1.7
Groceries	80%	339	2.6	2.5	2.7	2.6
Utilities	82%	344	3.0	3.3	3.2	3.2
Gasoline/transportation	50%	210	3.7	3.8	3.7	3.7
Medical Expenses	37%	155	3.1	3.3	3.5	3.3
Health Insurance	34%	143	3.3	2.7	3.2	3.1
Auto payment	29%	124	3.5	3.7	3.4	3.5
Car insurance	28%	119	3.6	4.2	3.6	3.8
Telephone	24%	100	3.9	3.4	4.0	3.8
TV/internet	15%	65	4.1	4.1	3.6	4.0
Credit card	15%	63	3.9	3.6	3.5	3.7
Clothes/shoes	7%	31	3.2	2.9	2.7	2.9
Daycare	0.5%	3	-	5	4	4.2

Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

The in-person interviews dug deeper into customers' perception of energy, particularly around other expenses. Although it can be substantial, especially in the winter, energy is not typically their largest expense, and paying for energy does not keep them from paying other expenses. Further, they generally expressed less anxiety about energy than other expenses. Customers expressed that it is a set cost, something they expect each month. They are generally not surprised by their energy costs and can plan around it. They view their energy costs as a necessary expense: "It is what it is."

When asked about their ability to pay their bills each month, customers in the lower income categories were more likely to say they had difficulty making those payments than their higher income counterparts. (Figure 2-24). The portion of customers in the 61%-80% SMI group who said, "I am easily able to pay for all expenses," was significantly lower than the portion of customers in both the 101%-120% and >120% SMI groups who said that.

Figure 2-24. Ability to Pay Bills by Income Category<sup>a</sup>



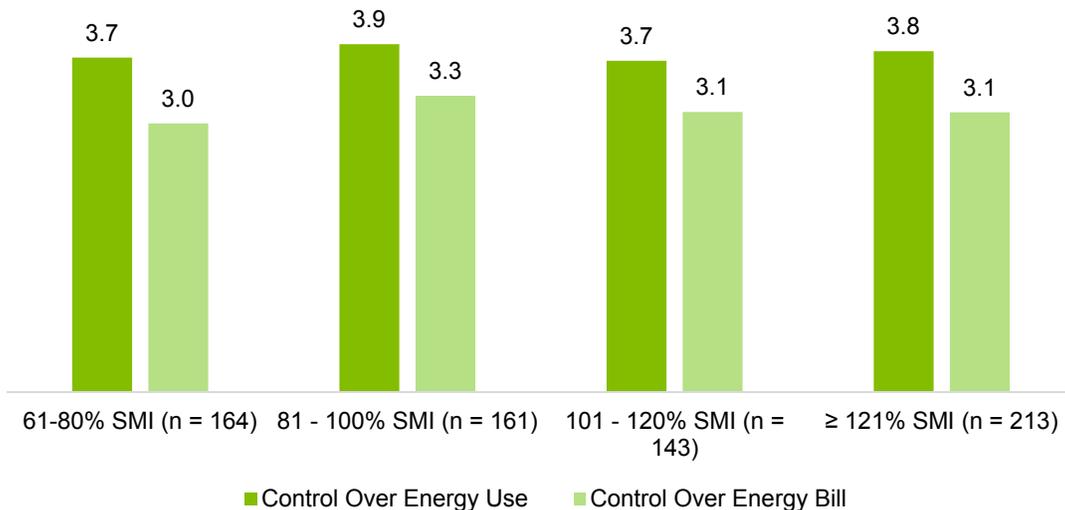
Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in ability to pay bills by income levels are significantly different.

### 2.5.2 Energy Control and Burden

While customers rank energy expenditures relatively high, they generally feel they have low control over those costs. In fact, customers overall feel they have more control over their energy use than their energy bill (Figure 2-25) with no statistical differences in income groups.

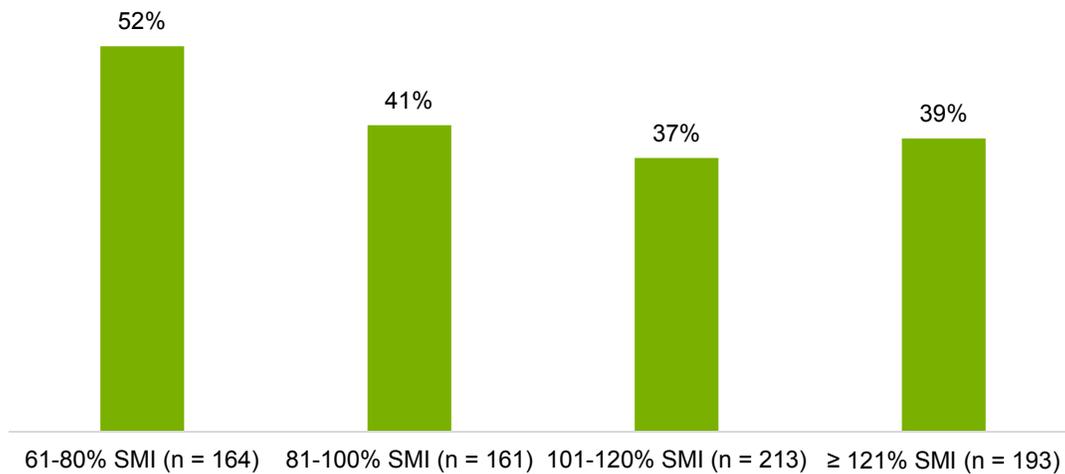
Figure 2-25. Perceived Control Over Energy Use and Energy Bills



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

Although customers of all income levels expressed a similar level of control over their energy bills, the customers who more often sacrificed their comfort to afford energy bills are those with lower incomes (Figure 2-26).

Figure 2-26. Percent of Customers Who Sacrificed Comfort to Pay Bills<sup>a</sup>



Source: Evaluation team analysis of Moderate Income Market Characterization Survey (September 2017)

<sup>a</sup> Differences in percent that sacrifice comfort to pay bills are significantly different between income levels.

The in-person interviews validated these findings, with about half of customers feeling like they have limited ability to manage their energy costs. Many respondents were aware of energy expenses and wanted to decrease their costs but believed that they are doing all they can to save energy. Typically, these actions equated to behavioral activities, such as turning off lights when not in the room, turning down thermostat temperature in the winter, and turning off televisions when not in use.

There was a sense of a lack of empowerment over customer ability to control their energy bills. All in-person interviewees felt there was a limit to how much they could do to minimize their energy costs, and that higher energy bills are simply part of living in New England. In other words, they are making changes at the margins but most of their energy costs—the usage associated with heating and cooling—is largely outside their control.

## APPENDIX A. POST-SURVEY SURVEY WEIGHTING

Given the sampling strategy included a census of all customers that may classify at or below 120% of SMI, the Moderate Income Market Characterization survey population was inherently biased toward lower income customers.<sup>24</sup> Therefore, the evaluation team post-weighted the survey to correct for this overrepresentation. The team created weights to account for the percentage of customers that fell within income ranges and household size (e.g., two household members reporting an income of less than \$15,000). The evaluation team then created proportional weights to reflect the entire population.

However, this weighting strategy alone assumes the *Residential Baseline Study (RES 1)* was representative of the Massachusetts population. Discussions with Navigant (who completed the analysis) confirmed that was not the case, and the data needed to be further post-weighted to account for education level and language preference. The evaluation team calculated survey weights using census data gathered from the ACS.

Finally, through comparisons with additional ACS survey data, the evaluation team observed discrepancies in the survey population concerning both ownership status and housing type (single family or multi-unit) with the Moderate Income Market Characterization survey over-representing homeowners and underrepresenting renters. As homeownership and housing type tends to correlate to income it was necessary to further weight by this combination of demographics. Again, the evaluation team calculated proportional weights and applied them to the survey data. Appendix A documents the weighting calculations.

$$\text{Final Weight} = (\text{HH Size and Income Range}) * (\text{Education and Language}) \\ * (\text{Ownership Status and Housing Type})$$

### Where:

**HH Size and Income Range** = Proportion of customers with stated household size by income ranges (population source: *Residential Baseline Study*)

**Education and Language** = Proportion of customers with a college degree with English as the most frequent language spoke in the home (population source: 2015 American Community Survey)

**Ownership Status and Housing Type** = Proportion of customers who either own or rent their home by housing type defined as single family, 1-4 units, and mobile homes (population source: 2015 American Community Survey)

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<sup>24</sup> Assuming the *Residential Baseline Study* survey was representative of the Massachusetts population in terms of household size and income.