Final Report

National Grid Rhode Island EnergyWise Single Family Process Evaluation

September 1, 2016

Final Report

National Grid Rhode Island EnergyWise Single Family Process Evaluation

September 1, 2016

Funded By:

National Grid Rhode Island

Prepared By:

Research Into Action, Inc.

www.researchintoaction.com

PO Box 12312
Portland, OR 97212

3934 NE Martin Luther King Jr. Blvd., Suite 300
Portland, OR 97212

Phone: 503.287.9136
Fax: 503.281.7375

Contact:
Jane S. Peters, President
Jane.Peters@researchintoaction.com

Table of Contents

Executive Summary I
Program Description I
Research Objectives II
Methodology II
Conclusions and Recommendations II
1. Introduction 1
1.1. Program Description 1
1.2. Research Objectives 2
1.3. Report Organization 4
2. Methodology 5
2.1. Program Data Analysis 5
2.2. Participant Survey 6
2.3. In-Depth Interviews 7
2.4. Comparison Program Review 8
3. Program Accomplishments 9
3.1. Participant Characteristics 9
3.2. Project Characteristics 11
3.3. Program Uptake 14
4. Participant Experience 17
4.1. Energy Assessment Motivations 18
4.2. Customer Feedback on Auditor & Experience 18
4.3. Information and Recommendations 20
4.4. Effectiveness of Energy Savings Measures 23
4.5. Weatherization Jobs 24
5. Program Delivery Experience 26
5.1. Assessor Perspectives 26
5.2. Installation Contractor Perspectives 31

6. HEAT Loans 36
6.1. HEAT Loan Process 36
6.2. HEAT Loan Product 38
6.3. Influence of HEAT Loans on Energy Efficiency Projects 42
6.4. Equity of HEAT Loan Offering 43
6.5. PACE 48
7. Comparison Program Findings 50
7.1. Review of Program Design and Delivery Strategies 50
7.2. Comparison of Program Costs and Outcomes 56
7.3. Summary 60
8. Conclusions and Recommendations 61
Appendix A. References 1
Appendix B. In-Depth Interview Guides 1
B.1. Administrative Staff (National Grid and RISE) 1
B.2. Assessors 4
B.3. Installation Contractors 9
B.4. HEAT Loan Lenders 12
Appendix C. Participant Survey Guide 1
C.1. Screening Questions 1
C.2. Energy Assessment and Savings 1
C.3. Measures Taken 7
C.4. Financing 10
C.5. Demographics 15
Appendix D. Participant Survey Frequencies 1
D.1. Screening Questions 1
D.2. Energy Assessment and Savings 2
D.3. Measures Taken 6
D.4. Financing 9
D.5. Demographics 13

List of Figures

Figure 1-1: EnergyWise Incentive Levels by Heating Fuel Type 2014-2016 2
Figure 2-1: Participant Survey Populations 6
Figure 3-1: Year Home Built by Participation Status 10
Figure 3-2: Quality Assurance Inspection Results January 2015 – May 2016 12
Figure 3-3: Distribution of Time from Assessment to Close of Weatherization Project.....13
Figure 3-4: Average Time to Complete EnergyWise Weatherization Projects 13
Figure 3-5: EnergyWise Program Uptake 2014-2016 14
Figure 3-6: Audit-to-Retrofit Conversion Rate by Primary Home Heating Fuel, 2014-2016 15
Figure 3-7: Audit-to-Weatherization Conversion Rate of Natural Gas Heated Homes with Incentive Levels 2014-2016 16
Figure 4-1: Survey Respondents by Participant Group.....17
Figure 4-2: Customer Ratings of Assessment Experience Relative to Other Home Improvement Services 19
Figure 4-3: Willingness to Pay for Home Energy Assessment 19
Figure 4-4: Ratings of Information Received Following Assessment by Type of Assessor Team.....21
Figure 4-5: Uptake of Recommendations for Heating and Cooling System, Thermostat, and Refrigerator Improvements.....22
Figure 4-6: Additional Energy Saving Actions Taken by participants that Did Not Complete EnergyWise Weatherization projects or receive HEAT Loans 24
Figure 4-7: Satisfaction with insulation and air sealing upgrade 25
Figure 4-8: Factors Influencing Decision to Make Insulation and Air Sealing Improvements 25
Figure 6-1: Participant Satisfaction with Elements of HEAT Loan Process 38
Figure 6-2: Alternatives to the 0% HEAT Loan 39
Figure 6-3: Reasons why participant did not apply for HEAT Loan.....40
Figure 6-4: Income Levels of All EnergyWise Assessment Recipients6 45
Figure 6-5: Income Levels of HEAT Loan Recipients 45
Figure 6-6: Income Levels of HEAT Loan Applicants Who Did Not Receive Loans 46
Figure 6-7: Income Levels of Participants Who Completed Weatherization Projects Without HEAT Loans 47
Figure 6-8: Support for Residential PACE 48
Figure 6-9: Concerns Regarding Residential PACE 49
Figure 6-10: Financing options for future energy efficiency upgrades.....49

List of Tables

Table 1-1: Customer Experience Research Objectives and Specific Research Questions 3
Table 1-2: Additional Research Objectives and Specific Research Questions 4
Table 2-1: Number of Assessments Listed in Measure-Level Data by Year 5
Table 2-2: Participant Survey Response Rates 7
Table 2-3: In-Depth Interview Populations and Sample Sizes 7
Table 3-1: EnergyWise Participants by County, Projects Completed June 2015-May 2016 9
Table 3-2: Heating Fuel Type by Participation Status 2014-2016 10
Table 3-3: Proportion of Recipients Receiving Measures by Type 11
Table 4-1: Energy assessment motivations by group 18
Table 4-2: Participant Ratings of Information Received Following Assessment 20
Table 4-3: Estimate of Uptake of Weatherization Recommendations 22
Table 4-4: Factors Influencing Decision Not to Move Forward with Recommendations 23
Table 4-5: Usage of Direct Install Measures 23
Table 5-1: Common Questions and Concerns Assessors Receive on Assessment Recommendations 28
Table 6-1: Action Taken If Participant Had Not Received Loan by Willingness to Adopt Alternate Loan Options 41
Table 6-2: HEAT Loan Uptake by Heating Fuel, 2014-2016 42
Table 6-3: HEAT Loans Not Used for Weatherization Projects 42
Table 6-4: Cost of Weatherization Projects by Use of HEAT Loans, 2014-2016 43
Table 6-5: Loan Completion by Year Assessment Completed, 2014-2016 44
Table 6-6: Income by Participant Group 47
Table 6-7: Actions taken without HEAT Loan by household income 48
Table 7-1: Services Offered by Programs Discussed in Literature Review 51
Table 7-2: Comparison Program Audit Offerings 57
Table 7-3: Comparison Program Incentive Offerings 58
Table 7-4: Comparison Program Costs and Participation, 2015 59
Table 7-5: Comparison Program Energy Savings and Cost of Saved Energy 60

Executive Summary

This report presents findings from a process evaluation of National Grid's EnergyWise single family energy assessment and weatherization program in Rhode Island. National Grid contracted with Research Into Action to conduct the evaluation, which took place during June and July of 2016.

Program Description

The EnergyWise program offers home energy assessments at no charge to all National Grid residential customers in single family homes, 1-4 units, with the exception of those who qualify for income eligible services, who are served by another program. Staff of the program's lead vendor, RISE Engineering (RISE), conduct the energy assessment. During the assessment, the assessor installs efficient light bulbs, faucet aerators, showerheads, and other measures. Following the assessment, the assessor provides the participant with a report of the findings, information about National Grid incentive and financing programs, efficiency and renewable energy opportunities offered by partner organizations, and a detailed action plan for any weatherization work the assessment recommends.

If the participant moves forward with the recommended weatherization work, RISE assigns and schedules one of the program's independent installation contractors to install the measures. As a quality assurance (QA) measure, a RISE staff member visits each participant's home at the completion of weatherization measure installation. This staff member is also on-call to the installation contractors to approve any deviation from the scope of work as the assessor defined it. In addition to these QA visits that RISE conducts, the program employs a third-party contractor, Competitive Resources, Inc. (CRI), to provide QA on a sample of assessments and weatherization installations.

National Grid offers incentives to reduce the cost of weatherization measures installed through the EnergyWise program. Incentive levels differ based on the participant's primary heating fuel and have varied over time, currently ranging from 75% of project costs for participants who use electricity or natural gas as their primary heating fuel to 25% of project costs for participants who heat with oil or other delivered fuels. Free air sealing is included with weatherization participation if needed. Incentives are currently capped at $4,000 for participants of all heating fuel types.

In addition to offering incentives, National Grid works with six financial institution partners in Rhode Island to make HEAT Loans available to EnergyWise participants. HEAT Loans allow participants to borrow up to $25,000 for a period of up to 7 years at 0% interest to pay for efficient heating systems, domestic hot water systems, and weatherization measures recommended in their EnergyWise audits.

Research Objectives

This evaluation was designed to address research objectives related to:

- The EnergyWise customer experience
- HEAT Loan lender perspectives on the program
- Performance of the lead vendor and sub-contractors
- Lessons learned from programs elsewhere in the country

Within each research objective, National Grid defined specific research questions. In pursuing these research objectives, we sought to identify opportunities to increase audit-to-retrofit conversion rates and to increase the efficiency and effectiveness of program delivery.

Methodology

Four key data sources inform this evaluation:

- **Program data analysis:** We reviewed exports from the EnergyWise database corresponding to 27,016 EnergyWise Home Energy Assessments that took place between January 2012 and June 2016. We also reviewed third-party QC findings for 2015 and 2016.
- **Participant survey:** We invited EnergyWise participants who received assessments between July 2015 and June 2016 to complete an online survey. We sought responses from participants who had received an audit and not taken additional action in the program, those who had completed weatherization projects and those who had received HEAT Loans. Ultimately, 352 participants completed the survey.
- **In-depth interviews:** We conducted in-depth interviews with National Grid and RISE staff involved in administering the program, RISE staff responsible for conducting energy assessments, independent installation contractors, and HEAT Loan lenders.
- **Comparison program review:** We identified a group of programs operating elsewhere in the United States that had the potential to provide lessons learned for the EnergyWise program. We reviewed conference papers, evaluation reports, and regulatory filings related to these programs to identify best practices and lessons learned.

Conclusions and Recommendations

Conclusion 1: Program processes work smoothly, both for participants and for those involved in program delivery.

Survey findings indicate that participants were largely satisfied with their experience with EnergyWise assessments, weatherization projects, and HEAT Loans. The survey did not identify areas of confusion or dissatisfaction affecting large numbers of participants. Assessor and lender

interviews support these findings, with both groups reporting that few participants raise concerns or areas of confusion, and they are able to resolve any issues that arise.

Assessors, installation contractors, and lenders also indicated that the program's administrative processes work relatively smoothly. Interview respondents did not report challenges with communication or major areas of inefficiency or dissatisfaction with program processes. Interview respondents expressed positive views of RISE's ongoing efforts to improve program processes, including sending two-person teams to conduct audits and conducting same-day air sealing.

Because program data did not clearly delineate which participants were part of these trial improvement efforts, our ability to assess the efforts' effectiveness is limited. Survey data did not indicate significant differences in satisfaction or likelihood of completing weatherization projects or taking out a HEAT Loan between participants who received assessments from a two-person team or same-day air sealing and those who did not.

- **Recommendation 1:** National Grid and RISE should record the participants that experience innovative program delivery strategies in order to assess the effectiveness of those strategies.

  The program database should include clear flags identifying these participants by strategy innovation.

- **Recommendation 2:** National Grid and RISE should use experimental designs to determine the effectiveness of innovative program delivery strategies.

  Designing and rigorously carrying-out experiments will provide a much more accurate sense of the benefits and drawbacks of changes to program implementation.

Conclusion 2: Higher incentives and an interest rate buy-down to 0% both add value to the EnergyWise program.

Program data confirms assessors' reports that participants eligible for higher incentives are more likely to move forward with weatherization measures. Natural gas customers, who qualify for larger incentives, generally have a higher conversion rate than customers heating with oil and other delivered fuels. Conversion rates among natural gas customers decreased as the available incentive levels fell and then gradually increased as incentive levels rose.

Assessors and lenders also credit the 0% HEAT Loan interest rate with motivating participants who would not otherwise do so to move forward with improvements and allowing them to complete larger projects. Participant survey data most strongly support the latter part of this assertion. Participants who would not have financed efficiency measures without the 0% loan offering most often reported that, in the absence of the loan, they would have done a smaller project or delayed their project.

Recognizing that these financial elements add value to the program, National Grid must determine whether that value justifies their cost. This study supports the notion that these elements contribute to program and measure uptake, but the study scope did not enable us to rigorously quantify the value of the financial elements nor to conduct a cost-benefit comparison.

- **Recommendation 3**: National Grid should consider conducting further research to more precisely quantify the impact of incentive levels and interest rates on weatherization uptake and project characteristics.

  This research could pursue one of two approaches:

  - A willingness to pay study using conjoint analysis or a similar statistical method could quantify the influence of various levels of incentives and interest rates on participants' likelihood of participation.
  - A rigorous analysis of participation data, examining differences in project uptake both between participants whose heating fuels make them eligible for different incentive levels within a given time period and over time among participants with the same heating fuel as incentive offerings change. It is important that these analyses account for factors internal to the program (e.g. marketing campaigns) and external to the program (e.g. economic conditions, weather and seasonality) in assessing the impact of changes in incentive levels. National Grid should also rigorously monitor participation data both before and after any future changes to incentive levels or interest rates to assess their effects.

Conclusion 3: The potential exists for market saturation or other market conditions to slow weatherization project uptake.

There are some indications that this could be occurring. While natural gas conversion rates increased as incentive levels were restored to their previous levels, the peak in October of 2015 (36%) is lower than the earlier peak, in February of 2014 (42%). There also appears to be a decline in conversion rate beginning in November 2015, even though we expect that most assessments completed prior to January 2016 should have completed their weatherization projects by the time of our database export. Nonetheless, this decline reflects a relatively small amount of data, and conversion rates may change as weatherization projects move through the participation process.

It will likely take six to twelve months after our database export to determine whether apparent conversion rate declines beginning in November of 2015 truly represent a trend, if they are a temporary, seasonal, decline, or if weatherization projects moving through the pipeline eliminate any apparent declines altogether. If the data continue to show an enduring decline, it may be worthwhile for National Grid to investigate whether the market is becoming saturated or if other market conditions are causing reduced uptake of weatherization projects. For example, low fuel prices combined with a mild winter in 2015/2016 may have contributed to reduced interest in weatherization.

- **Recommendation 4:** National Grid should continue to monitor audit-to-weatherization conversion rates and investigate causes of any long-term declines. To determine the cause of any long-term declines in conversion rates, National Grid could:
  - Review assessment uptake and recommendations: Strong assessment uptake with declining proportions of participants receiving recommendations for weatherization work would indicate a saturated market.
  - Conduct a non-participant survey: A non-participant survey could gauge program awareness and investigate reasons for not participating among those who are aware of the program. This could identify barriers to participation beyond market saturation.
  - Conduct a statistical analysis of the relationship between conversion rates and other factors: These factors could include prices of natural gas or other heating fuels, weather, and economic conditions.

1. Introduction

This report presents findings from a process evaluation of National Grid's EnergyWise single family energy assessment and weatherization program in Rhode Island. National Grid contracted with Research Into Action to conduct the evaluation, which took place during June and July of 2016.

1.1. Program Description

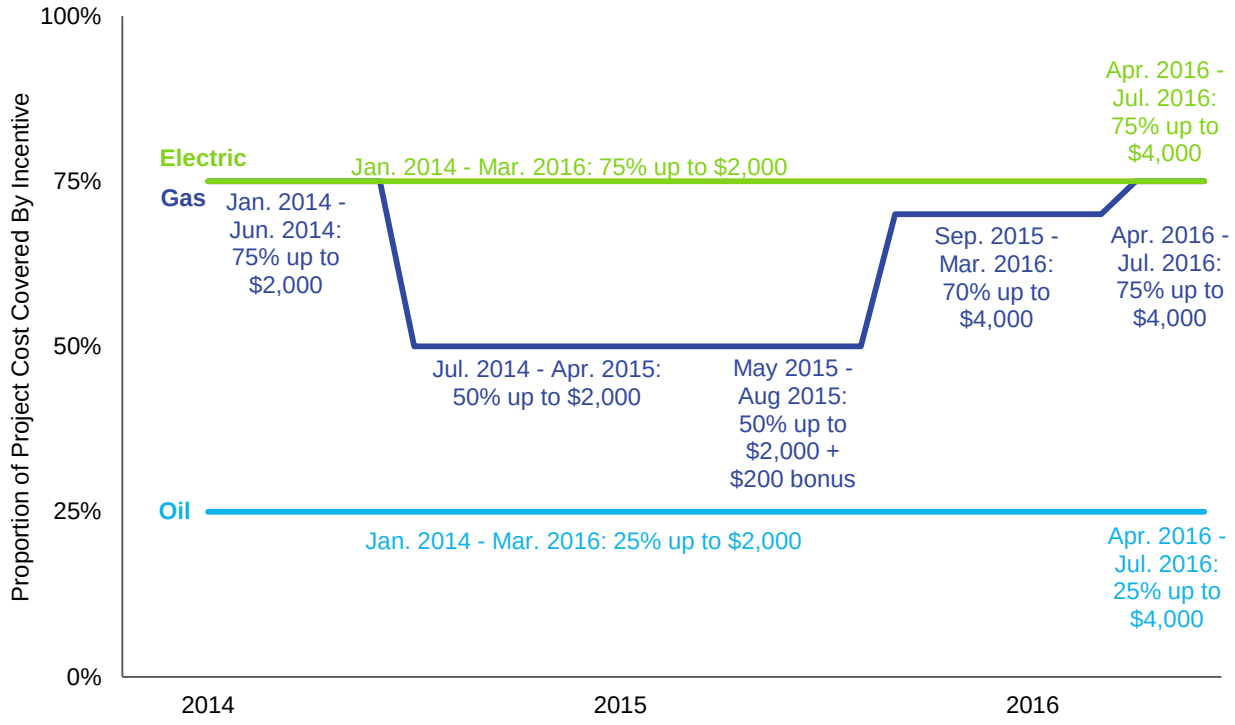
The EnergyWise program offers home energy assessments at no charge to all National Grid residential customers in single family homes, with the exception of those who qualify for income eligible services, who are served by another program. Staff of the program's lead vendor, RISE Engineering (RISE), conduct the energy assessment, which typically lasts between one and two hours and includes a blower door test to measure air leakage as well as an inspection of the building shell and systems to identify energy saving opportunities. During the assessment, the assessor also installs efficient light bulbs, faucet aerators, showerheads, and other measures. Following the assessment, the assessor provides the participant with a report of the findings, information about National Grid incentive and financing programs, efficiency and renewable energy opportunities offered by partner organizations, and a detailed bid for any weatherization work the assessment recommends.

If the participant decides to move forward with the recommended weatherization work, RISE assigns and schedules one of the program's independent installation contractors to install the measures. Contractors who refer participants to the program can tag those participants to ensure they are assigned that participant's installation. Participants who choose to make improvements other than weatherization are responsible for arranging installation of those measures independently, although they may qualify for incentives from other National Grid efficiency programs.

As a quality assurance measure, a RISE staff member visits each participant's home as the weatherization measures are being installed. This staff member is also on-call to the installation contractors to approve any deviation from the scope of work as the assessor defined it. In addition to these QA visits that RISE conducts, the program also employs a third-party contractor, Competitive Resources, Inc. (CRI), to provide QA on a sample of assessments and weatherization installations.

National Grid offers incentives to reduce the cost of weatherization measures installed through the EnergyWise program. Incentive levels differ based on the participant's primary heating fuel and have varied over time (Figure 1-1).

Figure 1-1: EnergyWise Incentive Levels by Heating Fuel Type 2014-2016



In addition to offering incentives, National Grid works with six financial institution partners in Rhode Island to make HEAT Loans available to EnergyWise participants. HEAT Loans allow participants to borrow up to $25,000 for a period of up to 7 years at 0% interest to pay for efficient heating systems, domestic hot water systems, and weatherization measures recommended in their EnergyWise audits. While HEAT Loans are available for measures not incentivized through the EnergyWise program, but may be incentivized through other National Grid programs, all HEAT Loan participants are required to have an EnergyWise assessment. This provides National Grid with an opportunity to encourage participants interested in single-system upgrades to take a more comprehensive approach.

1.2. Research Objectives

National Grid defined a list of specific research questions for the evaluation to pursue, grouped within four broader research objectives (Table 1-1).

Table 1-1: Customer Experience Research Objectives and Specific Research Questions

RESEARCH OBJECTIVES		SPECIFIC RESEARCH QUESTIONS
What is the customer experience?	Energy assessments and savings	What is the customer's feedback on the auditor and experience?
		How satisfied are customers compared to other similar services, e.g. remodeling or work with other home contractors?
		How have the energy saving measures worked?
		What additional energy savings action could National Grid pursue?
		Did the customer take additional energy saving actions on their own?
		What's the customer's awareness around certain marketing/brand topics?
		How can National Grid improve the program and services in the future (e.g. innovation and new measures)?
		What would a customer be willing to pay for an assessment in the future?
	Weatherization jobs	Having completed a weatherization, what does a customer wish they had known before to help them prepare?
		What is the customer's feedback on the weatherization subcontractor and experience? Was the customer satisfied with the results?
		What makes a customer move forward with a weatherization? What are other motivations?
		How do different weatherization incentive levels (e.g. 70% for gas, 25% for oil) motivate customers?
		What barriers do customers have who did not move forward with recommended weatherization measures?
	Heat Loan customer feedback	Is the Heat Loan equitable? Are there customers who are not applying or turned down due to financial or other barriers?
		Why did customers not participate? If they applied, why were they turned down?
		For customers who did weatherize but did not use a Heat Loan, why did they not pursue a Heat Loan and how did they fund the work?
		For participants, what is the customer's feedback on the Heat Loan and experience with the lead vendor and local bank?
		Are customers interested in or eligible for Residential PACE?
	Heat Loan effectiveness	What is the project size ($) for Heat Loan vs jobs without?
		What is the measure mix with Heat loan vs. jobs without?
		Did customers do more because of Heat Loan?
		Can the data be analyzed by income level (National Grid doesn't have income information)?

Table 1-2: Additional Research Objectives and Specific Research Questions

RESEARCH OBJECTIVES	SPECIFIC RESEARCH QUESTIONS
What are the Heat Loan vendor perspectives?	What is the amount of effort spent marketing HEAT versus other loan products offered? How complex is the Heat Loan compared to other products (are there efficiencies to be gained)?
	What is the current underwriting criteria applied by lender, stratified by FICO score range?
	What are lender perspectives on maintaining 0% HEAT loans in a rising interest rate environment?
	What lender perspectives on the potential to expand the tenor of HEAT loans and move to non-zero interest rates?
	What is the lender perspective on default rates of Heat Loans vs. other types of residential short-term, unsecured lending in RI?
	How many customers are being turned down for the Heat Loan?
How are the lead vendor and sub-contractors performing?	What processes can be improved regarding customer services, quality assurance, data?
	What kind of results have pilots provided?
	What is the feedback regarding performance among National Grid, the lead vendor and sub-contractors?
	Are there cost-efficiencies to be gained through process changes?
	How are sub-contractors performing regarding quality installation, savings and errors?
What can EnergyWise learn from programs elsewhere in the country?	Can you provide information broken out by different program designs, (e.g. lead vendor model vs. independent contractor model like Connecticut)?
	How do customer incentives and costs compare to similar programs in other states?
	How do savings achieved by the programs compare?
	In communities with a higher rate of weatherization per audit, what is driving the higher participation?
	How do other programs market differently?
	What are new and innovative, cost effective, measures that should be considered?

1.3. Report Organization

Following a discussion of the research methodology (Chapter 2), this report reviews EnergyWise program accomplishments, drawing on program data (Chapter 3). The report then examines the experience of EnergyWise participants (Chapter 4), the assessors and contractors who deliver the program (Chapter 5), and the lenders who offer HEAT Loans in Rhode Island (Chapter 6). Finally, the report presents findings from other programs offering home energy assessments and weatherization around the country (Chapter 7) and offers conclusions and recommendations drawing on findings across populations and data collection activities (Chapter 8).

2. Methodology

This chapter describes the research methodology for the four key data collection activities that inform this evaluation: analysis of program data, a web survey of participants, in-depth interviews with actors involved in program delivery, and a review of industry literature.

2.1. Program Data Analysis

National Grid provided the research team with two exports from the EnergyWise database. The first comprised 278,042 records, with each record representing a measure, incentive, or fee. These measures corresponded to 28,452 EnergyWise participants. Approximately 5% (1,436) of those participants had assessments prior to the period captured in the database export. As a result, for these participants, the export contained records of weatherization improvements but did not contain records of an assessment prior to those improvements. Because this evaluation focuses on the participation process and participants' motivations, we removed these cases, which did not reflect the complete process, from our analysis. This left us with records of 27,016 EnergyWise home energy assessments and subsequent weatherization measures.

These assessments were completed between January 2012 and June 2016, but the number of assessments in 2012 and 2013 is notably lower than the number completed in subsequent years, suggesting that data for 2012 and 2013 may not be complete (Table 2-1). As a result, we excluded projects prior to 2014 from any analyses comparing outcomes over time.

Table 2-1: Number of Assessments Listed in Measure-Level Data by Year

Year	Number of Assessments
2012	112
2013	2,890
2014	9,205
2015	10,101
2016 (through June)	4,708
Total	**27,016**

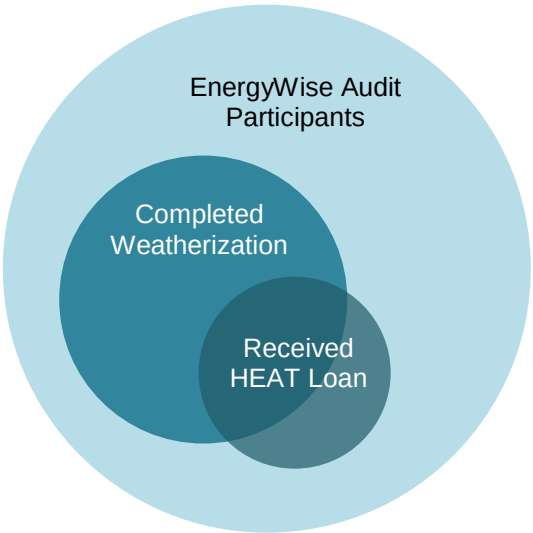
The second export comprised 9,786 records, with each record corresponding to a weatherization project completed between January 2013 and June 2016. We were able to match 8,474 of these records to the records in the measure-level database export. In consultation with National Grid and RISE, we determined that the remaining weatherization project records represent projects with audits that occurred prior to the time period captured in the measure-level database export. To create a dataset for analysis, we collapsed the records in the measure-level database export (creating one record per participant) and merged in data from the weatherization project database for participants that completed weatherization projects.

National Grid also provided an export of records from CRI, the program's third-party quality control (QC) contractor. These records listed the QC outcomes and included inspectors notes from 742 QC inspections conducted between January 2015 and the end of May 2016.

2.2. Participant Survey

Research Into Action sent email invitations to encourage EnergyWise participants to take an online survey on their experiences with the program and considerations regarding energy efficiency improvements. The survey gathered data on participants' experiences with the EnergyWise home energy assessment, weatherization upgrades, and HEAT Loans. In order to fully address these topics, we divided participants into three groups: those who completed an audit but did not make weatherization improvements or receive a loan, those who made weatherization improvements but did not receive a loan, and those who received a HEAT Loan. Figure 2-1 summarizes the relationships between these groups. All participants in all three groups received audits. While most HEAT Loan participants used their loans to fund weatherization improvements, heating and domestic hot water system replacements are also eligible for HEAT Loans. Thus, some HEAT Loan recipients did not complete weatherization projects.

Figure 2-1: Participant Survey Populations



To increase the likelihood that participants would be able to accurately recall their experiences with the EnergyWise program and HEAT Loans, we drew our sample from participants who had EnergyWise audits within the year leading up to the survey's implementation. The EnergyWise program conducted a total of 9,879 audits between July 2015 and June 2016, the month prior to the survey's launch. In order to minimize the burden on National Grid customers, we randomly selected a sample of participants within the audit and weatherization groups to receive survey invitations. We drew these samples of sufficient size to meet the targeted number of responses,

based on the response rate of a small-scale, pre-test of the survey. Given the relatively low number of HEAT Loan recipients, we sent survey invitations to all members of that group.

Table 2-2: Participant Survey Response Rates

Group	Audits Completed	Unique Participants With Email Address	Sample	Complete Surveys	Response Rate	95% Confidence Interval
Audit	7,830	6,162	1,023	131	13%	+/-9%
Weatherization	1,616	1,319	485	110	23%	+/- 9%
Loan	433	389	389	111	29%	+/- 8%
Total	**9,879**	**7,870**	**1,897**	**352**	**19%**	**+/- 5%**

To reduce the potential for non-response bias in our survey findings, we contacted the nonresponding participants in our sample multiple times. In addition to the initial invitation email, participants who had not completed the survey received two follow-up invitations over the course of eight days, from June 29, 2016 through July 5, 2016.

2.3. In-Depth Interviews

Research Into Action conducted in-depth interviews with members of four groups involved in program delivery: the program's administrative staff (including National Grid, and lead vendor, staff), auditors, independent installation contractors, and Heat Loan lenders. Because each group has a unique perspective on program delivery, we created unique interview guides addressing the research objectives based on each respondent's role. The overarching research objective for the in-depth interviews was to receive feedback regarding process improvements, potential cost-efficiencies, and program performance among assessors, contractors, lenders and administrative staff.

Table 2-3 lists the populations we interviewed, the anticipated number or responses from each group, and the number of completed interviews

Table 2-3: In-Depth Interview Populations and Sample Sizes

Group	Population Size	Target Sample Size	Complete Interviews
Administrative Staff	6	6	4
Auditors	16	10	10
Independent Installation Contractors	27	10	11
Heat Loan lenders	7	7	5

While we sought to interview contractors closely involved in the installation process, two of the contacts interviewed were in an office manager role; however, they still provided valuable feedback on program processes and customer feedback. One contractor we interviewed reported that although the firm was still an approved contractor, it no longer regularly conducts EnergyWise projects. However, this contractor provided unique feedback on why they no longer actively participate and so we include the contractor in our sample.

2.4. Comparison Program Review

Research Into Action conducted a review of secondary data to document best practices relevant to the design of the EnergyWise program. We identified four programs that we anticipated could provide insight into effective program design and delivery practices relevant to EnergyWise. We selected the following programs due to their innovative approaches and because they represent a variety of program designs:

- Boulder County (Colorado) EnergySmart
- Michigan SAVES
- Puget Sound Energy (PSE, Washington) HomePrint (now Home Energy Assessments)
- Austin Energy (Texas) Home Performance with Energy Star (HPwES) program

For each of the selected programs, we reviewed documentation including evaluation reports, conference proceedings, and regulatory filings to understand the programs' designs, accomplishments, and lessons learned.

In order to provide a more applicable and in-depth comparison of program costs and accomplishments, we also reviewed annual reports reporting energy efficiency accomplishments from four ratepayer-funded programs that offer services similar to EnergyWise:

- Baltimore Gas & Electric (BGE) Smart Energy Savers
- Efficiency Vermont Home Performance with ENERGY STAR
- Xcel Energy (Minnesota) Home Energy Audit/Home Energy Squad
- Puget Sound Energy HomePrints/Home Energy Assessments

3. Program Accomplishments

This chapter presents findings from a review of EnergyWise program data. The findings listed here are drawn from records corresponding to 28,452 home energy assessments conducted between 2012 and the first half of 2016. As discussed in section 2.1, above, we excluded records prior to 2014 from any analyses comparing outcomes over time due to concerns that data for 2012 and 2013 were incomplete. The program data provided insights into characteristics of EnergyWise participants and their homes, trends in program uptake over time, and characteristics of EnergyWise projects.

3.1. Participant Characteristics

In general, households receiving EnergyWise assessments are relatively similar to the larger population of owner-occupied homes in Rhode Island. Participants completing weatherization projects and using HEAT Loans begin to show differences from the larger population. For example, participation in EnergyWise assessments largely reflects the distribution of owner-occupied homes across Rhode Island counties. Participants completing weatherization projects through EnergyWise are slightly more likely to live in the most populous counties (Providence and Kent Counties), and this difference is more pronounced for HEAT Loan recipients.

Table 3-1: EnergyWise Participants by County, Projects Completed June 2015-May 2016*

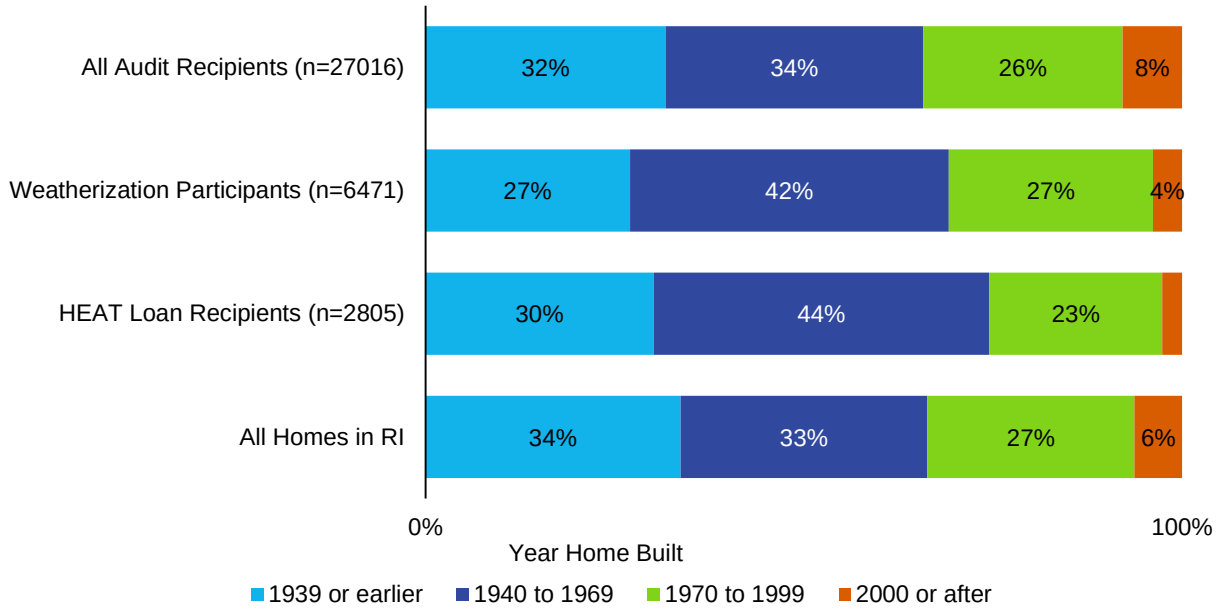
	EnergyWise Participants			All RI Homes*	
County	All Audit Participants (n=11,068)	Completed Weatherization (n=2,989)	Used HEAT Loan (n=879)	Owner Occupied	All
Providence County	51%	52%	57%	51%	68%
Kent County	19%	21%	22%	19%	13%
Washington County	13%	13%	10%	15%	8%
Newport County	10%	8%	6%	9%	8%
Bristol County	7%	7%	5%	6%	3%

* Data presented in this table are based on projects *completed* between June 2015 and May 2016. Other analyses focus on projects that received assessments within a particular date range. Because of the time required to move from assessment to completion of a weatherization project (see section 3.2.3), these data include considerably more completed weatherization projects and HEAT Loans than would an examination of projects initiated in the same time period.

** Based on American Community Survey 5-year estimates for 2009-2014.

EnergyWise participants are somewhat more likely than the larger population of Rhode Island households to live in older homes, and particularly in mid-century homes (Figure 3-1). Again, this difference is most pronounced among participants that completed weatherization projects and those that used HEAT Loans.

Figure 3-1: Year Home Built by Participation Status



Data for All Homes in RI represents single-family (1-4 unit) homes, based on ACS 5-year estimates for 2010-2014.

While EnergyWise assessment participants largely parallel the broader population of single-family homes in the state in their distribution of primary heating fuels, weatherization participants are notably more likely to heat with natural gas and less likely to heat with oil or other delivered fuels. As discussed below, this difference likely reflects differences in incentive levels by heating fuel type.

Table 3-2: Heating Fuel Type by Participation Status 2014-2016

	EnergyWise Participants			
Primary Home Heating Fuel	All Audit Participants (n=24,014)	Completed Weatherization (n=5,609)	Used HEAT Loan (n=2,805)	All Rhode Island Homes*
Natural Gas	52%	62%	56%	50%
Electric	4%	5%	2%	5%
Oil and Other Fuels	44%	33%	43%	44%

* Data for All Homes in RI represents single-family (1-4 unit) homes, based on ACS 5-year estimates for 2010-2014.

Data on EnergyWise participants' income levels is presented in Section 6.4.2.

3.2. Project Characteristics

3.2.1. Measures Installed

Almost all EnergyWise assessment participants received at least one measure that assessors install during the assessment, with efficient lightbulbs, refrigerator brushes, and smart power strips most common (Table 3-3). Weatherization measures were most common among the incentivized measure types listed in the database.

Table 3-3: Proportion of Recipients Receiving Measures by Type

	Proportion of Participants Installing:			
Measure Type	**2014 (n=9,205)**	**2015 (n=10,101)**	**2016 (n=4,708)**	**Total (n=24,014)**
Direct Install Measures				
Lighting (Lamps)	93%	93%	90%	**92%**
Refrigerator Brush	86%	93%	91%	**90%**
Smart Power Strip	85%	93%	93%	**90%**
Air Sealing	17%	19%	7%	**16%**
Thermostat	4%	7%	11%	**7%**
Hot Water Savings (showerheads, aerators, pipe wrap)	4%	6%	6%	**5%**
Any Direct Install Measure	**98%**	**99%**	**99%**	**99%**
Incentivized Measures				
Insulation and Air Sealing	27%	26%	9%	**23%**
Thermostat	9%	5%	1%	**6%**
Duct Insulation and Sealing	4%	5%	2%	**4%**
Lighting (Fixtures)	5%	3%	1%	**3%**
Any Incentivized Measure	**35%**	**31%**	**11%**	**28%**

* In this analysis, we define direct install measures as any measures for which the database indicates that National Grid paid the full measure cost.

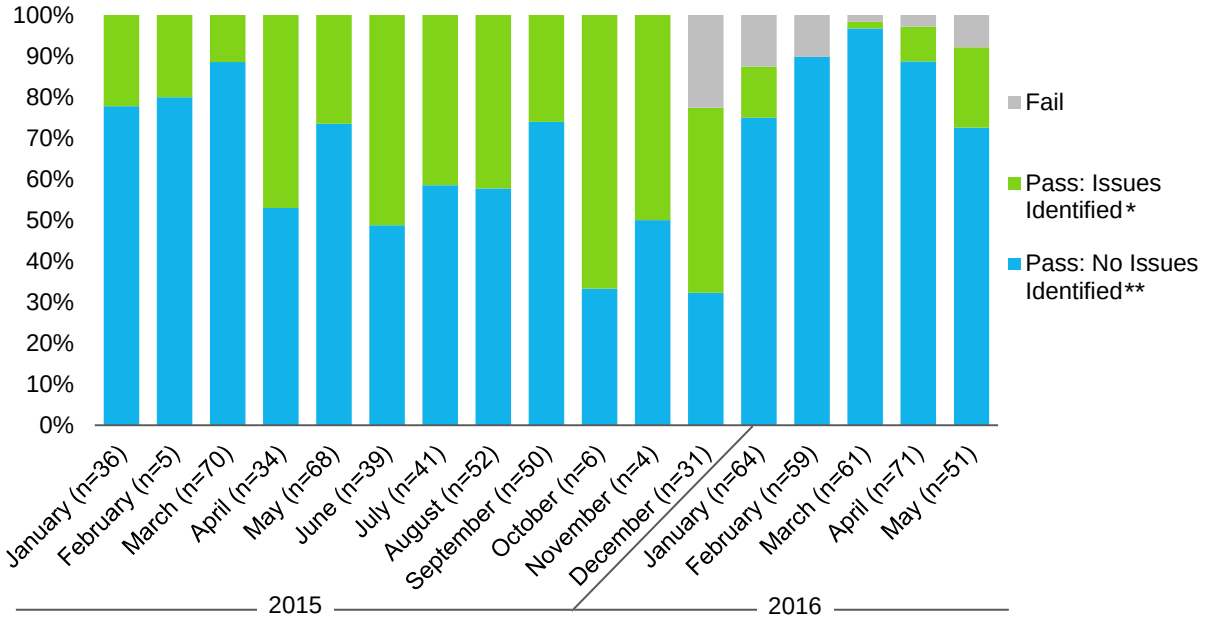
** We define incentivized measures as any measure for which the database indicates National Grid paid less than the full measure cost.

3.2.2. Quality Control Inspection Findings

CRI conducts independent quality control inspections on up to 10% of EnergyWise assessments and weatherization projects. Based on the records of these inspections, the proportion of projects that passed the inspection outright generally declined over the course of 2015, but notably increased at the beginning of 2016 (Figure 3-2). These changes likely reflect a shift in the way CRI rated projects, rather than a change in project quality. CRI staff reported that, late in 2015, they began rating projects as failures where previously these projects would have passed with notes. CRI staff stated that their program administrator clients agreed to this change in order to

better track projects that have more serious issues, distinct from those in which the notes address minor problems. CRI staff reported that, overall, project quality has remained consistent or improved in the past few years.

Figure 3-2: Quality Assurance Inspection Results January 2015 – May 2016



* Includes statuses "Pass with Notification" and "Pass with Follow-up"

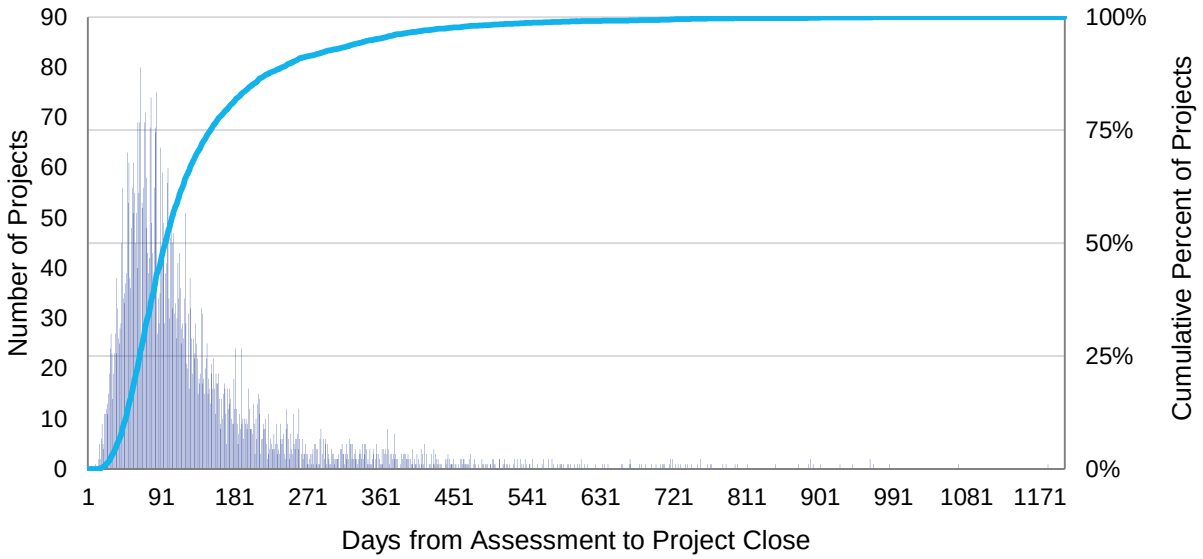
** Includes statuses "Pass" and "Pass with Compliment"

CRI staff reported that the most common reasons for weatherization projects to fail their inspections was a failure to install a sufficient amount of insulation, for example blowing in only four inches of insulation in an attic when eight inches were specified. RISE staff also noted that CRI had recently begun failing projects in which recessed light fixtures are only partially dammed and insulation makes its way into the recessed fixture. Other reasons projects might fail include multiple missed energy efficiency opportunities and incorrectly completed or incomplete combustion appliance safety tests or other potential health and safety issues.

3.2.3. Project Timelines

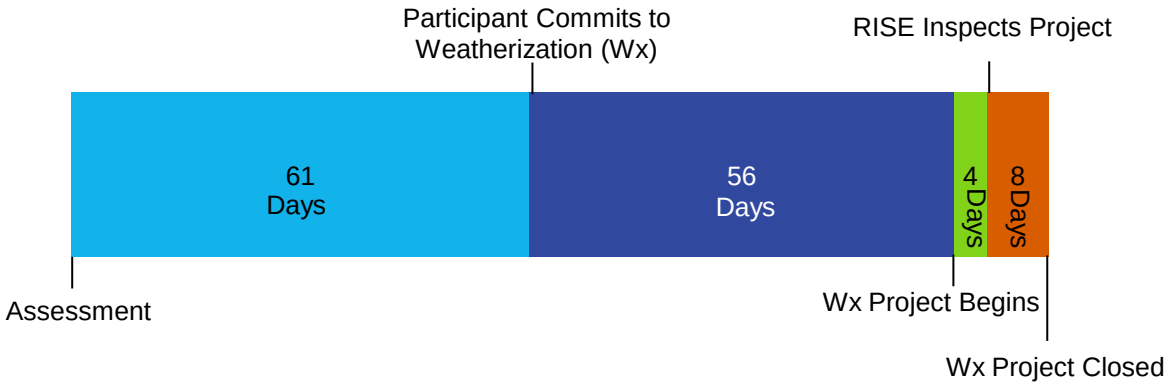
The median time required to complete an EnergyWise weatherization project, from the assessment to closing the project, was 95 days. Three-fourths of participants completed their weatherization projects within 150 days of their assessments, although a few took considerably longer (Figure 3-3).

Figure 3-3: Distribution of Time from Assessment to Close of Weatherization Project



Reflecting the small number of projects that took considerably longer to close than most, the average time required to close a weatherization project was 129 days after the time of the assessment (Figure 3-4). The time required for the participant to commit to moving forward with a weatherization project accounted for the largest portion of this period. While some participants committed to weatherization projects at the time of their assessments, others took considerably longer. Half of weatherization participants committed to their projects more than 23 days after their assessment, with the longest completing a project more than three years after their assessment. The time required to schedule the weatherization project was the next longest part of the process, ranging from participants whose projects began the day they committed to completing them to one whose project began more than 17 months after they committed.

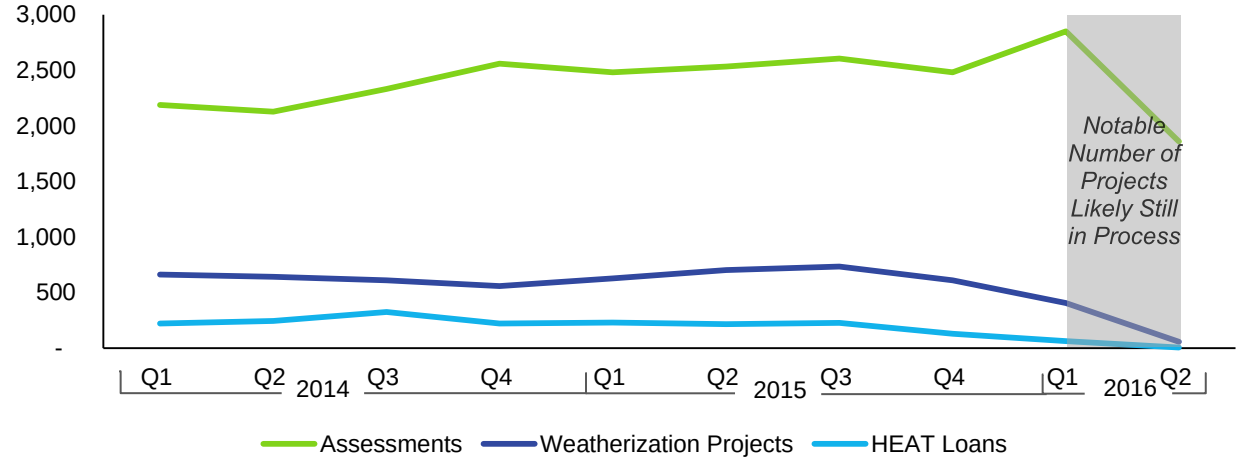
Figure 3-4: Average Time to Complete EnergyWise Weatherization Projects



3.3. Program Uptake

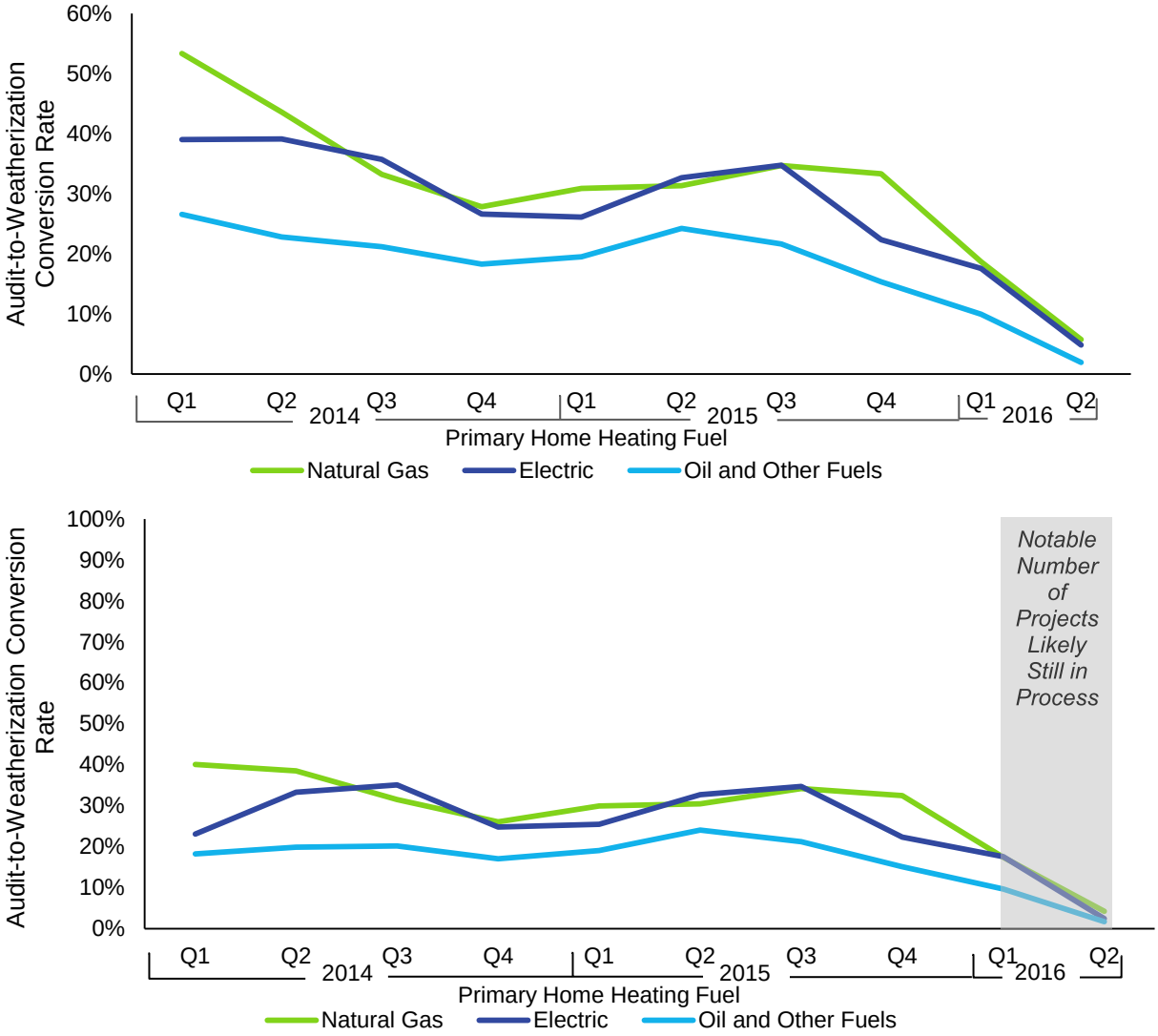
Participation in the EnergyWise program was largely steady from the beginning of 2014 through the fourth quarter of 2015, with quarterly participation ranging from 2,128 to 2,482 assessments, 559 to 735 weatherization projects, and 129 to 326 HEAT Loans (Figure 3-5). The data show a slight dip in participation in the first two quarters of 2016. This likely reflects the time required for participants to move through the program. As Figure 3-3, above, suggests, 25% of participants who will ultimately complete a weatherization project may not yet have done so five months (150 days) after their assessments were completed.

Figure 3-5: EnergyWise Program Uptake 2014-2016



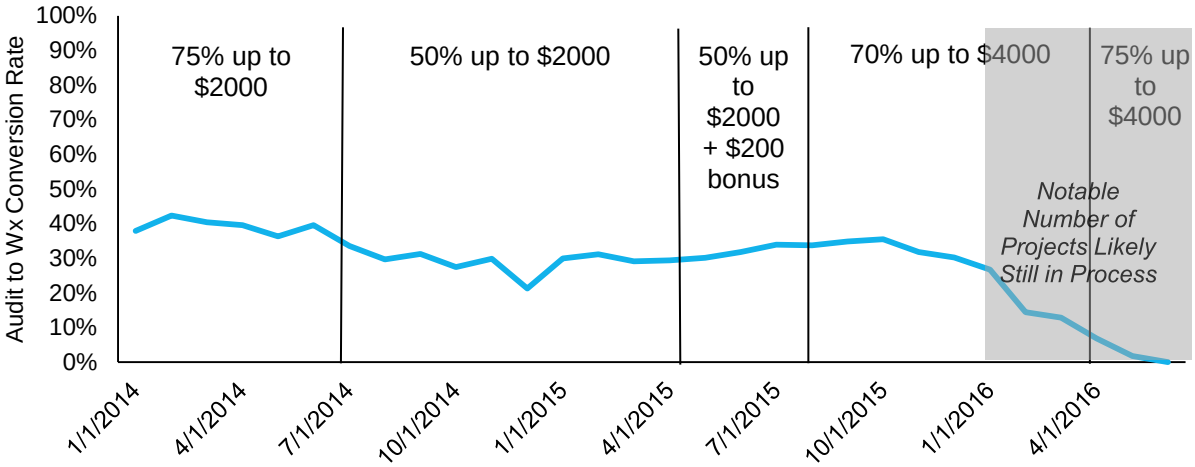
Overall, 27% of EnergyWise home energy assessment participants in 2014 and 2015 completed weatherization projects. This conversion rate varied by the participants' home heating fuel type, with the variation likely due, in part, to differences in the incentives available for weatherization projects. Participants heating with oil and other delivered fuels are eligible for the lowest incentives, and had the lowest conversion rates, averaging 18% over the two years. Participants heating with natural gas had the highest conversion rates (averaging 30% over the two years). Natural gas participants received lower incentives than participants heating with electricity for much of that period, but electrically-heated homes make up a relatively small proportion of EnergyWise participants, and Rhode Island homes in general.

Figure 3-6: Audit-to-Retrofit Conversion Rate by Primary Home Heating Fuel, 2014-2016



Variation in conversion rates among natural gas participants in particular shows the effect of changes in incentive level on uptake of weatherization projects (Figure 3-7). Conversion rates among participants heating with natural gas fell from an average of 39% in the first half of 2014 to 29% in the second half of 2014 and first half of 2015 as natural gas incentive levels declined from 75% of project costs to 50% of project costs. Conversion rates for natural gas participants gradually increased through the second half of 2015 and early 2016 as incentive levels increased. The decrease in conversion rates beginning at the end of 2015 likely reflects the time required for projects to move through the program; some projects may be in progress, or audit participants may not yet have begun weatherization projects.

Figure 3-7: Audit-to-Weatherization Conversion Rate of Natural Gas Heated Homes with Incentive Levels 2014-2016



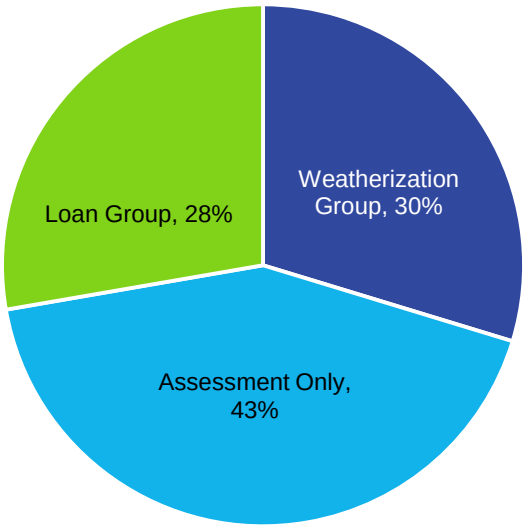
4. Participant Experience

This chapter presents findings from a survey of 352 EnergyWise home energy assessment participants. In the analyses that follow, we classify these respondents into three groups:

- **Assessment only participants** completed a home energy assessment, but reported they had not installed the insulation and air sealing measures the assessment recommended and did not report receiving a HEAT Loan.
- **Weatherization participants** completed a home energy assessment and reported installing insulation and air sealing measures the assessment recommended, but did not report receiving a HEAT Loan.
- **HEAT Loan participants** completed a home energy assessment and reported receiving a HEAT Loan. These participants may have installed weatherization measures or efficient heating and cooling or water heating systems that qualify for HEAT Loans.

Figure 4-1 summarizes the number of respondents in each group, based on their survey responses.[1]

Figure 4-1: Survey Respondents by Participant Group



[1] Note that these figures differ somewhat from those listed in Table 2-2 in Chapter 2, which lists the response rates for each survey group. The figures reported in Chapter 2 reflect participant type classifications based on data contained in the program database. The figures reported here are based on survey items designed to verify respondents' participation status. Differences between program data and reported responses may reflect a respondent's incomplete knowledge of the actions their household had taken (for example, if another member of the household managed the financial aspects of a weatherization project, including taking out a HEAT Loan), or recent actions not captured in the program data available to us.

The remainder of this section describes key trends and findings; frequencies for each survey item are available in Appendix D.

4.1. Energy Assessment Motivations

All but one of the 352 survey respondents recognized the EnergyWise Home Energy Assessment by name. Participants across all three groups most often cited reducing energy bills as a motivation to participate in the program (Table 4-1). Consistent with assessors' reports that increasing comfort is a key selling point for weatherization improvements, assessment-only participants – who did not complete weatherization upgrades following their assessments – were less likely to report a desire to increase home comfort as a factor that motivated them to seek an assessment.

Table 4-1: Energy assessment motivations by group

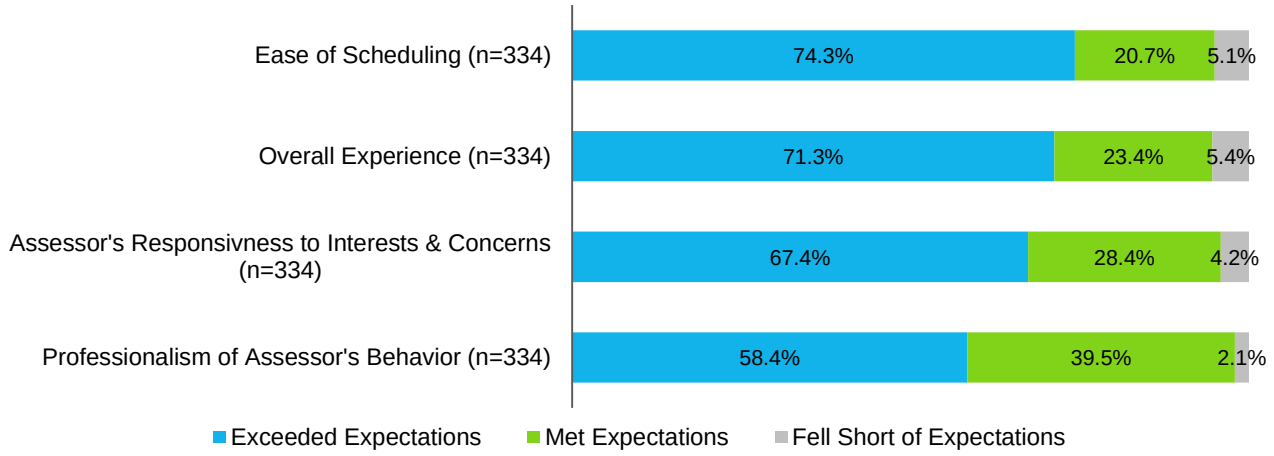
MOTIVATORS	ASSESSMENT GROUP (n = 150)	WEATHERIZATION GROUP (n = 105)	LOAN GROUP (n = 97)
Reduce energy bills	78.0%	88.6%	82.5%
Make home more comfortable	36.0%*	50.5%	50.5%
Help environment & community	30.7%	42.9%	35.1%
Improve recently purchased home	19.3%	19.0%	28.9%
Prepare home for sale	4.7%	5.7%	4.1%
Other	6.0%	5.7%	7.2%

* $x^2 < 0.05$

4.2. Customer Feedback on Auditor & Experience

Most customers rated their assessor and home energy assessment experience positively relative to other home improvement professionals, with more than 90% of respondents reporting that their assessment experience met or exceeded their expectations for home contractor services in each aspect the survey addressed. As shown in Figure 4-2, participants rated the ease of scheduling, overall experience, and assessor's responsiveness more highly than the assessor's professionalism, although more than half of respondents nonetheless reported that the assessor exceeded their expectations for home contractor services.

Figure 4-2: Customer Ratings of Assessment Experience Relative to Other Home Improvement Services



"Exceeded Expectations" includes ratings of much better and somewhat better on each aspect of the experience. "Met Expectations" includes ratings of equally good, and "Fell Short of Expectations" includes ratings of somewhat worse and much worse on each aspect.

More than half of the surveyed participants (56.6%) expressed willingness to pay for an assessment (Figure 4-3). Those participants most often reported they would pay up to $100 (22%), although nearly one fourth-of respondents (24.6%) reported they would pay up to $200 or more. There was no significant difference in price consideration between those who completed weatherization projects and those who did not. This suggests that customers saw value in the assessment whether they completed weatherization projects or not, but also calls into question the assertion that charging for assessments would increase conversion rates by reducing the proportion of participants not serious about making efficiency upgrades.

Figure 4-3: Willingness to Pay for Home Energy Assessment (n=350)

Consistent with their experience receiving more comprehensive services during the assessment, participants that received same-day air sealing reported they would be willing to pay more than those that did not receive same-day air sealing. Nearly half of those who received same-day air sealing (48%, n=46) reported they would consider paying up to $200 or more for an assessment, while about one-fourth of those that did not receive same-day air sealing (26%, n=222) reported willingness to pay at those levels.

4.3. Information and Recommendations

Overall, assessment participants gave relatively high ratings to the information they received following their assessments, with large majorities agreeing that the information was clear, they had learned something new about their home's energy usage, and they knew how to move forward with improvements, incentives, and loans (see Table 4-2). Participants who did not move forward with weatherization projects or loans gave significantly lower ratings to their understanding of how to move forward with improvements, their National Grid rebate opportunities, and how to apply for HEAT Loans than those who did complete improvements.

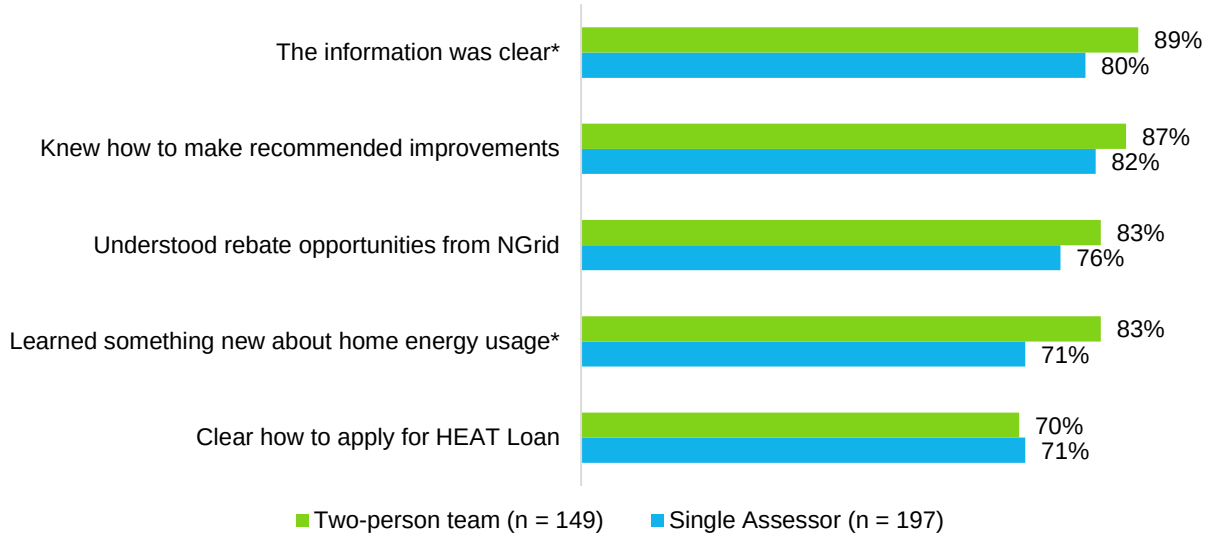
Table 4-2: Participant Ratings of Information Received Following Assessment

	Assessment Group (Agree)	Weatherization Group (Agree)	Loan Group (Agree)
The information was clear (n=345)	81%	88%	87%
Knew how to make recommended improvements* (n=345)	79%	90%	90%
Learned something new about home energy usage (n=342)	76%	78%	81%
Understood rebate opportunities from National Grid* (n=337)	75%	87%	89%
Clear how to apply for HEAT Loan* (n=309)	72%	77%	92%

* Difference is significant across all three groups (Non-parametric test <0.05)

Survey findings indicate that using a two-person team to conduct the assessment may improve participants' understanding of the information they receive following the assessment. Participants that received an assessment from a two-person team were significantly more likely to agree that the information provided was clear and that they learned something new about their home's energy usage.

Figure 4-4: Ratings of Information Received Following Assessment by Type of Assessor Team



4.3.1. Uptake of Recommendations

In order to assess participants' experience with the process of completing weatherization projects, we sampled a disproportionate number of survey respondents who completed weatherization projects. As a result, our survey data alone do not provide an accurate measure of the proportion of audit recipients who acted on weatherization recommendations. While all weatherization participants are likely to have received a recommendation to install weatherization measures, assessment-only and HEAT Loan participants may or may not have received these recommendations. Thus, we assume that these two groups are relatively representative of the larger population of EnergyWise participants in their likelihood of receiving recommendations for weatherization measures.[2]

Seventy-percent of EnergyWise assessment-only participants and Heat loan recipients reported that their assessors recommended weatherization improvements. Thus, of the 4,228 assessments completed between July 2015 and November 2015, approximately 2,960 likely received recommendations for weatherization. Program data suggests that participants who received assessments during that period completed 1,146 weatherization projects. As a result, we estimate that 39% of the EnergyWise participants who received a recommendation to install weatherization measures did so. Table 4-3 summarizes this calculation.

2 This assumption may somewhat underestimate the proportion of EnergyWise participants that received a recommendation for weatherization measures because the audit-only and HEAT Loan groups are likely to include almost all of the sampled participants who did not receive such a recommendation. Nonetheless, we believe an assumption based on these two groups is likely to be more accurate than one that includes the weatherization group.

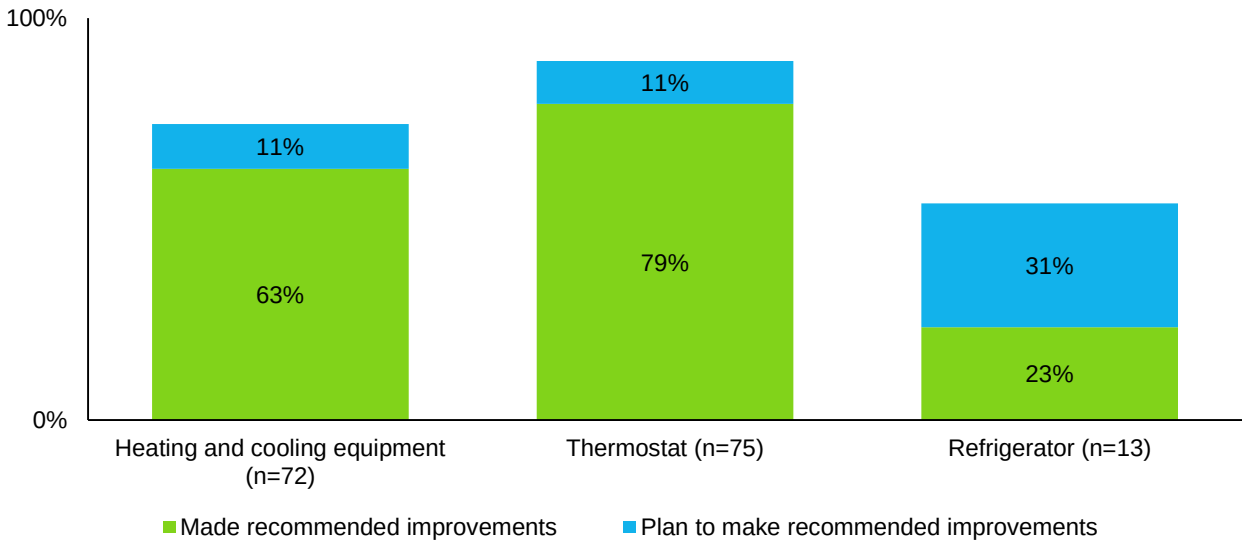
Table 4-3: Estimate of Uptake of Weatherization Recommendations

INPUT	VALUE
Assessments completed July to November 2015* (A)	4,228
Proportion of assessment-only and loan group respondents receiving recommendations for weatherization measures (B)	70%
Estimated number of assessments in which weatherization measures were recommended (A x B)	2,960
Number of weatherization projects completed by July 2015-November 2015 assessment recipients (C)	1,146
Estimated uptake of weatherization recommendations (C/ (A x B))	%39%

* This analysis uses a time period beginning in July 2015 to correspond to survey data, which drew on assessment participants between July 2015 and June 2016. Based on program data, we anticipate that a substantial proportion of participants (>25%) who had assessments after November 2015 would still be in the process of completing weatherization projects at the time of our database export.

This level of uptake for weatherization measures is considerably less than the level of uptake survey findings indicate for other measure types (Figure 4-5).[3] Nonetheless, a relatively small numbers of respondents that reported receiving recommendations for heating and cooling system upgrades, thermostats, and refrigerators. Some respondents who did not complete upgrades may have incorrectly reported that they did not receive recommendations for these measures. We did not have access to data that would allow us to assess this possibility.

Figure 4-5: Uptake of Recommendations for Heating and Cooling System, Thermostat, and Refrigerator Improvements



3 Because our sampling did not account for energy upgrades other than weatherization, we assume that our sample of survey respondents is representative of the larger population in the frequency with which respondents received recommendations for heating and cooling system, thermostat, and refrigerator upgrades.

4.3.2. Barriers to Uptake

Across the four measures; participants that did not plan to install recommended improvements in the next six months most often cited affordability as a factor preventing them from doing so. This was significantly more pronounced for heating and cooling system upgrades than weatherization, refrigerator, or thermostat upgrades (see Table 4-4).

Table 4-4: Factors Influencing Decision Not to Move Forward with Recommendations

Reason for Not Pursuing Upgrade	Insulation and air sealing, thermostat & refrigerator (n=36)	Heating and cooling (n=12)
Could not afford it	22%	58%
Not convinced of value	17%	8%
Completing work would have been too inconvenient	11%	0%
Did not know how to proceed with work	11%	8%
Did not need it	6%	8%
Loan application was denied	3%	8%
Did not want to use approved contractor	0%	0%
Other	31%	8%

4.4. Effectiveness of Energy Savings Measures

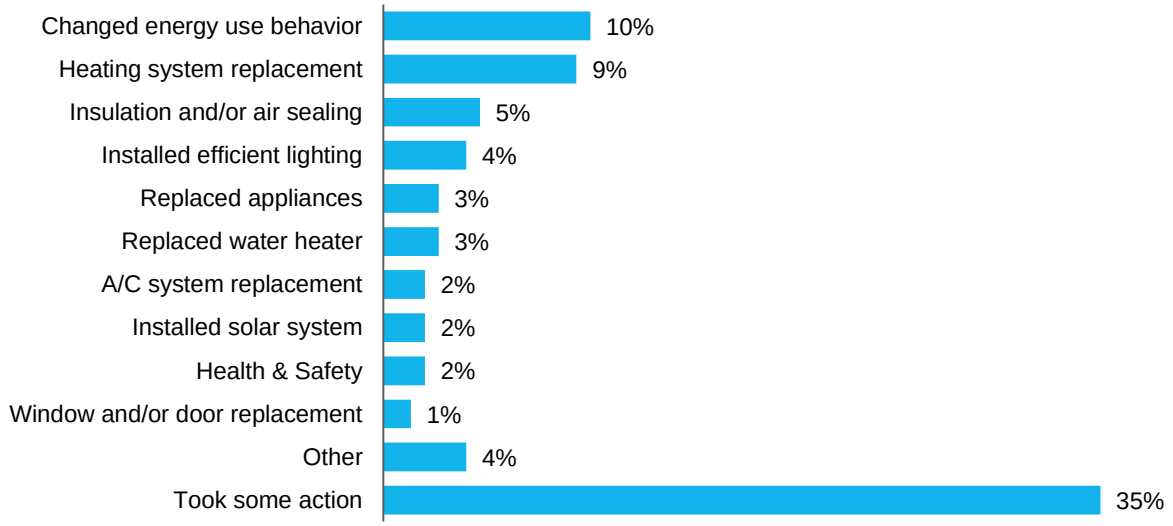
Participants were satisfied with the majority of the direct-installed measures they received during their home energy assessments. More than three-fourths of participants who received LED light bulbs, water-saving shower heads and advanced power strips reported regularly using them (Table 4-5). Furthermore, more than 87% of respondents across the three groups reported that they were satisfied with all five direct-installed measures ("mostly satisfied" or "very satisfied" on a 5-point scale). The smallest proportion of respondents reported regularly using the refrigerator coil brush that they received. Relatively few (11%) of these respondents reported difficulty using the brush. More often, respondents reported that they use it rarely (44%), forget to use it (23%), or are uninterested in using it (18%).

Table 4-5: Usage of Direct Install Measures (n=352)

Measures	Respondents Who Received Item	Respondents Who Regularly Use Item	Percent Who Regularly Use Item
LED light bulb(s)	316	305	97%
Water-saving showerhead(s)	23	18	78%
Advanced power strip(s)	312	241	77%
Water-saving faucet aerator(s)	12	8	67%
Refrigerator coil brush	298	130	44%

Approximately one-third of the respondents who did not make weatherization improvements through EnergyWise nonetheless reported that they had taken action to save energy in their homes since completing their energy assessment. Figure 4-6 shows the frequency of actions participants reported taking. These actions ranged from installing solar arrays to changing their home energy use behavior. Participants most often reported changing their energy use behavior and upgrading their heating and cooling systems, followed by adding insulation or air sealing and efficient lighting.

Figure 4-6: Additional Energy Saving Actions Taken by participants that Did Not Complete EnergyWise Weatherization projects or receive HEAT Loans (n = 150)

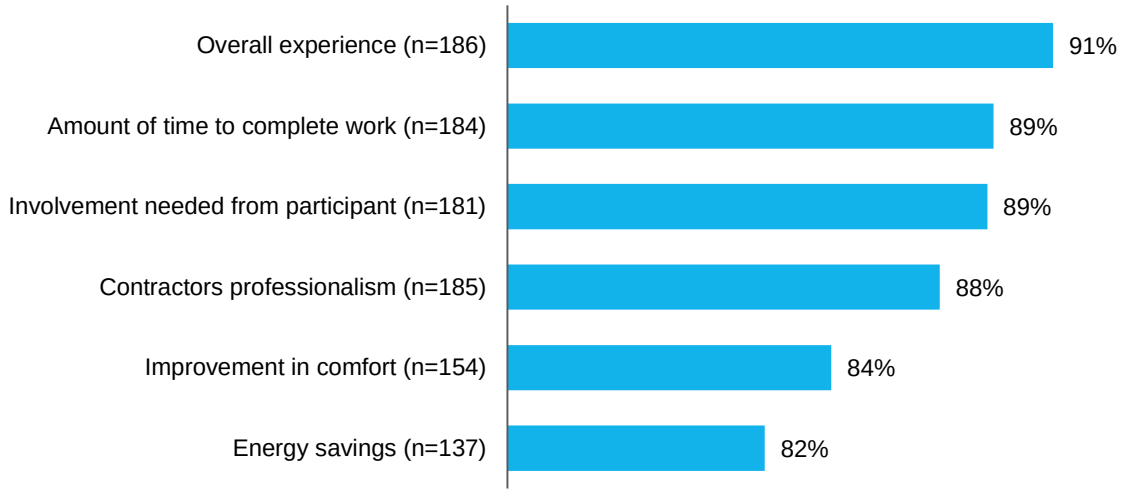


Participants who reported installing insulation and air sealing outside the program provided little additional detail on the measures they installed. Responses suggest that, for some participants, these actions may have been less comprehensive than a typical EnergyWise weatherization project, with participants referring to their actions as “weather stripping” or installing door drafts. Others reported only that they had installed insulation and completed air sealing.

4.5. Weatherization Jobs

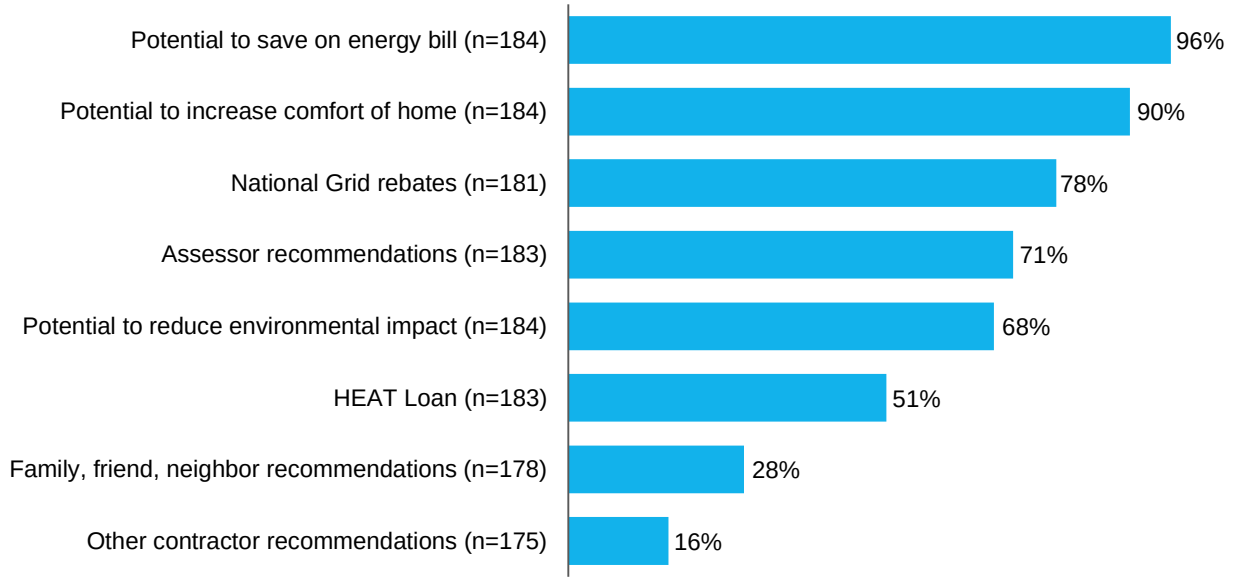
As shown in Figure 4-7, 91% of respondents who completed insulation and air sealing upgrades were satisfied with their overall experience. In addition, 95% of respondents said they would encourage others to do an insulation and air sealing upgrade. A notable proportion of respondents reported they were unsure of their satisfaction with the energy savings resulting from their weatherization improvements, likely because they have not experienced a full heating and cooling season since completing their projects.

Figure 4-7: Satisfaction with insulation and air sealing upgrade (n=186)



Similar to the energy assessment, participants reported that the energy saving potential, followed by home comfort and National Grid rebates were the primary factors that motivated them to make insulation and air sealing improvements (Figure 4-8). Reflecting on their experience with their weatherization upgrades, a majority of participants (60.7%) indicated that the information they received adequately prepared them for the upgrade experience. Among those that noted additional information would have been beneficial, financing (29.2%) and information about how to prepare their homes (9%) were the most common types of additional information desired.

Figure 4-8: Factors Influencing Decision to Make Insulation and Air Sealing Improvements (Rating of 4- or 5- on a 5-Point Scale)



5. Program Delivery Experience

This chapter presents assessors' and distributors' experience with the EnergyWise program and feedback on program offerings. These findings draw on interviews with 10 of the 16 RISE staff members who conduct EnergyWise home energy assessments in Rhode Island, and 11 of the 27 independent installation contractors who install weatherization measures through the program.

5.1. Assessor Perspectives

Assessors play a key role in delivering the EnergyWise program. In addition to the technical aspects of the assessment, they probe for and address participants' concerns, explain the participation process, and are the primary actors responsible for selling EnergyWise weatherization projects, including presenting information on incentives and HEAT Loans. This section presents assessors' perspectives on the assessment process, including their interaction with participants and presentation of findings, selling weatherization projects, including participants' motivations and responses to program offerings, and administrative and quality control processes.

5.1.1. Assessor Characteristics

The lead vendor for EnergyWise, RISE Engineering, Inc. conducts all program assessments. We spoke to assessors with varying levels of experience from those that had been conducting EnergyWise assessments for three months to as long as the EnergyWise program has existed. The majority have been working as an EnergyWise assessor for RISE for at least three years.

5.1.2. Assessment Process

The interviewed assessors were consistent in their descriptions of their approach to conducting assessments and interacting with customers. All assessors reported that they begin the assessment process with an introduction and overview to get to know the homeowners and their specific needs. The assessors use checklists to make sure they touch on every aspect of the house during the assessment. When a two-person team conducts the assessment, the assessor begins the walkthrough of the house, and for those that have implemented two person teams the technician will meanwhile check the lighting and conduct the blower door and combustion safety tests.

Assessors reported receiving training that prepared them well for interacting with participants. Consequently, they did not report making substantial changes to their interactions with participants as they gained experience conducting assessments. According to one assessor, "We have a pretty good training regimen for learning the ways we get through the house. [Any changes are] more tweaking to our own style. It helps us get through the assessment quickly and efficiently." Three assessors stated that they have always tried to make homeowners feel comfortable, which has helped them build trust. Some assessors reported that they have learned to better recognize and speak to participant concerns. According to one:

> "People are so different; you have to change how you describe things depending on the person. You get more talented at that as you do more. Adjusting to what they are looking for. They all get the same exact assessment, but the small interactions are a little different based on their personality."

The interviewed assessors described recent changes in procedures to help streamline the assessment process as effective. These changes include moving to a team approach, in which a technician is present during the assessment to conduct the lighting counts, install the direct install measures, and conduct the blower door and combustion safety tests. One assessor stated that this has improved the process and enabled him to make better recommendations because everything is done at once. Four assessors also mentioned their move to recording assessment findings on tablets or computers rather than on paper, and the use of photos (three mentions) as changes that have been effective in streamlining and improving the assessment process.

Assessors' recommended a few additional changes to program processes that might improve the program's efficiency and effectiveness. Two assessors stated that when they know the homeowner's concerns ahead of time, they can be more efficient and focus on what is important to the customer during the assessment. Additionally, two assessors expressed a desire for information about resources they can recommend to assist participants that need to overcome pre-weatherization barriers such as knob and tube wiring and additional ventilation.

5.1.2.1. Participant Interaction

Assessors stated that a wide variety of questions and concerns motivate participants to pursue an assessment. Most often assessors mentioned that customers are concerned about their heating system (six assessors), and why their utility bill is so high (six assessors). Some customers are also curious about how the program works and where the funding comes from (four assessors).

Assessors reported that most customers are engaged in the assessment and interested in the recommendations that follow. The majority of assessors (seven of ten) stated that most participants are very engaged in the assessment and will accompany the assessor for at least part of the walkthrough, but the level of interest can vary. Assessors cited a variety of factors associated with a customer's level of interest, including why the customer wanted an assessment, if the person who called is present at the time of the assessment, and how busy the participant is at the time of the assessment. One assessor commented that customer interest levels are a "mixed bag, the person who calls may not be there, but some people are really into it. It really depends on the person."

Assessors reported that most customers have few concerns, if any, with the assessment process. According to assessors, those participants that do have questions most often want to know more about next steps. The interviewed assessors stated they are able to address these concerns so that customers feel confident in their next steps at the end of the assessment. According to one assessor, "That is usually the biggest concern, steps they have to take to take advantage of what we're doing. But it's pretty clear cut, so not that difficult to illustrate to them."

Assessors reported rarely encountering challenges that affected their own ability to complete the assessment. The most common challenge assessors reported include the need to move participants' furniture or belongings to access certain areas of the home (six respondents); and not being able to access some portion of the house (three respondents). Respondents reported encountering these challenges in a minority of their EnergyWise projects, and stated they are usually able to work with homeowner to resolve the issue, work around it, or come back another time.

5.1.2.2. Presentation of Assessment Findings

At the end of the assessment, the assessor reviews the findings with the homeowner and recommends next steps. All of the interviewed assessors reported that most customers are very interested in the recommendations at the end of the assessment. Four respondents specifically mentioned that most participants are pleased at the end of their assessment, and feel that the assessment has addressed their concerns or reassured them about the state of their home. One assessor cited the ability to provide a report immediately after the assessment, rather than preparing a report to send several days later, as particularly helpful in improving participants' satisfaction with their reports. This assessor noted that providing immediate findings allowed the assessor to be more efficient and make recommendations that are more useful.

Table 5-1 summarizes the common questions and concerns that the interviewed assessors reported receiving from participants as they present the recommended energy efficiency improvements following an assessment.

Table 5-1: Common Questions and Concerns Assessors Receive on Assessment Recommendations

QUESTIONS/CONCERNS	NUMBER OF RESPONDENTS CITING
Cost of recommended measures	3
Efficacy or compatibility of lighting measures	2
Safety of materials used	2
Loss of storage space	2
Air tightness of home	2

Assessors reported that the majority of the homes they visit do not require any pre-weatherization measures to move forward with the weatherization project. Seven assessors mentioned that knob and tube wiring is the most common issue that needs to be addressed before a home can be weatherized. Other conditions assessors reported encountering that may preclude

homeowners from weatherizing included: asbestos, insufficient ventilation, moisture or mold issues, and heating system or water heater failure (three mentions each). Most assessors reported encountering these kind of barriers less than half the time, but stated they can be significant barriers for participants to move forward with weatherization.

5.1.3. Selling Weatherization

5.1.3.1. Assessment Cost

Most assessors (seven of ten) anticipated that requiring participants to pay for an assessment would decrease assessment uptake. Assessors were divided regarding the impact charging for assessments might have on weatherization uptake. Five assessors anticipated that, as fewer homeowners received recommendations for energy efficiency improvements, fewer weatherization projects would occur. In contrast, one assessor noted that conversion rates might increase if participants were required to pay for an assessment because fewer customers who were not serious about installing measures would pursue assessments. This increased conversion rate could offset, to some extent, the smaller volume of participants reached. Four assessors suggested a price participants might be willing to pay for an assessment. These assessors stated that $100 – the cost of a pre-sale home inspection – would be a reasonable price for an assessment. These estimates are consistent with participant survey findings, as listed in Figure 4-3 in section 4.

The interviewed assessors suggested that the EnergyWise program's long history and reputation in Rhode Island may make it more difficult for the program to begin charging for assessments. Many assessors reported that the program has a strong reputation, and participants often learn of the program through word-of-mouth. As a result, participants may expect assessments to be available for free. According to one assessor, "so many participants know through word of mouth that the assessment is free, charging [for the assessment] would be an unexpected thing for the homeowner. A lot of people have heard about this through a friend."

5.1.3.2. Indicators of Weatherization Uptake

Most assessors (seven of ten) felt they could at least somewhat accurately predict whether a particular customer would follow through with recommended measures. These assessors reported that the reasons people request an assessment, their apparent interest level, and the age and heating fuel type of their homes are indicators of whether a customer will move forward with recommended measures. Four assessors mentioned that participants who opt not to accompany the assessor during the assessment and show less interest in the assessment process are less likely to move forward. In addition, one assessor reported that customers who mention that their primary concern is insulating their house or who expect that they will need to install measures are more likely to move forward with a weatherization project. Another assessor reported that customers who talk about increasing the comfort of their home they are more likely to pursue weatherization projects.

Most assessors (six of ten) reported that characteristics of the housing stock of a given area are the primary factor influencing the uptake of weatherization projects in that area. Participants

from neighborhoods that do not have natural gas service or that have older building stock – which tend to have more pre-weatherization barriers – are less likely to move forward with weatherization projects. Some assessors also mentioned that wealthier neighborhoods are more likely to move forward with weatherization projects.

5.1.3.3. Motivations for and Barriers to Weatherization

Assessors reported that the most important reasons customers move forward with weatherization projects are to save money (six mentions) and improve the comfort of their home (six mentions). Assessors also cited participants' desire to reduce their carbon footprint (one mention) and their trust in RISE's expertise (one mention) as secondary reasons customers pursue weatherization projects. The most common reason assessors reported participants do not move forward with weatherization projects was cost (five mentions). Cost is particularly a barrier for those that need pre-weatherization measures such as addressing knob and tube wiring, additional ventilation for houses that are too airtight, those with oil heating who receive less incentive. One contractor explained the gravity of these barriers:

> "If they have a costly road block - such as knob and tube wiring and they have to replace $30,000 worth of electric, that's a big road block Most people can't take that on. There are incentives for it, but some roadblocks are more than what they want to get into."

Assessors reported that these are difficult barriers for them to overcome. In promoting weatherization to participants that face these types of challenges, assessors reported trying to explain in different ways how it is in the participant's best interest to weatherize (three mentions) and use payback analysis (two mentions) to persuade customers to move forward with weatherization projects.

5.1.3.4. Incentives

Assessor interviews suggest that incentives are important in helping customers do weatherization projects, and do projects that are larger than they would have done otherwise. All assessors said the incentives were very important, if not the most important factor, in encouraging participants to do weatherization projects, and a majority (seven of ten) noted that conversion rates increase with incentive levels.

Most (seven of ten) stated that the lower incentives for oil heated homes has a big impact on their ability to sell weatherization projects to those customers. One assessor stated that oil and propane customers "have to think about it over a couple of days. I get more 'sign on the spots' for electric and gas. They usually do it with minor coaxing. Oil and propane customers are more apprehensive about it and they have to weigh their options." This assessor also noted that participants heating with oil and propane are more likely to complete their weatherization projects in multiple phases because they cannot afford to install all the recommended measures at once.

A few assessors commented that they would like to be able to offer more incentives and assistance to participants with oil and propane heat, as well as those with other weatherization barriers. Assessors suggested that this type of assistance would help the program increase its

energy savings, with five assessors suggesting more assistance for additional ventilation, four suggesting more assistance for oil heated homes, and three suggesting more assistance for homes with knob and tube wiring as opportunities for the program to increase savings. Some assessors also mentioned direct install or additional rebates for thermostats (three mentions) and appliances (two mentions) as opportunities to increase savings.

5.1.4. Administrative

Interview findings suggest that administrative processes run smoothly for assessors, and they are already taking steps to improve efficiencies. All assessors said the program notifies them of program changes through bi-weekly meetings, and by email for items that are more urgent. All reported that the communication of program changes was sufficient but two suggested opportunities for improvement including providing more concrete steps (one mention) and communicating the changes to technicians and administrative staff as well as the assessors (one mention). Most assessors felt that data management systems were sufficient from their perspective. Five assessors mentioned that RISE is moving toward digital solutions for gathering data, which has helped streamline processes. Some assessors mentioned minor glitches in this system, but they characterized these as ‘growing pains’ that will likely be worked out easily with time.

5.1.5. Quality Assurance

Most assessors (seven of ten) were familiar with the program’s third-party quality assurance (QA) assessments, conducted by CRI. The majority (six of seven) of assessors reported that they felt the QA process was effective, and those that had experience with CRI’s QA process said they have not had major challenges with the process. Most see the main benefit of this process as keeping assessors honest and ‘on their toes.’ Most assessors (seven of ten) also reported familiarity with RISE’s QA process. They all reported that they find the process effective and have they have not had any major challenges or issues with the process. Many see this process as a way to build trust and educate the homeowner. One assessor mentioned that they would like to see the QA process improve by providing assessors with more ‘lessons learned’ in their training.

5.2. Installation Contractor Perspectives

This section elaborates on the program processes and products from the installation contractors’ perspective. The EnergyWise program allocates weatherization projects to installation contractors, although a contractor can “tag” a particular participant that they bring to the program. Installation contractors are responsible for installing the weatherization measures scoped by the assessor and meeting the program’s quality standards.

5.2.1. Installation Contractor Characteristics

Most of the installation contractors participating in the EnergyWise program are experienced with the program and with other energy efficiency programs, reporting they have been working

with EnergyWise for more than five years. More than half of contractors (six of eleven) also work with energy efficiency programs outside of Rhode Island. In addition to weatherization, contractors reported working in new construction (four mentions), general construction (two mentions), carpentry (one mention), or multifamily (one mention).

A majority of the interviewed contractors (seven of eleven) reported that EnergyWise weatherization projects makes up the majority of their work, and that their business has grown because of the work that EnergyWise provides them (nine of eleven). Interview findings suggest that contractors have realized these benefits largely by relying on program-assigned projects. Contractors reported doing little to no marketing for the program and that the majority of the jobs contractors receive through EnergyWise come from a lead generated by the program. Consistent with the lack of marketing they reported conducting outside the program, contractors reported conducting few eligible weatherization improvements that did not use EnergyWise. Only two contractors reported completing qualified projects that did not go through the program. These contractors stated that, in the rare cases when this occurs, it is because the homeowner chooses not to go through the program process or paperwork.

5.2.2. Communication with Auditors and Installation of Measures

Installation contractors reported the information RISE assessors provide is typically sufficient for them to complete the scope of work as defined. The majority of contractors (nine of eleven) reported that in general, they find the scope of work to be clear and straightforward. As one contractor explained, “it’s very clear, I have a whole list of items from auditors and auditors provide photos of job to me ahead of time.” In order to help contractors better plan for the installation, one contractor suggested that assessors could break out air sealing tasks by area, rather than listing the total amount of air sealing for the project.

Most contractors reported that they are able to install measures as specified by the assessor in the majority of cases. The interviewed contractors reported that the scope of work is flexible enough to accommodate their needs (eight of eleven), or straightforward enough that there is no need for flexibility. Given the straightforward nature of their work, over half (six of eleven) of the interviewed contractors said that EnergyWise weatherization work is likely to be relatively uniform across contractors. Those that reported that jobs may vary by contractor emphasized that every job is different, and they cannot know exactly how others do their work.

The challenges contractors reported facing in carrying out their scope of work were largely minor; contractors most often spoke of difficulties related to getting access to certain spaces, for example if the homeowner has an area blocked off and the contractor needs to move things out of the way to install measures. Three contractors also mentioned that older houses and those with knob and tube wiring may pose more challenges.

If the contractor can overcome the challenges preventing them from accessing a particular space fairly easily, they will do so with the homeowner’s cooperation. If the contractor cannot easily resolve access challenges, feels that the assessor has incorrectly specified some part of the scope of work, or believes there is a better way to install the measures, the contractor works with the

RISE inspector to find a solution. One contractor provided an example of a situation in which it was not practical to install the weatherization measures as specified

> "Sometimes an auditor will call for one thing, but when we arrive at the job we have a different way we prefer to do it that will achieve the same result. Usually that occurs when we are trying to access unseen areas. For example, lack of access to the attic through the house would call for us to cut up the entire roof, when most of the time we can avoid that by gaining access to the area through a vent."

If these types of questions or issues with the scope of work arise, the contractor contacts the RISE inspector that is on call that day and works with the inspector to create a change order. The majority of contractors (ten of eleven) reported that, most of the time this process works smoothly. As one contractor reported, "The foreman knows what he's doing and they can work it out between whether the auditor missed something or should have done something else. There is flexibility and they have a little back and forth." Nonetheless, most expressed a desire to avoid change orders when possible. Contractors suggested that change orders may upset homeowners or require the contractors to schedule a second visit because they do not have the necessary materials.

A large majority of the interviewed contractors (9 of 11) reported they are able to install weatherization measures as specified in almost all cases. Two contractors reported a greater need for change orders. One of these contractors, to whom the program has stopped assigning work due to problems with work quality, reported that they were not able to install the measures as specified approximately 30% of the time. This contractor stated they had needed more change orders early in their program experience, but they had fewer change orders over time.

A second contractor, who was still active with the program, reported needing to complete change orders on about 75% of their EnergyWise projects, with those change orders affecting the cost of about 20% of their projects. This contractor stated that the need for change orders most often resulted from incomplete information gathered during the assessment. As an example, the contractor noted that an assessor may determine that a home needs insulation based on testing a single wall, when other parts of the home are already insulated. Other interview findings suggest this situation may have improved. A second contractor, who is currently inactive.

5.2.3. Customer Interaction

Scheduling or confirming the installation appointment is typically a contractor's first interaction with an EnergyWise participant. Prior to this initial interaction with the contractor, participants have interacted with the program to schedule their audit, completed their assessment, and received the contract. The assessors inform participants of the next steps in the program process. As a result, most contractors (eight of eleven) reported that customers generally have a good understanding of the weatherization process when the contractors arrive at the house for the installation appointment. As a result, contractors reported that participants typically have few question or concerns about the installation process. Contractors most commonly reported that the questions that arise relate to the state of the participant's home during and after installation, (seven mentions), effectiveness of the measures (five mentions), and the safety of the materials used (three mentions).

Most contractors (eight of eleven) noted that despite the auditors' best efforts, some homeowners do not fully read their contract or do not understand that they should move their possessions to provide the installers access to the areas where they need to work. Since this is a common issue, one contractor recommended that the program reach out to participants in the day or two before their installation appointment to remind them to prepare their homes.

Contractors reported receiving little feedback on the energy saving measures the assessors installed, and were not aware of whether or not the measures were in place at the time of the installation appointment. One contractor that reported feedback regarding direct install measures said some participants had complained about light bulbs burning out, but this did not seem to be a frequent occurrence.

Contractors reported little interaction with customers beyond the installation of weatherization measures. All contractors reported that customers rarely request going beyond recommended measures. When customers request additional measures, contractors most often reported that customers request more or different types of insulation (six mentions). Following the installation of measures, the majority of contractors do not market additional services or follow up with participants. Some noted that National Grid does not allow or "frowns upon" installation contractors marketing additional services. Many contractors (eight of eleven) do not follow up with customers because they are aware that RISE follows up and they do not want to duplicate efforts.

5.2.4. Quality Assurance

Most contractors were unfamiliar with the quality assurance (QA) audits that CRI, the program's third-party QA inspector, conducts. The majority (nine of eleven) contractors reported that they had little to no experience with CRI. This relatively low level of awareness of CRI's QA inspections may reflect the communication structure within the program. CRI reports its QA findings to National Grid and RISE staff, who are then responsible for addressing the issues with installation contractors. Some contractors may not be aware the feedback they receive comes from CRI inspections, rather than from RISE directly. Those that did have experience with CRI's QA process said they had resolved minor issues the process had uncovered, but had little additional feedback on the effectiveness of the process.

Contractors reported more familiarity with RISE's QA process. All reported that they relatively rarely had to address many issues the RISE QA process uncovered, and there had been no consistent problems they had been asked to address. Five contractors stated that they appreciate that RISE conducts its QA inspections during the measure installation appointment, instead of after the fact. This makes the process more efficient as the contractors are able to resolve issues in real time.

5.2.5. General Program Feedback

In general, contractors spoke positively about the program. Contractors reported that the program is beneficial to participants in that it generates long-term energy savings. They also noted that the program is beneficial to their businesses in that it provides them with steady work

that does not require them to devote resources to recruiting new customers. Only one contractor expressed a higher level of dissatisfaction with the program, citing the need for change orders and stating that the compensation did not justify their efforts.

Contractors most often reported that they did not see any shortcomings to the EnergyWise program, even compared to other energy efficiency programs in which they participate, which they noted were similar. Those contractors that offered suggestions for improvement suggested (one respondent each) that the program seek to more realistically set participant expectations for their weatherization projects, provide contractors greater input regarding scheduling, and increase the diversity of the contractor base while more heavily favoring in-state firms.

6. HEAT Loans

This chapter presents findings on HEAT Loans, drawing from in-depth interviews with five of the six lenders offering HEAT Loans in Rhode Island as well as findings from in-depth interviews with program assessors, surveys of program participants, and analysis of program data. These findings address the HEAT Loan participation process, the HEAT Loan product, including the role of the 0% interest rate, the equity of the HEAT Loan offering, and assessors' and participants' initial reactions to the concept of PACE financing.

6.1. HEAT Loan Process

6.1.1. Promotion of HEAT Loans

The participant survey found relatively high awareness of the HEAT Loan program, with 70% of participants who had an audit and did not make further improvements and 65% of those who made weatherization improvements but did not receive a loan aware of the program.

Assessors most often reported presenting the heat loan to all eligible participants in the same way. Assessors stated that they explain the HEAT Loan process to participants and promote the loans by discussing the payback from energy efficiency improvements and stressing that the loans are a good way for participants to fund larger projects. Assessors reported discussing the HEAT Loan offering at different points during the assessment based on the participant's interests and needs. For example, assessors reported they often bring up the HEAT loan right away if the heating system is a primary concern for the participant and discuss how the HEAT loans can help with heating system upgrades. According to one assessor, "Sometimes heating system needs to go, then the HEAT Loan is the first thing I talk about."

The majority of interviewed assessors (eight of ten) reported that most customers react positively to the heat loan. One assessor reported that some participants receive an assessment so that they can be eligible for a HEAT Loan, which they will use to replace their heating system. Most assessors (seven of ten) reported receiving little negative feedback on the HEAT loan offering; instead they reported participants are most interested in learning about the process. Most commonly, assessors stated that participants opt not to use a heat loan because they do not need it; their project is not big enough to justify the extra effort (five mentions). Two assessors also mentioned that participants might not use a HEAT loan because they do not like to use financing.

Interview findings suggest that lenders see little need to actively market the HEAT Loans. None of the lenders we spoke to conduct marketing activities for the HEAT Loan product, with most noting that program marketing generates sufficient demand for HEAT Loans. According to one lender, the HEAT Loans "promote themselves. We did market at the beginning using ads, but now we feel like we do not need to. The utilities put information in the billing statements." Two lenders reported they do not market the program because, while they are satisfied with the program, they are not interested in increasing the proportion of HEAT Loans in their portfolios. These lenders explained that they are satisfied with the current mix of assets in their portfolios.

According to one, "We're not marketing anymore because of the growth of the loan portfolio and loan portfolio size, coupled with the external threat of rising interest rates." Section 6.2.4, below, provides additional detail on the potential effect of rising interest rates on lenders' interest in HEAT Loans.

6.1.2. Application and Approval Processes

The interviewed lenders indicated that program processes related to HEAT Loans worked relatively smoothly for both the lenders and the borrowers. While all the lenders said that the HEAT Loan requires a little more time than their other products, they stated that this added effort was minor, and justified by the benefits the loans offered.

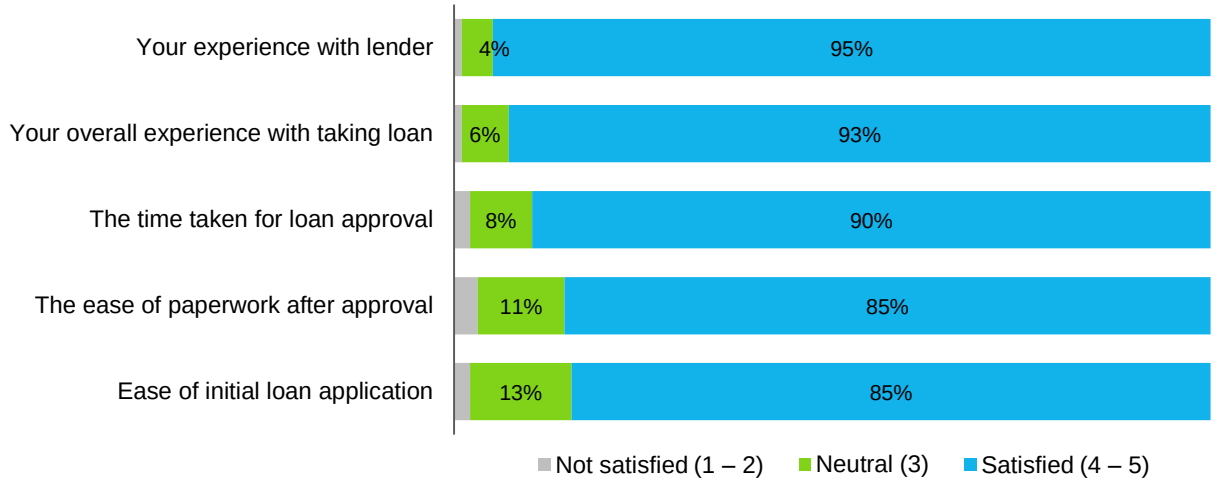
The most common challenge lenders reported with the process related to delays in completing projects. Three lenders mentioned that there are occasionally delays, as long as three or four months in some cases, between the time they approve a loan and when the work is done and the loan can be disbursed. In these cases, the loan authorization form, which participants receive after their home energy assessment, may expire. One lender noted that, while obtaining a new authorization form is not difficult, asking RISE to reissue the form adds a step to the process. Lenders noted that the time lag required even for typical HEAT Loans can limit the program's potential for emergency equipment replacements. As one lender explained, "If [a participant's] boiler breaks today, they have to schedule an audit, and get the loan approved. It is not a program that rewards procrastination."

Lenders reported that the areas of confusion customers sometimes experience with the loan process are relatively easy for them to resolve. Lenders noted that prospective borrowers occasionally try to apply for a HEAT loan without first receiving an EnergyWise Home Energy Assessment. Lenders stated that, when this occurs, it is not difficult to explain the process to the customer and refer them to the program. Two lenders also reported that customers sometimes express confusion that the funds cannot be disbursed until their energy efficiency project is complete. The non-profit lender that specializes in moderate income customers stated that, in some instances, customers are worried about qualifying for a loan so they may obtain pre-approval before conducting a program audit.

Lenders had a few recommendations for changes. One reiterated the need for better communication to participants about where they should be in the process before they receive payment. Another lender recommended that the program expand offerings to cover measures like central air conditioners to be able to continue to offer loans to a finite market in Rhode Island.

Participant survey findings support lenders' assessment that program processes work smoothly. Overall, a majority of surveyed loan recipients gave relatively high ratings to their experience obtaining the HEAT Loan, with overall and lender experience and time taken for approval receiving the highest ratings (Figure 6-1). Further indicating their satisfaction with the HEAT Loan process, all but one of the surveyed HEAT Loan recipients reported they would encourage others to use a HEAT Loan.

Figure 6-1: Participant Satisfaction with Elements of HEAT Loan Process (n=98)



Ease of paperwork and initial loan application had lower satisfaction ratings (84.5%), although most respondents nonetheless were pleased with the experience. Participants that provided lower satisfaction ratings most often suggested the paperwork and application process (36.6%) and overall length of time required for the process (21.1%) as opportunities for improvement.

6.1.3. Underwriting

Lenders reported using similar qualification criteria for HEAT Loans to other loan products that they offer. The most commonly mentioned requirements included banking history and proof of income (four mentions), home ownership verification (three mentions), and debt to income ratio (three mentions). The non-profit lender reported that they primarily look at customers' banking history, including the average daily balances in their checking and savings accounts and credit history. All of the lenders specified that they do not have a FICO score cutoff; instead, they look at many factors in addition to credit scores. Only one lender reported that they have made changes to loan qualification requirements. They added a step to verify home ownership, due to a delinquent loan. However, they reported that this was an easy change to make and just adds one additional free step to their qualification process.

6.2. HEAT Loan Product

6.2.1. Reactions to HEAT Loan Product

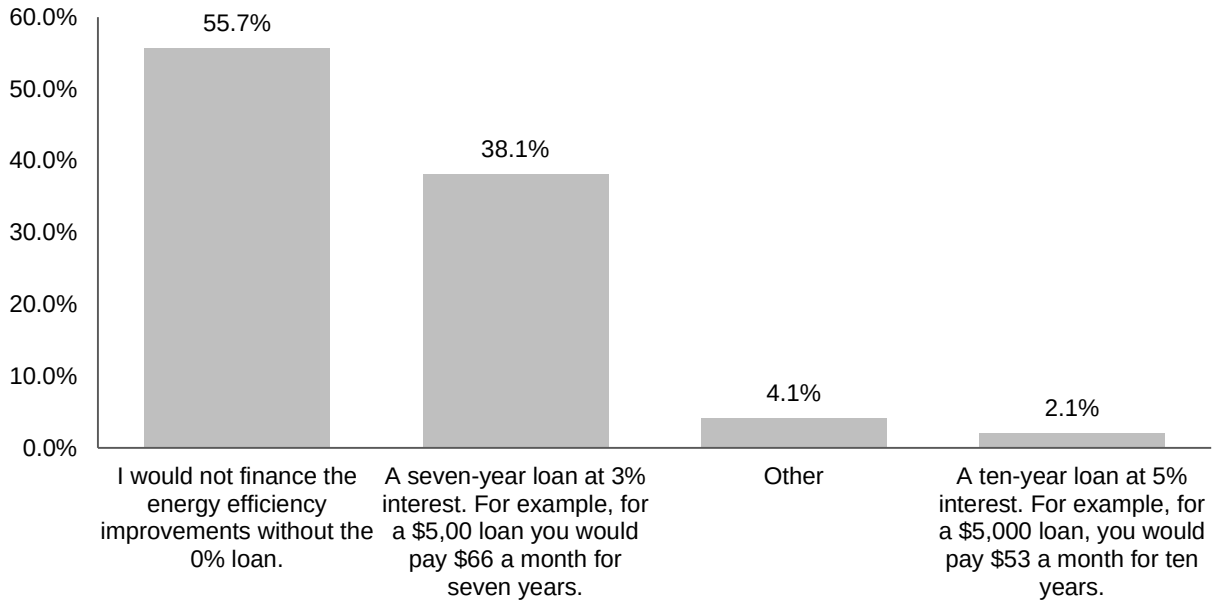
6.2.1.1. Participant Response

Lenders reported receiving mostly positive feedback from participants about the loan product, particularly regarding the 0% interest rate. Most lenders (four of five) mentioned how pleased participants are about the fact that there is no interest. Lenders also reported other aspects that participants appreciate about the loan product including (one mention each) low payments, no penalty, long tenor and that it is a good way to build credit. Lenders reported very few concerns

about the loan from prospective participants. The non-profit lender, mentioned that the only concern they hear from potential participants is in regards to whether they will qualify.

Participant survey findings are consistent with lenders' observations. Almost all (99%) of the surveyed loan recipients reported that the 0% interest rate was an appealing feature of the loan, followed by the ability to repay over time (66%) and the ease of qualification (52.6%). Survey findings further emphasized the importance of low interest rates in participants' decision to use a loan. The vast majority of those respondents that reported they would use an alternate financing product if the 0% HEAT loan was not available opted for one with a lower interest rate and a shorter term over one with a higher interest rate and longer term that offered lower monthly payments (Figure 6-2).

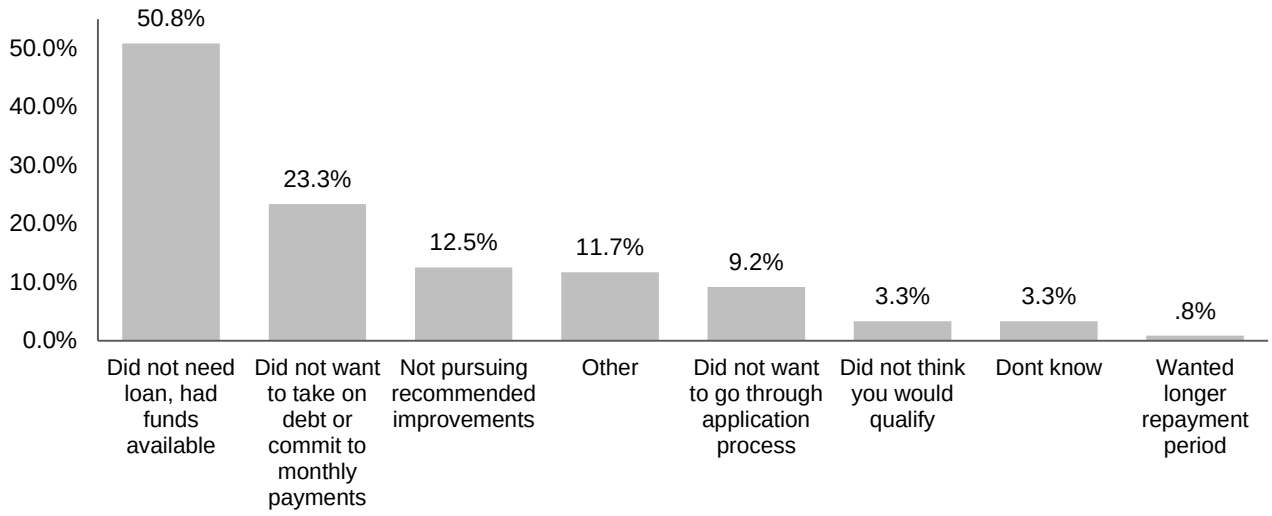
Figure 6-2: Alternatives to the 0% HEAT Loan (n=97)



6.2.1.2. Reasons Participants Do Not Use HEAT Loans

As shown in Figure 6-3, the most common reason participants reported for not pursuing HEAT Loans was that they did not need a loan to pay for their energy efficiency improvements. Consistent with these findings, 88.6% of those who made weatherization upgrades but did not utilize a HEAT Loan reported that they paid for projects using cash, check or credit card to be paid at the end of the month. Responses differed somewhat for lower income households, which were less likely to be able to pay for weatherization improvements without financing. Among households with incomes up to $50,000 (18% of survey respondents), the most common reason for not applying to the HEAT Loan program was an aversion to taking on debt or committing to monthly payments.

Figure 6-3: Reasons why participant did not apply for HEAT Loan (n=120)



6.2.2. Importance of 0% Interest Rate

Both lenders and assessors predicted that loan uptake would decrease if the HEAT Loan interest rate rose above 0%. All of the interviewed lenders anticipated that HEAT Loans would lose some of their appeal to customers if interest rates rose to a level at which the loans were competing with home equity loans and other similar products. Lenders were largely unable to predict a specific interest rate that would significantly decrease HEAT Loan activity. When probed, many lenders suggested that if the HEAT Loan interest rate rose above a range of 1% to 3%, customers would have more comparable options from which to choose and therefore there would be a marked decrease in HEAT loan activity.

The interviewed lenders suggested that a 0% interest rate may motivate participants to use financing and may attract them to a program in which they may not otherwise participate. One lender also stated that the 0% interest rate motivates participants to install more energy efficiency measures than they would otherwise, so an increase in interest rates may lead to a decrease in the size of projects.

Consistent with the lenders' assessment, most assessors predicted that offering HEAT Loans at a non-zero interest rate would negatively affect assessment uptake. Assessors stated that potential participants may be aware of the 0% loan, and may be attracted to the program because of it. Offering loans at a higher interest rate may run against these participants' expectations. Additionally, some assessors anticipated that a higher interest rate may decrease participants' willingness to take on larger projects. According to one assessor, "It would take a tool out of the tool box to move projects forward; projects may be done on a piece meal basis, rather than all at once." Like lenders, assessors also noted that the extent to which raising the interest rate would affect project uptake depended on how high the interest rate was. Assessors stated that, as long as the interest rate was small enough to be competitive with other financing options, for example below 3%, the impact may not be large.

Survey findings are consistent with assessor and lender interviews in suggesting that increasing the HEAT Loan interest rate may reduce average project sizes and increase lag times. Nonetheless, survey findings indicate the impact on overall participation could be relatively small. A majority (56%) of HEAT Loan recipients reported they would opt not to finance energy efficiency improvements rather than use an alternate loan option with a higher interest rate. However, only 20% of those respondents (11% of all HEAT Loan recipients surveyed) reported they would not have made energy efficiency improvements if they had not received a loan. Larger numbers of HEAT Loan recipients who would not have used a higher-interest financing option reported they would have delayed their projects more than six months or done smaller or less expensive projects (Table 6-1). Those who reported they would not have financed energy efficiency improvements with a higher interest loan were also more likely than other respondents to report they would have done exactly the same project if they had not received a loan.

Table 6-1: Action Taken If Participant Had Not Received Loan by Willingness to Adopt Alternate Loan Options (n=98)

	Action Taken if 0% Loan Replaced By Other Options			
Action Taken if Participant Had Not Received Loan	Would not have financed	Would have used alternate option	Other	Total
Not have done a project at all	11%	3%	0%	14%
Delayed project more than six months	11%	14%	0%	25%
Done a smaller or less expensive project	16%	15%	1%	33%
Done exactly the same project	14%	6%	2%	22%
Other	1%	2%	0%	3%
Don't Know	2%	0%	1%	3%
Total	55%	40%	4%	100%

6.2.3. Loan Performance

The HEAT loans are performing well according to lenders. All lenders reported their default rate was low, with estimates ranging from 0 to 2%, and two lenders elaborated that the performance of HEAT was loans as good if not better than other products. None reported experiencing or anticipated any changes in performance.

6.2.4. Financial Market Conditions

Some lenders indicated that offering HEAT Loans would become less attractive if the interest rates of other financial products in the market increased. According to one lender, “We’re giving 0% loans out and rebated 5% back. If rates rise that spread isn’t big enough for the unsecured risk.” This lender reported that they have already decreased the tenor and loan cap because of the threat of rising interest. Nonetheless, another lender reported that offering HEAT Loans benefits their organization in ways beyond the profits the loans themselves provide, such as keeping up with competitors and providing a valuable service to their customers. As a result, this lender

stated that a market-wide increase in interest rates may not affect their participation in the program.

6.3. Influence of HEAT Loans on Energy Efficiency Projects

6.3.1. Uptake of HEAT Loans

Across heating fuels, approximately one-fifth of participants who completed EnergyWise weatherization projects used HEAT Loans (Table 6-2). Potentially reflecting the lower incentive levels for which they are eligible, participants heating with oil and other delivered fuels were more likely to use HEAT Loans to fund their weatherization projects than participants heating with other fuels. Participants heating with electricity were least likely to use HEAT Loans. With a relatively small number of participants heating with electricity, these households may share some other characteristic, not included in our data, that makes them less likely to pursue a loan.

Table 6-2: HEAT Loan Uptake by Heating Fuel, 2014-2016

Primary Home Heating Fuel	Weatherization Projects Completed	Weatherization Projects Using HEAT Loans	Percent Using Loans
Oil and Other Fuels	1,794	458	26%
Natural Gas	3,532	724	20%
Electric	283	24	8%
Total	**5,609**	**1,206**	**22%**

The data we received from National Grid do not directly indicate whether a participant installed a heating system, although we can infer that participants who received a HEAT Loan but do not have record of completing a weatherization project likely used their loan for heating or hot water system improvements. Slightly more than one-third of the HEAT Loans recorded in the database for participants who had assessments between 2014 and 2016 went to participants who did not complete weatherization projects (Table 6-3). Additional participants may have installed heating systems in addition to weatherization projects, but our data do not distinguish these cases from those that installed weatherization measures alone.

Table 6-3: HEAT Loans Not Used for Weatherization Projects

Year	All HEAT Loans	Loans Not Used for Weatherization	Percent
2014	1,011	380	38%
2015	799	265	33%
2016	69	28	41%
Total	**1,879**	**673**	**36%**

6.3.2. HEAT Loan Influence on Project Size

The interviewed assessors were confident that the availability of HEAT Loans allows participants to complete larger projects, and projects that they would not complete without a loan. One assessor provided an example, saying that "having the HEAT loan that can be used for knob and tube, has helped some people get projects done they wouldn't have been able to otherwise. It helps them pay for removal and insulation."

Survey findings support the assessors' assertion that HEAT Loans are important in enabling energy efficiency improvements for the participants that use them. For the 97 respondents who participated in the HEAT Loan program, 80% reported that the availability of the HEAT Loan was important in their decision to complete the recommended improvements (providing a response 'Very important' or 'Extremely important' on a 5-point scale). As Table 6-1, above, suggests, more than three-fourths of the surveyed loan recipients reported their energy efficiency projects would have been different had they not received the loan. Respondents most often reported the projects would have been smaller or less expensive (33%) delayed more than six months (24%) or not occurred at all (14%).

Program data further supports the assertion that HEAT Loans enable larger projects. Between 2014 and 2016, weatherization projects receiving HEAT Loans cost, on average, 27% more than projects not using HEAT Loans (Table 6-4).

Table 6-4: Cost of Weatherization Projects by Use of HEAT Loans, 2014-2016

	With Loan		Without Loan		Total	
Year	Count	Average	Count	Average	Count	Average
2014	631	$3,669	1,842	$2,808	2,473	$3,028
2015	534	$3,982	2,139	$3,114	2,673	$3,287
2016	41	$4,409	422	$3,436	463	$3,522
Total	**1,206**	**$3,833**	**4,403**	**$3,017**	**5,609**	**$3,192**

6.4. Equity of HEAT Loan Offering

To assess the equity of the HEAT Loan offering, we investigated both loan approval rates, to determine whether large numbers of borrowers, and particularly lower-income borrowers were being turned down for loans, and borrowers' income levels, to determine whether lower-income borrowers were underrepresented among HEAT Loan recipients.

6.4.1. Loan Approval

Most lenders reported high approval rates for HEAT Loans, with estimates ranging from 80-99%. The non-profit lender was the exception, with a much lower approval rate (approximately 35%). Nonetheless, this lender acts as the 'lender of last resort,' and reported this approval rate is common across their loan offerings. Many lenders had difficulty reporting exactly how many applications they had received or the exact approval rate. Only two lenders mentioned that they

have seen indications that the application rates have been slowing down. One attributed this to seasonal changes while the other suggested that the market will eventually be saturated and there will be no more customers to serve.

Most lenders (four of five) reported that customers are most often turned down for HEAT Loans because their debt to income ratio is too high or it is determined that they could not afford the payments. Some lenders also mentioned a history of delinquent payments (two mentions), poor credit performance or recent credit history (two mentions), and overdrafts (one mention) as common reasons customers do not qualify for HEAT loans.

Consistent with the lenders' reports, assessors stated that they rarely encounter customers who worry they will not qualify for HEAT loans. However, the interviewed assessors noted that they try not to discuss, or make assumptions about, participants' financial situations. As a result, they may not know if a participant has these concerns unless the participant is forthcoming with this information. Assessors refer those that express concerns about qualifications to the lender that specializes in lower income borrowers.

Survey findings are also consistent with the lenders' reports of high loan approval rates. Of the 102 respondents who reported applying for a HEAT Loan, none reported their application had been denied. Only four respondents (3%) of the 120 who completed eligible efficiency projects and were aware of HEAT Loans reported they did not apply for a loan because they did not believe they would qualify.

Program data indicate that a higher percentage of participants applied for a loan but did not receive one than interview and survey data would suggest (Table 6-5).[4] It is important to note, however, that these data do not distinguish between those who had financing applications rejected and those who chose not to move forward for their own reasons or whose projects are still in progress. Based on lenders' rough estimates of application acceptance rates and the volume of loan each financial institution made, the records in our database export would represent approximately 500 rejected financing applications, accounting for just over half of the 949 records that indicate an application but not a complete loan.

Table 6-5: Loan Completion by Year Assessment Completed, 2014-2016

Year Assessment Completed	Total Loan Applications*	Complete Loans**	Incomplete Loans	Percent with Complete Loan
2014	1148	845	303	74%
2015	1335	934	401	70%
2016 (Substantial portion of projects likely still in progress)	*629*	*384*	*245*	*61%*

* Participants with a HEAT Loan administration fee associated with their record.

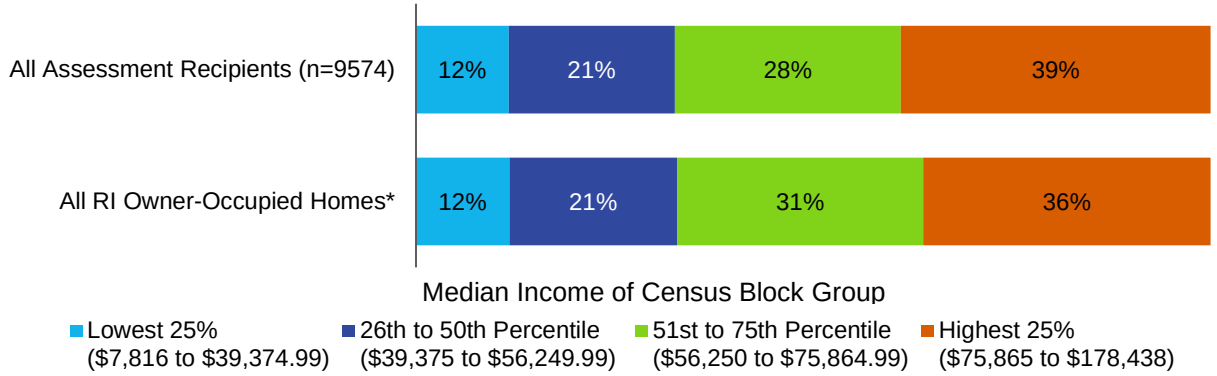
[4] We identify participants who applied for a loan but did not receive one as those who have a record of a HEAT Loan Administration Fee but no record of HEAT Loan Total Financed or HEAT Loan Interest Paid.

** Participants with a HEAT Loan interest paid or HEAT Loan total financed associated with their record.

6.4.2. Income Levels of HEAT Loan Recipients

To investigate whether the EnergyWise program and HEAT Loans are serving Rhode Island households equitably, we analyzed participation by the median income of each participant's Census block group.[5] Based on this analysis, the incomes of EnergyWise assessment recipients are relatively reflective of owner-occupied households in the state.

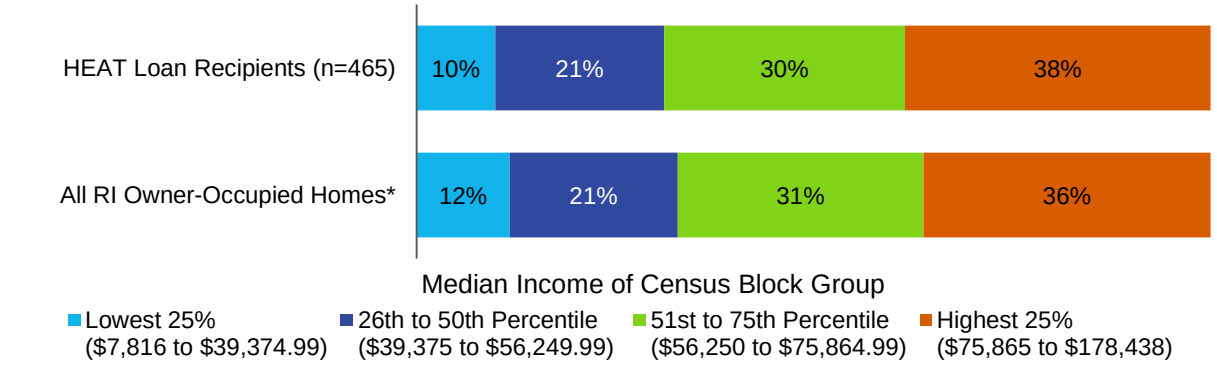
Figure 6-4: Income Levels of All EnergyWise Assessment Recipients, June 2015 – May 2016



* Data from American Community Survey five-year estimates for 2010-2014.

The income distribution of HEAT Loan recipients relatively closely parallels the income distribution of all owner-occupied households in Rhode Island, although HEAT Loan recipients are slightly more likely to come from the highest-income Census block groups and less likely to come from those with the lowest median incomes

Figure 6-5: Income Levels of HEAT Loan Recipients, June 2015 – May 2016

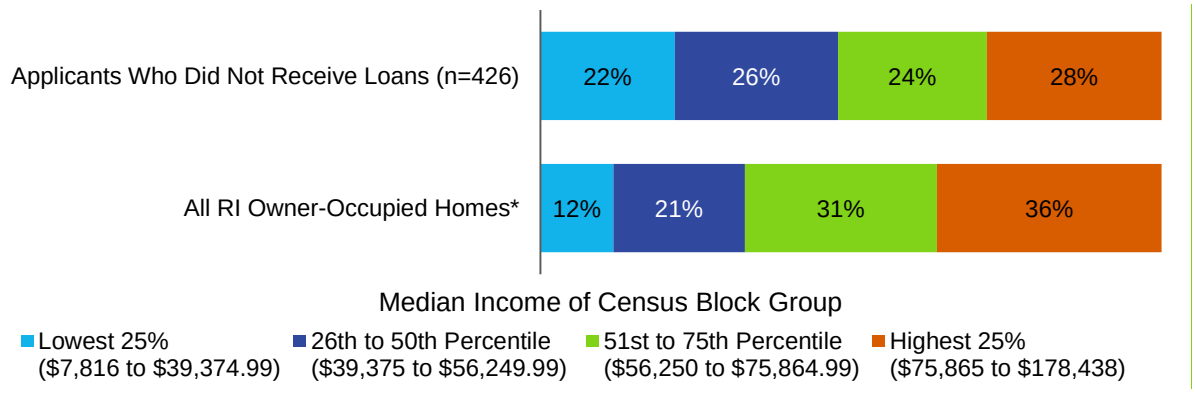


5 Census block groups are the smallest geographical areas for which the U.S. Census Bureau makes income data available. There are 813 unique Census block groups in Rhode Island. Rhode Island Census block groups range from 5 to 1,512 households, and average approximately 500 households.

* Data from American Community Survey five-year estimates for 2010-2014.

While participants in the lowest-income census block groups were not significantly underrepresented among HEAT Loan recipients relative to the Rhode Island population as a whole, they were more likely to have applied for, but not received, a loan.[6] The participants included in this analysis had their assessment within the last year, and, as noted above, a notable proportion may still be in the process of completing their projects. Nonetheless, given their lower incomes, these participants may also be more likely to be denied credit.

Figure 6-6: Income Levels of HEAT Loan Applicants Who Did Not Receive Loans, June 2015 – May 2016

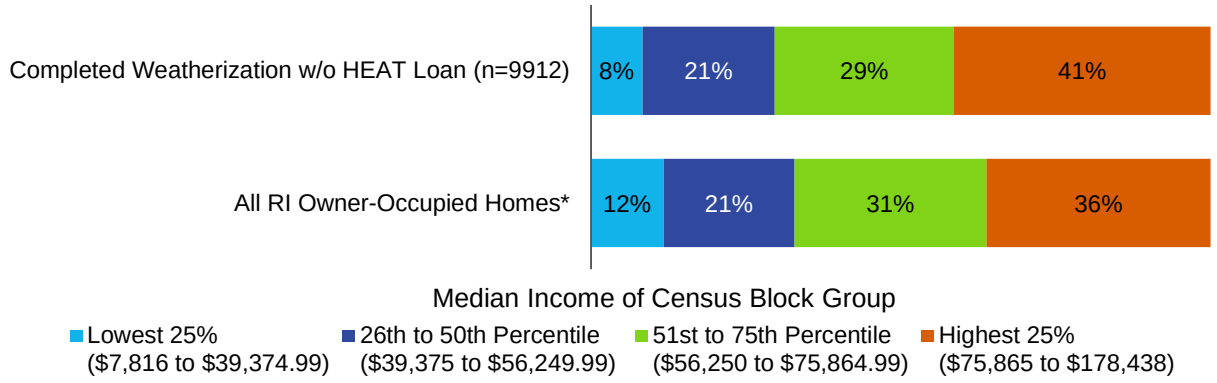


* Data from American Community Survey five-year estimates for 2010-2014.

Consistent with survey findings that participants who did not use HEAT Loans often had the means to pay for their projects out of pocket, participants who completed weatherization projects but did not apply for HEAT Loans were more likely than the larger population of Rhode Island homeowners to come from the Census block groups with the highest median incomes.

6 We identified participants who applied for a loan but did not receive one as those for whom the program database included a record for a HEAT Loan administration fee, but no record for HEAT Loan interest paid or HEAT Loan total financed. Program data does not provide insight into why these participants did not receive a loan: in some cases, their applications may have been denied, while in others they may have decided not to move forward with the loan for other reasons.

Figure 6-7: Income Levels of Participants Who Completed Weatherization Projects Without HEAT Loans, June 2015 – May 2016



* Data from American Community Survey five-year estimates for 2010-2014.

The income data participants reported in the survey further support these findings. Participants who used HEAT Loans were somewhat more likely than those who completed weatherization projects without using a loan to report annual household incomes of less than $50,000 (Table 6-6). The EnergyWise program screens participants to determine whether they are eligible for income-qualified programs, like the federal Weatherization Assistance Program (WAP), and directs those who are eligible to those programs, which offer higher levels of assistance. Nonetheless, 15 of the surveyed participants (4%), were likely eligible for WAP, based on the income levels and household sizes they reported. Almost half of these participants (7 of 15) reported using a HEAT Loan to make efficiency improvements, and only one completed a weatherization project without a HEAT Loan.

Table 6-6: Income by Participant Group

Household Income	Audit Only (n=108)	Weatherization (n=68)	Loan (n=82)
Under $50,000	20%	15%	18%
$50,000 to under $100,000	52%	54%	50%
$100,000 or more	28%	31%	32%

Survey findings suggest that the HEAT Loans may be particularly important in enabling these lower-income participants to complete energy efficiency projects. Respondents with household incomes less than $50,000 were significantly less likely than higher-income households to report that they would have moved forward with the recommendations had not received a loan (Table 6-7).

Table 6-7: Actions taken without HEAT Loan by household income

ACTIONS TAKEN WITHOUT HEAT LOAN	< $20K - $50K* (n=14)	$50K - $100K* (n=40)	$100K+* (n=24)	TOTAL (n=78)
I would not have done a project at all	35.7%	17.5%	8.3%	**17.9%**
I would have delayed the project more than six months	14.3%	35.0%	20.8%	**26.9%**
I would have done a smaller or less expensive project	35.7%	20.0%	58.3%	**34.6%**
I would have done exactly the same project	14.3%	27.5%	12.5%	**20.5%**

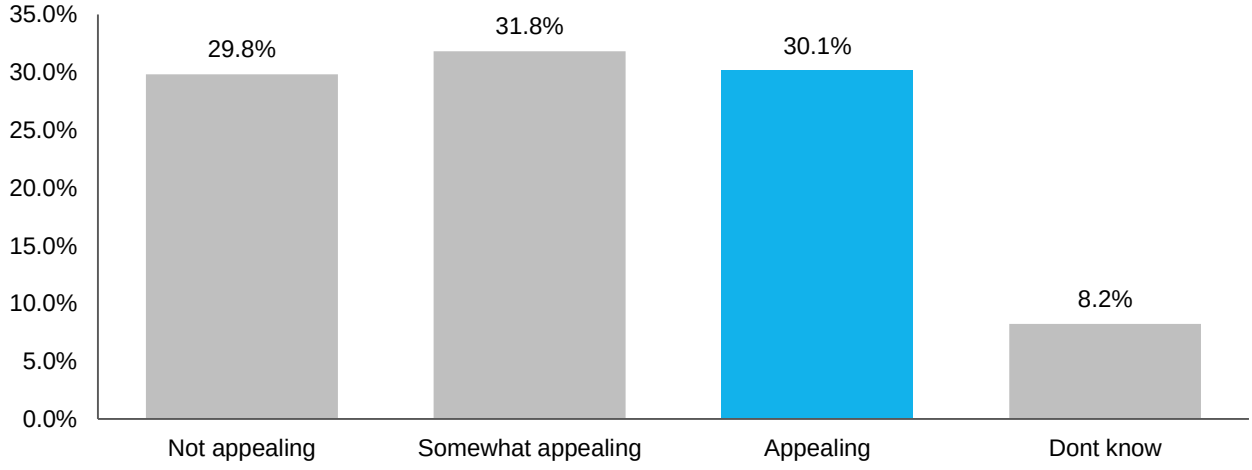
* x^2 <0.05

6.5. PACE

None of the interviewed assessors were familiar with Property Assessed Clean Energy (PACE) financing, which would allow homeowners to finance energy efficiency upgrades through a special assessment on their property tax bill. Based on the interviewer's explanation of the concept, half of the assessors (five of ten) anticipated that participants might be interested in PACE financing as an alternative or additional financing option. The interviewed assessors, described PACE financing primarily as a potential benefit to customers who may not qualify for HEAT Loans under traditional underwriting criteria. The interviewed assessors, including those who thought PACE could nonetheless be a useful tool, expressed concerns that the need to place a special tax assessment on the home would deter potential participants. Most assessors thought PACE financing would have little impact on weatherization uptake, but might result in a slight increase in uptake.

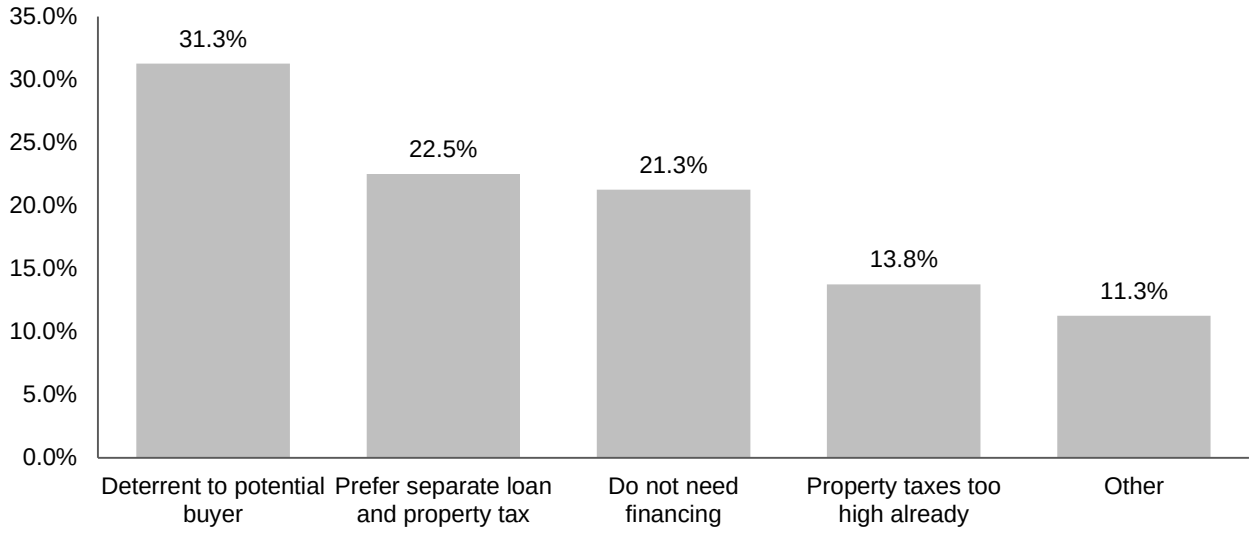
Participant survey findings are largely consistent with the assessors' opinions of a PACE offering. Overall, interest in Residential PACE was split fairly evenly into three groups, with about one-third of respondents reporting incremental levels of interest (Figure 6-8).

Figure 6-8: Support for Residential PACE (n=352)



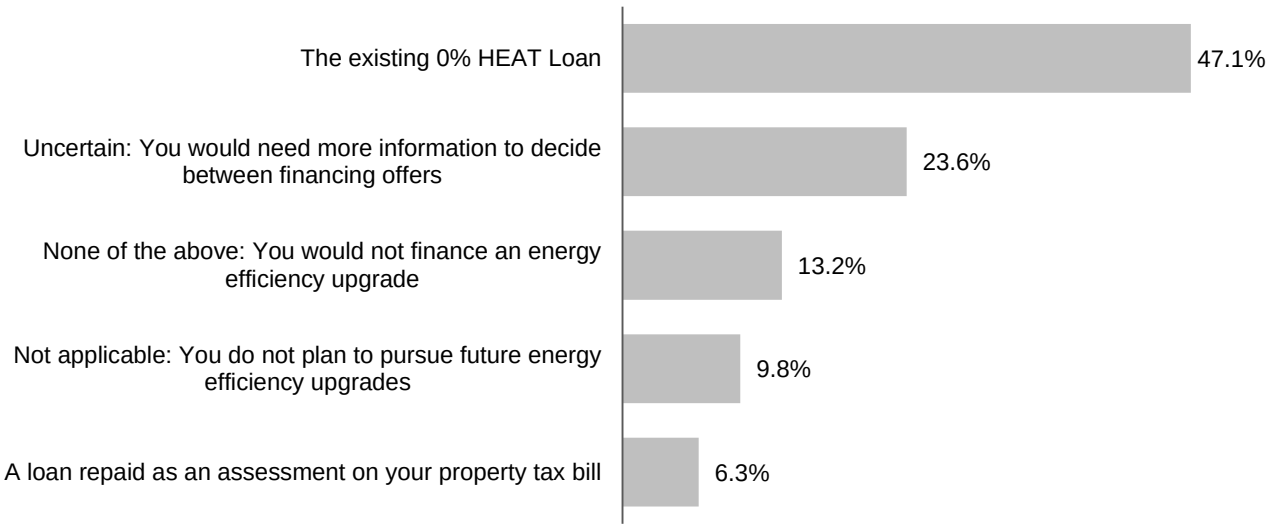
Respondents who reported residential PACE was not appealing most often (31.1%) anticipated that a PACE assessment could be a deterrent to potential home buyers or reported (22.5%) that they would prefer a loan that does not appear on their property tax bill (Figure 6-9).

Figure 6-9: Concerns Regarding Residential PACE (n=80)



For future energy upgrades, participants most often reported they would pursue a HEAT Loan rather than a PACE assessment (Figure 6-10).

Figure 6-10: Financing options for future energy efficiency upgrades (n=348)



7. Comparison Program Findings

This chapter presents findings from a review of secondary data related to innovative efficiency programs providing home energy audits, weatherization incentives, and related home energy upgrade services around the country. We identified four programs that we anticipated could provide insight into effective program design and delivery practices relevant to EnergyWise. We selected these programs due to their innovative approaches and because they represent a variety of program designs. The first section of this chapter summarizes findings from these four programs.

The second portion of this chapter provides a comparison of program costs and outcomes between EnergyWise and an expanded group of programs from around the country. This comparison goes beyond the four programs examined in the detailed review of program delivery practices to include a wider range of investor-owned utilities that likely face cost effectiveness and other regulatory requirements similar to National Grid.

7.1. Review of Program Design and Delivery Strategies

To document best practices relevant to the design of the EnergyWise program, we reviewed findings from evaluations of four home energy audit and upgrade programs:

- Boulder County (Colorado) EnergySmart
- Michigan SAVES
- Puget Sound Energy (PSE, Washington) HomePrint (now Home Energy Assessments)
- Austin Energy (Texas) Home Performance with Energy Star (HPwES) program

7.1.1. Program Descriptions

The four reviewed programs differ in a number of ways. Table 7-1 summarizes the key elements these programs offered, and the sections that follow give a brief summary of each program's offerings. Notably, none of the comparison programs implements a lead vendor model in precisely the same way as EnergyWise. While Boulder County uses a lead vendor to provide program audits, participants are responsible for selecting their own contractor to complete weatherization projects and coordinating installation with that contractor directly. Michigan SAVES, PSE HomePrints, and Austin Energy HPwES implement an independent contractor model where participants may receive audits from one of multiple contractors, who may also install the recommended measures.

Table 7-1: Services Offered by Programs Discussed in Literature Review

	Program Model		Program Offerings					
	Lead Vendor	Independent Contractor	Free Audits	Audits with Copay	Direct Install	Incentives/ Rebates	Financing	Energy Advisor
EnergySmart Boulder	✓			✓	✓	✓	✓	✓*
Michigan SAVES		✓		✓	✓	✓	✓	
PSE HomePrint/ Home Energy Assessments		✓	✓		✓	✓		✓
Austin Energy HPwES		✓		✓		✓	✓	
EnergyWise	✓		✓		✓	✓	✓	

* EnergySmart's lead vendors provided an "energy advisor" role for participants.

7.1.1.1. Boulder EnergySmart

Using funds made available through the American Recovery and Reinvestment Act (ARRA) funded Better Buildings Neighborhood Program (BBNP) from 2010 to 2013, Boulder County developed the EnergySmart program to provide energy efficiency services to local residents and businesses.[7] All single- and multifamily residents in Boulder County were eligible for the program and could select one of three services from a home energy advisor: 1) an energy audit, which included direct install of energy- and water-saving equipment, offered for a fee; 2) a paid home visit from an "advisor consultant" who would direct-install measures and provide support for rebates and financing, also offered for a fee; or 3) free phone support and energy saving tips. Regardless of which audit service a resident selected, they could receive support from an Energy Advisor for the contractor procurement process if they decided to move forward with an upgrade. In addition to its flexible audit approach, EnergySmart offered residents a number of financing and incentive options for upgrades and implemented a number of marketing and outreach approaches, including contractor marketing, presence at local events, and a home energy makeover contest. Boulder County continues to offer EnergySmart today.[8]

7 Boulder County, "Energy Efficiency and Conservation Block Grant (EECBG) Better Buildings Neighborhood Program Final Report" (Washington DC: U.S. Department of Energy, December 30, 2013).

8 http://www.energysmartyes.com/

7.1.1.2. Michigan SAVES

Michigan was another recipient of BBNP grant funds and offered education, audit, and upgrade services to homeowners and businesses across the state through its Michigan SAVES program, which was developed by the Michigan Energy Office, Michigan Saves, the City of Grand Rapids, the Economic Development Corporation of the City of Detroit, and the Southeast Michigan Regional Energy Office.[9] The single-family residential program focused its efforts on a series of "sweeps" in targeted areas that included door-to-door outreach as well as broader marketing efforts. The program targeted areas that, among other criteria, had a high percentage of homeownership with 20% or fewer households eligible for low-income assistance. Program implementers experimented with various marketing messages and channels, sometimes using message they believed would appeal to specific target communities. Participants paid a copay to receive an audit and could choose to undertake an energy efficiency upgrade through the program. Michigan SAVES partnered with local contractors in each of its target areas to conduct both audits and upgrades, and upgrades could include any measures recommended by participating contractors. Program implementers also experimented with a number of program delivery approaches, including different copay amounts for audits and different interest and rebate amounts for upgrades, in an effort to determine which approaches were most effective at driving participation. The Michigan SAVES program is still active today.[10]

7.1.1.3. PSE HomePrint/Home Energy Assessments

The PSE HomePrint program (now Home Energy Assessments)[11] emphasizes audits rather than upgrades.[12] HomePrint/Home Energy Assessments is offered this program to current PSE customers in single-family units or attached housing with four or fewer units. Customers can only participate in the program one time. Qualified contractors conduct audits and provide participants with information on their energy consumption and tips for reducing energy use and making their homes more comfortable. Contractors also leave behind compact fluorescent lamps (CFLs), light emitting diodes (LEDs), and, if requested by the homeowner, low flow shower heads.[13] Some contractors also sell upgrades through the program, most of which involved insulation and air sealing when the program was evaluated in 2015. PSE markets the program through a variety of channels, including PSE's existing Energy Advisors, who provide customer support through PSE's call center.

---

9 MEDC Michigan Energy Office and Michigan SAVES, "Better Buildings for Michigan Final Report" (Washington DC: U.S. Department of Energy, September 30, 2013).

10 http://michigansaves.org/

11 https://pse.com/savingsandenergycenter/Rebates/Pages/Home-energy-assessment.aspx

12 DNV GL, "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report" (Bellevue, WA, December 18, 2015).

13 In 2014, the program transitioned to only offering LEDs.

7.1.1.4. Austin Energy Home Performance with ENERGY STAR

Austin Energy operates its HPwES program under DOE's national umbrella HPwES program.[14,15] Austin Energy markets the program through a number of standard channels, including mailing, internet marketing, and outreach at community gatherings. Austin Energy's HPwES is a contractor-driven program and provides a list of registered contractors, and Austin Energy customers that own homes in buildings of up to four units can browse the list and solicit bids from multiple contractors for a home energy audit.[16] Participating contractors conduct audits and, if the participant wants to move forward, upgrades and post-inspections. Upgrades conducted through the program include only specific measures available through both HPwES and Austin Energy, such as insulation, duct repair and sealing, and energy efficiency heating, ventilation, and cooling (HVAC) systems. The program provides low-interest financing and rebates to participants who chose to conduct upgrades.

7.1.2. Program Delivery Model

As noted, all of the reviewed programs involve trade ally contractors in selling weatherization projects to a greater extent than does EnergyWise. Evaluations of these programs have found both benefits and drawbacks to this approach. A key benefit that multiple reports cited of a model that uses trade ally contractors to provide audits is the potential to offer a smoother participant experience from audit to installation relative to programs that use a lead vendor to conduct audits and rely on participants to select an installation contractor.

For example, a report detailing best practices and lessons learned from the Boulder EnergySmart program suggested that the program would be more effective if it engaged "vertically integrated businesses" that provide both audits and upgrades.[17] Similarly, an evaluation of Austin's HPwES program found that the hassle of working with multiple contractors across the audit and upgrade components of the program was a challenge for some participants.[18] Evaluators recommended having the same contractor conduct both the audit and upgrade provide a more "seamless" program experience for participants. Note, however, that these evaluation recommendations were offered for programs that already used contractors for audits, suggesting that a "smoother participant experience" is a potential that is not always achieved by programs following this model.

Evaluations cited a variety of drawbacks to approaches that rely on trade ally contractors to sell weatherization projects to participants. One key drawback that emerged from the literature is that

---

14 http://powersaver.austinenergy.com/wps/portal/psp/residential/offerings/buildings/home-performance-with-energy-star-rebate

15 GDS Associates, Inc., "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program" (Austin Energy, September 2012).

16 Mobile and manufactured homes are not eligible for the program.

17 "Best Practices for Energy Retrofit Program Design Case Study: Boulder, Colorado" (Home Performance Resource Center, March 2010).

18 GDS Associates, Inc., "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program."

this model can challenge a program's ability to control the messages participants receive about the program. In some service territories, a limited number of qualified audit contractors also limits the effectiveness of this program model.

Michigan SAVES found that contractors varied widely in their sales skills, with those completing the highest volume of projects through the program also completing the largest projects, suggesting these contractors had better sales skills.[19] An evaluation of PSE's program noted that it was important for contractors to clearly communicate the constraints of the program's services with homeowners up-front. PSE also faced challenges delivering the program in areas served by few qualified contractors.[20]

Boulder County reported it was able to control costs for its EnergySmart program by providing energy coaching over the phone in addition to in-person support.[21] This is consistent with findings of a national evaluation of BBNP grantee programs, which found that offering a wider range of ways for participants to engage with the program, including a larger number of audit types, was associated with overall program success.[22]

7.1.3. Strategies to Increase Conversion Rates

The reviewed programs offered lessons learned regarding increasing the rate at which audit participants complete additional measures (conversion rates) related to all aspects of the audit process. A review of best practices across HPwES programs found that very low audit prices may lead to a higher proportion of "tire kickers" who pursue an audit but do not intend to conduct any upgrades.[23] The authors recommended that programs explore the "optimum" audit price within their market to limit "tire kickers" without pricing out customers who would not pay for an expensive audit. Further investigation is necessary to determine whether this applies to EnergyWise participants. As noted in section 4.2, there was no significant difference in reported willingness to pay for an audit between participants who completed weatherization projects and those who did not.

In presenting audit recommendations to participants, Michigan SAVES found that contractors were more successful in converting audits to upgrades when they focused on selling "packages" of measures rather than promoting measures individually. Contractors working with PSE's HomePrint program speculated that they would have been able to increase the program

---

19 MEDC Michigan Energy Office and Michigan SAVES, "Better Buildings for Michigan Final Report."

20 DNV GL, "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report."

21 Boulder County, "Energy Efficiency and Conservation Block Grant (EECBG) Better Buildings Neighborhood Program Final Report."

22 Research Into Action, Inc., "Drivers of Success in the Better Buildings Neighborhood Program - Statistical Process Evaluation: Final Evaluation Volume 3" (Washington DC: U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, June 2015), http://energy.gov/eere/analysis/downloads/drivers-success-better-buildings-neighborhood-program-statistical-process.

23 GDS Associates, Inc., "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program."

conversion rate if audit reports contained more detail on certain key topics, including average costs and payback, or if the program supported more follow-up with homeowners.[24]

Finally, the reviewed programs' experience using deadlines as a strategy to increase conversion rates differed, suggesting that it is important to recognize participants' decision-making timelines in setting deadlines. In a technical report describing its program accomplishments, Boulder County reported that implementing deadlines for rebates encouraged participants to move forward with a project rather than "stalling." Michigan SAVES staff, on the other hand, noted that they increased the length of time that they worked with homeowners after finding homeowners needed more time to make a decision about moving forward with an upgrade than administrators had originally anticipated.[25]

7.1.4. Marketing and Outreach Strategies

Two primary lessons learned related to marketing emerged from the programs we reviewed. First, in the content of marketing messages, sources consistently suggested that messages focused on non-energy benefits, such as comfort, health, and safety, were more successful than those focused on energy savings alone. Michigan SAVES reported this was the case in a review of its program.[26] Further, an evaluation of Austin Energy's HPwES program recommended that the program do more to highlight the non-energy benefits of home energy upgrades, such as health comfort and safety, because energy savings are not a key driver for all potential participants.[27] Contractors involved in PSE's HomePrint program also felt that they would be more successful in converting audits to upgrades if the program provided messaging that emphasized safety and comfort.[28]

As noted in section 4.1, EnergyWise participant survey findings support comfort as an outreach message that is likely to be effective. Overall, increasing comfort was the second most frequent motivator (after reducing energy bills) participants cited for receiving an audit, and participants who completed weatherization projects or used HEAT Loans were significantly more likely to cite comfort as a motivator that participants who did not make weatherization improvements.

Second, in the delivery of marketing messages, the reviewed programs found benefit in the use of diverse marketing approaches, particularly when those approaches were targeted toward qualified participants. Michigan SAVES reported that its participation rates were higher when it used a larger number of different marketing channels, as well as when it used marketing materials that "inspired action," supplemented with door-to-door conversations about the details of the program. Further, Michigan SAVES found that a "seed and return" approach, in which the

---

24 DNV GL, "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report."

25 MEDC Michigan Energy Office and Michigan SAVES, "Better Buildings for Michigan Final Report."

26 Ibid.

27 GDS Associates, Inc., "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program."

28 DNV GL, "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report."

program conducted door-to-door sweeps followed by a city-wide program the next year, successfully generated interest in the program.[29]

The experience of PSE and Austin Energy is consistent with these findings. An evaluation of PSE HomePrint found that the program's "varied and active" marketing approach, which included web banners, social media, events, lawn signs and door-to-door visits was successful.[30] Nonetheless, some interview respondents felt that marketing efforts would have been more effective if they were specifically targeted to qualifying customers, namely current PSE customers in single-family units or attached housing with four or fewer units who have not already participated in the program. Evaluators of Austin Energy's HPwES program also recommended that the program implement some more innovative approaches to marketing, such as a Home Energy Makeover Contest.[31]

7.2. Comparison of Program Costs and Outcomes

Michigan Saves, Austin Energy, and Boulder County have experience with innovative program delivery models, and offer potentially valuable lessons learned for EnergyWise. However, these programs are delivered by local governments or municipal utilities, and thus do not operate in the same type of regulatory environment as EnergyWise. As a consequence, they do not report their costs and program outcomes with the frequency or level of detail of EnergyWise and other ratepayer-funded programs. To augment the detailed program model analysis offered above, this section expands our review to examine the program offerings, costs, and outcomes from four ratepayer-funded programs that offer services similar to EnergyWise: Baltimore Gas & Electric (BGE) Smart Energy Savers, Efficiency Vermont Home Performance with ENERGY STAR, Xcel Energy (Minnesota) Home Energy Audit/Home Energy Squad, and PSE HomePrints/ Home Energy Assessments.

7.2.1. Program Offerings

The reviewed programs vary in the cost of their audits, as well as in who provides the audit (Table 7-2). Three of the four comparison programs require participants to pay for their audits. BGE and Xcel are relatively consistent in their audit pricing, although Xcel offers multiple levels of audits. Efficiency Vermont offers participants an incentive for the audit, but it is not clear from program materials what the final cost to the participant typically is. The programs are relatively consistent in the types of measures they provide through direct installation.

29 MEDC Michigan Energy Office and Michigan SAVES, "Better Buildings for Michigan Final Report."

30 DNV GL, "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report."

31 GDS Associates, Inc., "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program."

Table 7-2: Comparison Program Audit Offerings

Organization	Program	Audit Cost/ Incentive	Audit Provided By	Direct Install Measures
Baltimore Gas & Electric (BGE)	BGE Smart Energy Savers	Cost = $100	Trade ally contractor selected by participant	CFLs, water heater tank wrap, domestic hot water pipe insulation, showerheads, aerators
Efficiency Vermont	Home Performance with ENERGY STAR	$100 discount	Trade ally contractor selected by participant	None listed
Xcel Energy (Minnesota)	Home Energy Audit/Home Energy Squad	Home Energy Audit costs = $30 for walk-through; $60 for standard (blower door); $100 for standard w/infrared Home Energy Squad cost = $70 for walk through with direct install measures	Lead vendor	None listed for Home Energy Audits. Home Energy Squad provides: light bulbs, door weather stripping, water heater tank wrap, showerheads, aerators, programmable thermostats, door sweeps, power strips
PSE	HomePrints/ Home Energy Assessments	Free	Trade ally contractor assigned by program	LEDs, showerheads, and aerators provided at no cost; power strips available with copay
National Grid	EnergyWise	Free	Lead vendor	LEDs, showerheads, aerators, power strips

Data drawn from program websites, listed in references section.

The EnergyWise maximum incentive offerings for participants heating with electricity and natural gas are higher (at $4,000) than those of the comparison programs, with three of the comparison programs capping incentives at about $2,000 (Table 7-3). Xcel Energy's incentives are notably lower than those of the other comparison programs. Program materials did not detail reasons for these lower incentives. EnergyWise also differs from all four comparison programs in that the lead vendor coordinates measure installation. In the comparison programs, participants select a contractor from an approved trade ally list and contract with that firm directly to install measures.

Table 7-3: Comparison Program Incentive Offerings

Organization	Program	Incentives for Customers with Gas and Electric Heat		Measures Installed By:
		Air Sealing	Insulation	
BGE	BGE Smart Energy Savers	50% up to $2,000 for full project		Trade ally contractor selected by participant
Efficiency Vermont	Home Performance with ENERGY STAR	Performance based on air leakage reduction: 20-35%=$250; >35%=$500, + $500 bonus for min 10% air sealing + installation of all recommended health & safety improvements	$0.40/sq. ft. up to $2,000 for insulation and air sealing	Trade ally contractor selected by participant
Xcel Energy (Minnesota)	Home Energy Audit/Home Energy Squad	20% up to $40	20% caps vary by measure (up to $300 for attic insulation + $300 for wall insulation)	Trade ally contractor selected by participant
PSE	HomePrints/ Home Energy Assessments	50% up to $350	50% caps vary by measure; up to $1600 if all measures installed, in addition to air sealing incentive	Trade ally contractor selected by participant
National Grid	EnergyWise	Up to $850 of air sealing provided at no cost to customer	75% up to $4,000	Trade ally contractor assigned by program or selected by customer

Data drawn from program websites, listed in references section.

7.2.2. Program Costs and Outcomes

The comparison programs varied in their expenditures and number of participants served in 2015 (Table 7-4). All programs served a smaller volume of participants and operated with smaller budgets than EnergyWise, which is notable given that, with the exception of Efficiency Vermont, National Grid Rhode Island has fewer residential customers than these utilities.[32] Within comparison programs, the cost per participant varied considerably between electric and natural gas participants, and the comparative cost by fuel type varied by program as well. For example, PSE's implementation cost per electric participant was considerably lower than its cost per natural gas participant, while Xcel's program showed the opposite pattern.

[32] "Annual Electric Power Industry Report: 2015 Early Release" (Washington DC: U.S. Energy Information Administration, August 2, 2016), https://www.eia.gov/electricity/data/eia861/.

Despite this variation in per-participant implementation costs by fuel type, when per-participant costs are averaged across fuels they were relatively consistent across the comparison programs. Comparison programs that offered only audits had considerably lower costs per participant than programs offering incentives for measure installation, with costs for audit-only offerings ranging from $217 to $299 per participant. Average per-participant costs for programs offering incentives for measure installation were higher, ranging from $966 to $1,307, with EnergyWise on the lower end of this range at a cost of $1,011 per participant.

Table 7-4: Comparison Program Costs and Participation, 2015

		Expenditure (x $1,000)*		Participants		Cost Per Participant		
Organization	Program	Electric	Gas	Electric	Gas	Electric	Gas	Avg.**
BGE	BGE Smart Energy Savers	$2,825		2,926		$966		$966
PSE	HomePrint	$2,482		8,300		$299		$299
	Weatherization + ARRA	$1,683	$3,938	500	4,400	$3,366	$895	$1,147
Efficiency Vermont	Home Performance with ENERGY STAR	$4,150	$4,424	4,125	2,435	$1,006	$1,817	$1,307
Xcel Energy (Minnesota)	Home Energy Squad	$1,319	$650	4,580	2,096	$288	$310	$295
	Home Energy Audit	$387	$428	2,053	1,702	$188	$251	$217
	Home Performance with ENERGY STAR	$1,078	$196	141	142	$764	$1,383	$1,075
National Grid	EnergyWise	$9,782	$4,877	11,665	2,830	$839	$1,724	$1,011

* Figures reported are total expenditure, including program administrative costs.

** Averages are weighted by number of participants within each fuel.

Data drawn from 2015 regulatory filings reporting on energy efficiency accomplishments; specific sources cited in references section

There was considerably more variation between the comparison programs in the cost of saved energy than in per-participant costs, with costs per reported megawatt hour saved ranging from $343 to $1,657 and costs per reported Therm ranging from $7 to $200 (Table 7-5). A large part of this variation likely reflects factors external to the program design, including differences in climate and differences in savings estimation and reporting practices between program administrators. As a result, cost of saved energy may be a less reliable metric in comparing programs than per participant costs.

Table 7-5: Comparison Program Energy Savings and Cost of Saved Energy

		Expenditure (x $1,000)		Energy Savings		Cost of Saved Energy	
Organization	**Program**	**Electric**	**Gas**	**MWh**	**Therms**	**$/MWh**	**$/Therm**
BGE	BGE Smart Energy Savers	$5,625		2,337	122,131	Insufficient Detail to Calculate	
PSE	HomePrint	$2,482		3,784	None Claimed	$656	N/A
	Weatherization + ARRA	$1,683	$3,938	3,509	551,364	$480	$7
Efficiency Vermont	Home Performance with ENERGY STAR	$4,150	$4,424	2,505	22,115	$1,657	$200
Xcel Energy (Minnesota)	Home Energy Squad	$1,319	$650	3,845	24,384	$343	$27
	Home Energy Audit	$387	$428	None Claimed		N/A	
	Home Performance with ENERGY STAR	$108	$196	106	4,779	$1,015	$41
National Grid	EnergyWise	$9,782	$4,878	19,484	67,891	$502	$72

Data drawn from 2015 regulatory filings reporting on energy efficiency accomplishments; specific sources cited in references section

7.3. Summary

The EnergyWise program differs from the programs reviewed in this chapter in that the lead vendor coordinates measure installation for participants. The reviewed programs that use a lead vendor model for assessments leave participants to coordinate measure installation, although some, like Boulder's EnergySmart program, offer support if participants have questions or face challenges in that process. By using the lead vendor in this role, EnergyWise addresses or circumvents some of the challenges that other programs have faced. Because the lead vendor is primarily responsible for selling the weatherization project, EnergyWise differences in sales skill between contractors have little effect on program uptake. By coordinating the installation, EnergyWise also maintains a more seamless process for participants, relative to programs that use a lead vendor for assessments but rely on participants to coordinate installation.

Despite the greater involvement of its lead vendor, the EnergyWise program's average per-participant implementation cost is in line with those of programs offering similar services and incentives in other parts of the country. HPwES programs that use a contractor model for both assessments and installation had per-participant implementation costs that were in-line with, or slightly higher than, those of EnergyWise.

8. Conclusions and Recommendations

We draw the following conclusions and recommendations from this research:

Conclusion 1: Program processes work smoothly, both for participants and for those involved in program delivery.

Survey findings indicate that participants were largely satisfied with their experience with EnergyWise assessments, weatherization projects, and HEAT Loans. The survey did not identify areas of confusion or dissatisfaction affecting large numbers of participants. Assessor and lender interviews support these findings, with both groups reporting that few participants raise concerns or areas of confusion, and they are able to resolve any issues that arise.

Assessors, installation contractors, and lenders also indicated that the program's administrative processes work relatively smoothly. Interview respondents did not report challenges with communication or major areas of inefficiency or dissatisfaction with program processes. Interview respondents expressed positive views of RISE's ongoing efforts to improve program processes, including sending two-person teams to conduct audits and conducting same-day air sealing.

Because program data did not clearly delineate which participants were part of these trial improvement efforts, our ability to assess the efforts' effectiveness is limited. Survey data did not indicate significant differences in satisfaction or likelihood of completing weatherization projects or taking out a HEAT Loan between participants who received assessments from a two-person team or same-day air sealing and those who did not.

- **Recommendation 1:** National Grid and RISE should record the participants that experience innovative program delivery strategies in order to assess the effectiveness of those strategies.

  The program database should include clear flags identifying these participants by strategy innovation.

- **Recommendation 2:** National Grid and RISE should use experimental designs to determine the effectiveness of innovative program delivery strategies.

  Designing and rigorously carrying-out experiments will provide a much more accurate sense of the benefits and drawbacks of changes to program implementation.

Conclusion 2: Higher incentives and an interest rate buy-down to 0% both add value to the EnergyWise program.

Program data confirms assessors' reports that participants eligible for higher incentives are more likely to move forward with weatherization measures. Natural gas customers, who qualify for larger incentives, generally have a higher conversion rate than customers heating with oil and other delivered fuels. Conversion rates among natural gas customers decreased as the available incentive levels fell and then gradually increased as incentive levels rose.

Assessors and lenders also credit the 0% HEAT Loan interest rate with motivating participants who would not otherwise do so to move forward with improvements and allowing them to complete larger projects. Participants who would not have financed efficiency measures without the 0% loan offering most often reported that, in the absence of the loan, they would have done a smaller project or delayed their project.

Recognizing that these financial elements add value to the program, National Grid must determine whether that value justifies their cost. This study supports the notion that these elements contribute to program and measure uptake, but the study scope did not enable us to rigorously quantify the value of the financial elements nor to conduct a cost-benefit comparison.

- **Recommendation 3**: National Grid should consider conducting further research to more precisely quantify the impact of incentive levels and interest rates on weatherization uptake and project characteristics.

  This research could pursue one of two approaches:

  - A willingness to pay study using conjoint analysis or a similar statistical method could quantify the influence of various levels of incentives and interest rates on participants' likelihood of participation.
  - A rigorous analysis of participation data, examining differences in project uptake both between participants whose heating fuels make them eligible for different incentive levels within a given time period and over time among participants with the same heating fuel as incentive offerings change. It is important that these analyses account for factors internal to the program (e.g. marketing campaigns) and external to the program (e.g. economic conditions, weather and seasonality) in assessing the impact of changes in incentive levels. National Grid should also rigorously monitor participation data both before and after any future changes to incentive levels or interest rates to assess their effects.

Conclusion 3: The potential exists for market saturation or other market conditions to slow weatherization project uptake.

There are some indications that this could be occurring. While natural gas conversion rates increased as incentive levels were restored to their previous levels, the peak in October of 2015 (36%) is lower than the earlier peak, in February of 2014 (42%). There also appears to be a decline in conversion rate beginning in November 2015, even though we expect that most assessments completed prior to January 2016 should have completed their weatherization projects by the time of our database export. Nonetheless, this decline reflects a relatively small amount of data, and conversion rates may change as weatherization projects move through the participation process.

It will likely take six to twelve months after our database export to determine whether apparent conversion rate declines beginning in November of 2015 truly represent a trend, if they are a temporary, seasonal, decline, or if weatherization projects moving through the pipeline eliminate any apparent declines altogether. If the data continue to show an enduring decline, it may be

worthwhile for National Grid to investigate whether the market is becoming saturated or if other market conditions are causing reduced uptake of weatherization projects.

- **Recommendation 4:** National Grid should continue to monitor audit-to-weatherization conversion rates and investigate causes of any long-term declines. To determine the cause of any long-term declines in conversion rates, National Grid could:
  - Review assessment uptake and recommendations: Strong assessment uptake with declining proportions of participants receiving recommendations for weatherization work would indicate a saturated market.
  - Conduct a non-participant survey: A non-participant survey could gauge program awareness and investigate reasons for not participating among those who are aware of the program. This could identify barriers to participation beyond market saturation.
  - Conduct a statistical analysis of the relationship between conversion rates and other factors: These factors could include prices of natural gas or other heating fuels, weather, and economic conditions.

Appendix A. References

"2015 Savings Claim Summary." Burlington, VT: Efficiency Vermont, April 1, 2016. https://www.efficiencyvermont.com/Media/Default/docs/plans-reports-highlights/2015/efficiency-vermont-savings-claim-summary-2015.pdf.

"Annual Electric Power Industry Report: 2015 Early Release." Washington DC: U.S. Energy Information Administration, August 2, 2016. https://www.eia.gov/electricity/data/eia861/.

Baltimore Gas and Electric. "Home Performance with ENERGY STAR®." BGE Smart Energy Savers Program, March 11, 2015. http://bgesmartenergy.com/residential/home-performance-energy-star.

———. "Q3 and Q4 2015 Semi-Annual EmPOWER Maryland Report of Baltimore Gas and Electric Company." Maryland Public Service Commission, February 1, 2016.

"Best Practices for Energy Retrofit Program Design Case Study: Boulder, Colorado." Home Performance Resource Center, March 2010.

Boulder County. "Energy Efficiency and Conservation Block Grant (EECBG) Better Buildings Neighborhood Program Final Report." Washington DC: U.S. Department of Energy, December 30, 2013.

DNV GL. "2012-2013 HomePrint Assessment Program Process and Impact Evaluation Report." Bellevue, WA, December 18, 2015.

GDS Associates, Inc. "Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program." Austin Energy, September 2012.

"Home Energy Efficiency." Xcel Energy. Accessed August 11, 2016. https://www.xcelenergy.com/programs_and_rebates/residential_programs_and_rebates/home_energy_efficiency.

"Home Performance with ENERGY STAR." Efficiency Vermont. Accessed August 11, 2016. https://www.efficiencyvermont.com/rebates/list/home-performance-with-energy-star.

MEDC Michigan Energy Office, and Michigan SAVES. "Better Buildings for Michigan Final Report." Washington DC: U.S. Department of Energy, September 30, 2013.

Puget Sound Energy. "2015 Annual Report of Energy Conservation Accomplishments." Washington Utilities and Transportation Commission, March 1, 2016.

"Rebates and Offers." Puget Sound Energy. Accessed August 11, 2016. https://pse.com/savingsandenergycenter/Rebates/Pages/default.aspx.

Research Into Action, Inc. "Drivers of Success in the Better Buildings Neighborhood Program - Statistical Process Evaluation: Final Evaluation Volume 3." Washington DC: U.S.

Department of Energy Office of Energy Efficiency and Renewable Energy, June 2015. http://energy.gov/eere/analysis/downloads/drivers-success-better-buildings-neighborhood-program-statistical-process.

The Narragansett Electric Company d/b/a National Grid. "2015 Energy Efficiency Year-End Report." Docket 4527. Warwick, RI: Rhode Island Public Utilities Commission, May 2, 2016. http://www.ripuc.org/eventsactions/docket/4527-NGrid-YrEndRept(5-2-16).pdf.

Xcel Energy. "2015 Status Report & Associated Compliance Filings: Minnesota Electric and Natural Gas Conservation Improvement Program." Docket No. E.G002/CIP-12-447. St. Paul, MN: Minnesota Department of Commerce: Division of Energy Resources, April 1, 2016. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={79598249-A465-4584-8DCE-22E10CE99535}&documentTitle=20164-119668-01.

Appendix B. In-Depth Interview Guides

B.1. Administrative Staff (National Grid and RISE)

B.1.1. Introduction

Thank you for taking the time to talk with me. As we work on the process evaluation of the EnergyWise program, we want to make sure we have a really strong understanding of how the program works. We would also like to hear your perspective on the program's strengths and weaknesses and some of the other evaluation objectives. Knowing your views on these things and what led the team craft the evaluation's research questions will help us focus our research and present results in a more helpful way.

Before we begin, do you have any questions about the evaluation?

And would you mind if I record our conversation? The recording is just to help with my note-taking. We won't report anything in a way that would identify you.

B.1.2. Role

Q1. What is your role in delivering the EnergyWise program?

1. How much of your time is focused on the EnergyWise program, as opposed to other responsibilities?
2. How long have you been in your current role?

Q2. Who do you regularly interact with in carrying out your role?

1. Overall, do you feel like your communication with those people/groups is effective? Why or why not?
2. What communication systems or practices have been particularly successful?
3. What are the greatest challenges you face in communicating with those people/groups?

B.1.3. Participation Process

Q3. Please walk me through the EnergyWise process as a participant would experience it, including how they would hear about the program through to completing their project and receiving their incentive.

1. How, if at all, has the participation process changed in the past few years?
2. What motivated those changes?

Q4. What pilots, if any, have you run recently related to the participation process?

1. What motivated you to test those changes?
2. What kind of results did you see?

Q5. What parts of the process seem most challenging for participants?

1. [If needed:] On what parts of the process do participants have the most questions or need for support? Where do you see the most errors?

Q6. What do you see as the biggest factors that motivate people to move forward with weatherization projects?

Q7. What kind of feedback have you gotten from participants about their experience with EnergyWise auditors?

1. How did you receive that feedback (was it through customer service calls, regular surveys, prior evaluation reports, etc.)?
2. How widespread do you think those opinions or experiences are?

Q8. And what about the independent installation contractors, what kind of feedback have you gotten about them? [Repeat probes from Q7]

1. What are the most common issues you are finding through the QA/QC process? How frequently do those come up?
2. How else have you received feedback (was it through customer service calls, regular surveys, prior evaluation reports, etc.)?
3. How widespread do you think those opinions or experiences are?

Q9. What feedback have you gotten, if any, about the instant savings measures the auditor installs?

1. Are there any opportunities for the auditors to install additional measures, beyond what they are already doing?

Q10. What opportunities do you see to increase the efficiency of the participation process?

1. [If needed:] Are there any elements of the process that could be combined or that are not necessary?

Q11. How could the participation process become more effective, so that participants would be more likely to complete energy efficiency retrofit?

Q12. What would be the biggest obstacles to making the kinds of changes you just suggested to increase the efficiency or effectiveness of the participation process?

B.1.4. Administrative Process

Q13. Now please walk me through the behind-the-scenes administrative process that supports a project as it moves through the EnergyWise program. I'm thinking of things like verifying eligibility, assigning auditors and independent installation contractors, quality control, incentive processing, and all the other pieces that go into delivering the program.

1. How, if at all, have the administrative processes changed in the past few years?
2. What motivated those changes?

Q14. [If not addressed:] How does information flow between the auditors and the installation contractors? [If not addressed: I am particularly interested in understanding the hand-off between auditors and contractors and how the measure installation gets scheduled.]

1. What role does each play in making the sale to convince a participant to do a weatherization project?
2. I understand the auditor develops the scope of the weatherization project. How much leeway does the installation contractor have to interpret or alter that scope?
3. What processes, if any, does the contractor have to use if it is necessary to alter the scope?

Q15. What pilots have you run recently related to the program's administrative processes?

1. What motivated you to run those pilots?
2. What results have you seen?

Q16. What aspects of the administrative process do you feel are most effective? Why do you say that?

1. [If needed:] What challenges do those process elements overcome, and how do they overcome them?

Q17. What aspects of the process are the most challenging?

Q18. What opportunities do you see to make the program's administrative processes more effective?

Q19. What opportunities do you see to make the administrative processes more efficient?

Q20. What would be the most difficult part of making the changes you just suggested to increase the efficiency or effectiveness of the administrative processes?

B.1.5. Program Experience

Q21. What trends have you seen in program uptake through 2015 and the first half of 2016?

1. What do you think is driving those trends?
2. Is that something you had anticipated?

Q22. What do you think are the most important things that prevent more households from making weatherization upgrades?

Q23. In your experience, what effect do different weatherization incentive levels have on uptake of weatherization projects?

Q24. From your perspective, what role do HEAT Loans play in bringing about more weatherization projects through the program?

1. [If needed:] For example, does their availability generate interest in the program? Do they allow people to complete projects who otherwise would not be able?
2. Why don't more participants use Heat Loans?

Q25. From your experience, how accessible are Heat Loans to moderate income participants?

1. Are you aware of any participants that needed a loan but did not qualify for a Heat Loan or did not apply for one because they did not think they would qualify?

Q26. How important is the 0% interest rate in the Heat Loans' ability to deliver the benefits you described?

1. How do you anticipate adopting a non-zero interest rate would affect loan uptake?
2. And what impact would that have on uptake of weatherization improvements?

Q27. How do you anticipate the introduction of residential PACE financing will affect the EnergyWise program? Why do you say that?

B.1.6. Closing

Q28. Overall, what do you see as the greatest strengths of the EnergyWise program?

Q29. What are the biggest challenges the program faces?

Q30. How would you like to see the program change to overcome those challenges?

Q31. What questions are you most interesting in the evaluation addressing?

Q32. Those are all the questions I have prepared. Is there anything else you think we should know about EnergyWise as we move forward with the evaluation?

B.2. Assessors

B.2.1. Introduction

Thank you for taking the time to talk with me. As I mentioned in my [phone call/email], we are working with National Grid to identify ways to make the EnergyWise program more efficient and effective. You play a central role in the program, and I'm interested to hear your perspective

on the program. I have some questions about the audit process, and your interactions with participants and the administrative side of the program.

Before we begin, do you have any questions about our research?

And would you mind if I record our conversation? The recording is just to help with my note taking. We won't report anything in a way that would identify any individual respondent.

B.2.2. Audit Process

Q1. How long have you been working as an auditor for National Grid's EnergyWise program in Rhode Island?

Q2. Please walk me through your interaction with a typical audit participant:

1. How engaged are participants in the audit process: do you typically have to encourage them to follow along, or are they eager to participate?
2. What are the most common questions participants ask you during the audit?
3. What are their most common concerns about their homes?
4. How interested are participants in the recommendations and information you present at the end of the audit?

Q3. What are the most common concerns you hear from participants about the audit process itself?

1. [If not addressed:] What parts of the audit process, if any, seem challenging for customers? Where do you find customers are most often confused?

Q4. What are the most common concerns you hear about the energy efficiency measures the audit recommends?

Q5. How frequently do you encounter conditions that may preclude you from weatherizing the home? [Probe: mold and moisture problems, needed home repairs, combustion safety issues, or other]

Q6. What are the biggest challenges you regularly encounter in typical homes that make it difficult for you to do what you need to do to complete the audit?

1. [For each challenge identified:] How frequently does that occur?
2. [For each challenge identified:] What do you do when you run into that challenge? How do you overcome it?

Q7. I would imagine that, during the time you have been doing EnergyWise audits, you have found ways to streamline the process within the program requirements. How have you changed the way you do EnergyWise audits in Rhode Island since you began doing them?

1. [If not addressed:] How have you changed the way you collect information about the home itself or install measures?

2. [If not addressed:] How have you changed the way you interact with participants?
3. [For all changes mentioned:] What motivated you to make those changes?
4. [For all changes mentioned:] Did those changes accomplish your objectives?

Q8. What other opportunities do you see to increase the effectiveness or efficiency of EnergyWise audits, including opportunities that would require a change in the program requirements?

1. What opportunities do you see to increase the energy savings that the audits generate?
2. Are there additional measures the program could offer, either as a direct installation during the audit or as an incentive, to increase energy savings?

Q9. Do you think participants would be willing to pay for their audits?

1. Why do you say that?
2. [If not addressed:] What impact do you think charging for audits would have on audit uptake? What impact would it have on weatherization project uptake?
3. How much do you think participants would be willing to pay for an audit?

B.2.3. Selling Weatherization Work

Q10. When you are working with a participant during their audit, how accurately can you predict whether that participant will do an energy efficiency project?

1. [If they can predict:] What signs indicate an audit participant is more likely to complete a project?
2. [If they can predict:] What signs indicate an audit participant is less likely?
3. Are there differences in likelihood of making upgrades between the communities where you work? What drives those differences?

Q11. What are the most important reasons that participants decide to move forward with weatherization projects?

Q12. What are the most important reasons that more participants do not make weatherization improvements?

1. How could an auditor help overcome those barriers? How could they better show the value of retrofits to customers?

Q13. How important are the program incentives in motivating participants to complete weatherization projects?

1. We understand the weatherization incentive amounts differ based on the household's primary heating fuel. How much does that impact your ability to sell weatherization projects to oil or propane-heated homes?
2. What differences in uptake have you seen as gas incentive levels varied?

Q14. How do you incorporate the Heat Loan into your efforts to encourage participants to make weatherization improvements?

1. At what point in the discussion do you bring up the loan?
2. Do you present information about the loan the same way to all participants? If not, how does your presentation vary and how do you decide what to emphasize with participants?

Q15. How do participants react to the Heat Loan offer?

1. What are their most common questions or concerns?
2. Why don't more participants use Heat Loans?
3. [If not addressed:] To your knowledge, have you encountered participants that were reluctant to apply for a Heat Loan because they did not think they would qualify? How frequently does this occur? How do you address those concerns?

Q16. In your experience, do Heat Loans allow participants to do larger or more expensive projects than they would if the loan was not available?

1. Do Heat Loans allow participants to do weatherization projects who would not be able to do a project at all without the loan?
2. What have you seen that leads you to that conclusion?

Q17. How do you think the uptake of Heat Loans would change if they were no longer available at a 0% interest rate?

1. Why do you say that?
2. How would that impact your ability to sell weatherization projects through the program?

Q18. Are you aware of PACE financing? [*If not, explain: PACE stands for Property Assessed Clean Energy financing, and it is a platform that allows participants to pay for energy efficiency improvements by placing a lien on their properties that they will pay back over time on their property taxes. One big advantage of PACE over other types of financing is that it is attached to the property, rather than the individual. This means that the payments can transfer to the next owner if the participant moves away from the property and the qualification criteria can be relaxed, since it doesn't have to be based on an individual's credit worthiness.*]

1. Do you think the audit participants you work with would be interested in PACE financing if it were available for their weatherization projects? Why or why not?
2. How do you think the availability of PACE financing would affect uptake of weatherization projects?
3. How would you present PACE financing to participants to encourage them to use it?

B.2.4. Administrative Processes

Now I'd like to move away from your interaction with participants to talk about the administrative side of the program.

Q19. How do you typically learn about any changes to the program?

1. Do you generally get enough information to understand what has changed and how the change will affect your work? [If not:] What is missing?
2. How could communication about program changes be improved?

Q20. From your perspective, how effective are the program's systems for capturing and managing data? Why do you say that?

1. How could the program's data systems be improved?

Q21. Finally, I'd like to know what you think about the program's quality assurance process. First, please tell me about RISE's QA process. What is your involvement with RISE's QA/QC process?

1. How effective do you think the QA process is?
2. What challenges, if any, have you faced in getting through the QA process?
3. From your perspective, what are the most important benefits of the QA process?
4. How would you like to see the QA process improve?

Q22. Do you have experience with CRI's QA/QC process?

1. How effective do you think the QA process is?
2. What challenges, if any, have you faced in getting through the QA process?
3. From your perspective, what are the most important benefits of the QA process?
4. How would you like to see the QA process improve?

B.2.5. Closing

I just have a few more, general questions as we wrap up the interview.

Q23. Thinking about the process of delivering the EnergyWise program, what are the most effective elements?

Q24. Which elements are most in need of change? What changes would you like to see?

Q25. Preliminary results from an analysis of EnergyWise participants' energy usage are not showing the level of savings National Grid expected. Why do you think actual savings might be coming in lower than the estimates?

Q26. Those are all the questions I have prepared. Is there anything we haven't covered that you think I should know as we think about how to improve the EnergyWise program?

B.3. Installation Contractors

B.3.1. Introduction

Hello, my name is _____, and I'm calling from Research Into Action. My company is working with National Grid to identify ways to make the EnergyWise program more efficient and effective, and I wanted to hear your perspective as one of the program's installation contractors. You have a central role in delivering the program directly to participants in Rhode Island. The questions I have should take about 20 minutes to answer. Is this a good time to talk?

[If respondent is unavailable, attempt to schedule an interview.]

Before we begin, do you have any questions about our research?

And would you mind if I record our conversation? The recording is just to help with my note taking. We won't report anything in a way that would identify any individual respondent.

B.3.2. Background

Q1. How long have you been doing weatherization projects through the EnergyWise program?

Q2. What proportion of your firm's work comes from EnergyWise weatherization projects?

Q3. [If less than 100%:] What kinds of projects does your firm do outside of EnergyWise?

1. [If not addressed:] How, if at all, does the scope of the projects you do outside of EnergyWise typically differ from the projects you do through the program?

Q4. Has your company grown as a result of your work with the EnergyWise program?

1. [If so:] How many positions have you added to meet the demands of your EnergyWise work?
2. Beyond companies like yours that work directly with the program, are you aware of any other firms that have added jobs as a result of EnergyWise? [If so:] Which firms and how many jobs have they added?

B.3.3. Measure Installation

Q5. Please walk me through your role in a typical EnergyWise weatherization project, from the time you first learn about the customer opportunity to until the project is complete and the incentives have been paid.

Q6. What, if anything, have you done to market the EnergyWise program in Rhode Island?

1. [If market the program:] What marketing approaches have you found to be the most effective?

2. [If do not market the program:] Why haven't you done anything to market the program?
3. What proportion of your EnergyWise projects come from leads that you generated and "tagged" in the program, as opposed to leads the program assigned to you?

Q7. How clear is the scope of work you receive for weatherization work that was specified during an EnergyWise participant's energy audit?

1. Are you typically able to understand what the energy auditor intended for you to do?
2. Who do you contact if you have questions about the scope the auditor defined? Are they typically able to resolve the issue?
3. How much room does the scope leave for you to determine how you will implement the recommended improvements?
4. [If needed:] To what extent might two jobs differ if they had the same scope from the auditor but were installed by different contractors?

Q8. Have there been cases in which it wasn't practical for you to install the weatherization measures exactly the way the auditor specified them?

1. How frequently does this occur?
2. What procedures do you follow when that happens? Do you notify the program? Do you need approval?

Q9. What are the most common challenges you face in installing customers' weatherization upgrades as the auditor specifies?

1. Are there any measure types or housing types in particular that frequently cause problems?

Q10. What feedback, if any, have you received from participants about the measures that the auditor installs, like efficient light bulbs, faucet aerators, and power strips?

1. How frequently do you encounter cases where participants have removed these measures? What reasons do they offer as to why they removed them?

Q11. Tell me about your experience with the program's quality control processes. First, I'd like to hear about the QA/QC review that RISE performs on every job.

1. What have been the most common issues that your firm has had to address through RISE's quality control process?
2. Do you think the process is effective? Why or why not?
3. How could the quality control process improve?

Q12. Next, I'd like to hear about your experience with the QC that CRI does on a sample of EnergyWise projects.

1. What have been the most common issues that your firm has had to address through CRI's quality control process?
2. Do you think the process is effective? Why or why not?

3. How could the quality control process improve?

B.3.4. Customer Interaction

Now I'd like to hear a little bit about your interaction with EnergyWise participants.

Q13. When you arrive at a home, how well do participants typically understand what is involved in a weatherization project?

1. What are the most common questions that come up in your interaction with participants?
2. What do participants seem to find most surprising about your work?
3. How could participants be better prepared for their weatherization projects?

Q14. What are the most common concerns participants raise about the process of installing the weatherization measures?

Q15. How frequently, if at all, do participants request that you expand the project to install measures that go beyond the recommended EnergyWise weatherization work?

1. What kinds of additional work do you typically do?

Q16. Have you done projects in Rhode Island that would qualify for EnergyWise incentives, but do not go through the program?

1. How frequently does this occur: what proportion of your Rhode Island weatherization projects go through the program?
2. Why don't you use the program for some projects?

Q17. How, if at all, do you follow-up with participants after you complete a weatherization project?

1. What kind of feedback have you received on the weatherization work? What were people most satisfied with, and what were they least satisfied with?
2. Do you market other services to participants? If so, what kind?

B.3.5. General Feedback and Closing

Finally, I have some general questions about your overall experience with the EnergyWise program and how it could improve.

Q18. Does your firm work with energy efficiency programs outside of Rhode Island?

1. [If so:] What programs do you work with?
2. [If work with other programs:] What proportion of your firm's work comes from projects that go through energy efficiency programs, including EnergyWise and others?

Q19. [If work with other programs:] How does your experience with those programs compare with your experience with EnergyWise in Rhode Island?

1. What are the greatest strengths of the EnergyWise program relative to other programs?
2. What are the greatest shortcomings of the EnergyWise program relative to others?

Q20. [If not addressed:] In general, what do you see as the EnergyWise program's greatest strengths? Why do you say that?

Q21. [If not addressed:] And what do you see as the program's greatest shortcomings? How could the program change to address those issues?

Q22. What home energy efficiency opportunities, if any, does the program regularly miss? Are there any measures or opportunities to save energy that you often see but are not able to address?

Q23. A preliminary analysis of EnergyWise participants' utility bill data is not showing as much energy savings as National Grid expected. Do you have any ideas about what might be causing that? [Probe to understand whether responses apply to electric, oil, or gas savings measures].

Q24. Those are all the questions I had prepared. Is there anything else you think I should know as we think about ways to improve the EnergyWise program?

B.4. HEAT Loan Lenders

B.4.1. Introduction

Thank you for taking the time to talk with me. As I said in my [email/phone call], we are working with National Grid staff to help them improve the EnergyWise program, including their Heat Loans offering. I'd like to hear about how the Heat Loans are working for you, how they could be improved, and how you see the Heat Loan program adapting in the future.

Before we begin, do you have any questions about our research?

And would it be OK if I record our conversation? The recording will just help with my note taking. We won't report anything in a way that would identify any particular person or organization.

B.4.2. Role

Q1. What is your role related to Heat Loans?

Q2. How long has your organization been offering Heat Loans in Rhode Island?

Q3. What does your organization do to promote Heat Loans to your customers?

B.4.3. Participant Feedback

Q4. Please walk me through the process a customer goes through, from the time they first contact you about a Heat Loan to the time they complete their project.

Q5. What parts of that process are most difficult for customers? Where do you see the most errors or have to provide the most support?

Q6. What feedback have you received from customers about the loan process?

Q7. And what about the loan product, what feedback have you received from customers about that?

Q8. What concerns have prospective customers expressed about the loan?

Q9. To what extent have those concerns prevented customers from pursuing loans?

B.4.4. Interest Rates

Q10. How do you think Heat Loan uptake would change if customers were required to pay interest? To rephrase, at about what non-zero interest rate do you think you'd begin to see a diminution in Heat Loan activity?

Q11. If, as anticipated, the Federal Reserve increases interest rates, would it be feasible for your institution to continue offering Heat Loans at the current terms, which include 0% interest? (In other words: if interest rates increase, at what point does the 5% buy down become less attractive to you?) If not, how do you anticipate those terms would need to change?

Q12. [*If not addressed:*] Under what conditions would your institution want to increase the Heat Loan tenor?

Q13. How do you think customers would react to these changes in the Heat Loan offering that we've been discussing?

B.4.5. Underwriting

Q14. What requirements does an applicant have to meet to qualify for a Heat Loan? [*If not discussed, explore relationship with FICO score]*

Q15. How do those underwriting requirements compare to other loan products you offer, including amount of forms or paperwork to complete?

Q16. [*If qualification requirements differ:*] Why are your Heat Loan qualification requirements different from other types of loans?

Q17. How, if at all, have your qualification requirements changed since you began offering Heat loans? What motivated you to make those changes?

B.4.6. Loan Performance

Q18. About how many completed Heat Loan applications have you received in the past year? What has been your approval rate for these applications?

Q19. What is the most common reason you turn down applicants for Heat Loans?

Q20. Has the application rate or approval rate changed over time? If so, in which direction and to what do you attribute the change?

Q21. What is the default rate for your Heat Loans?

Q22. What changes, if any, have you seen in the performance of Heat Loans (including both approval and default rates) over the time you have been offering them?

Q23. How does the performance of Heat Loans (including both default rates and approval rates) compare to other, similar, loan products you offer?

Q24. What do you do with Heat Loans once you have made them: do you keep them in your portfolio, or do they go into secondary markets? Why?

Q25. [If keep loans in portfolio:] Would the Heat Loan offering be more attractive to you if you could sell the loans on the secondary market? Why or why not?

B.4.7. Heat Loan Experience

Q26. From your perspective, what are the primary benefits in offering Heat Loans?

Q27. What are the biggest challenges you face in offering Heat Loans?

Q28. [*If not addressed:*] To what extent do Heat Loans require more of your time than other types of lending products? If the time spent differs, first I'd like to know with respect to loan marketing, and then with respect to loan servicing.

Q29. How, if at all, would you like to see the Heat Loan offering change? Why do you say that?

Q30. Those are all the questions I have prepared. Is there anything we haven't talked about that you think I should know as we think about opportunities to improve the EnergyWise program and the Heat Loan offering?

Appendix C. Participant Survey Guide

C.1. Screening Questions

S1. Our records show your household received a free EnergyWise Home Energy Assessment through National Grid, performed by RISE Engineering. Is this correct?

1. Yes – my household received the energy assessment
2. No – my household did not receive an energy assessment
3. Don't know

[IF S1=2 OR 3]

S2. In the past year, have you had someone come to your home to identify opportunities to make your home more energy efficient? If so, we are going to refer to that experience as your energy assessment.

1. Yes – my household received an energy assessment
2. No – my household did not receive an energy assessment (→ TERMINATE)
3. Don't know (→ TERMINATE)

S3. [IF S1=2 OR 3] We would like to hear from a household member that was involved in the energy assessment experience. Are you that person?

1. Yes – I was involved in the energy assessment experience
2. No – I am not involved in the energy assessment experience (→ TERMINATE)
3. Don't know (→ TERMINATE)

C.2. Energy Assessment and Savings

[ASK ALL]

Q1. Why were you interested in having an energy assessment performed on your home? Were you seeking opportunities to…

[MULTIPLE RESPONSE]

1. Reduce energy bills
2. Do your part to help the environment or your community
3. Make your home more comfortable
4. Improve your home to prepare it for sale
5. Improve a home you recently purchased
96. Other
98. Don't know

[ASK ALL]

Q2. Did one person come to your house to conduct the energy assessment, or was it a two-person team?

[SINGLE RESPONSE]

1. One person
2. A two-person team
98. Don't know

[ASK ALL]

Q3. Prior to your audit, had you hired other home improvement service providers, like remodelers, plumbers, or HVAC contractors?

[SINGLE RESPONSE]

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

[IF Q3=1]

Q4. In general, how would you rate your experience with the home improvement service providers you worked with prior to your energy assessment? Was it:

[SINGLE RESPONSE]

1. Very positive
2. Somewhat positive
3. Neither positive nor negative
4. Somewhat negative
5. Very negative

[ASK ALL]

Q5. Relative to your expectations for other home contractor services, would you say that scheduling the home energy assessment was:

[SINGLE RESPONSE]

1. Much easier
2. Somewhat easier
3. About the same
4. Somewhat harder
5. Much harder

[IF Q5=4 OR 5]

Q6. What was difficult about scheduling the assessment?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q7. Compared to your expectations for other home contractor services, was the assessor's behavior:

[SINGLE RESPONSE]

1. Much more professional
2. Somewhat more professional
3. Equally professional
4. Somewhat less professional
5. Much less professional

[IF Q7=4 OR 5]

Q8. In what ways did the assessor behave unprofessionally?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q9. Compared to your expectations for other home contractor services, how responsive was the assessor to your interests and concerns. Would you say:

[SINGLE RESPONSE]

1. Much more responsive
2. Somewhat more responsive
3. Equally responsive
4. Somewhat less responsive
5. Much less responsive

[IF Q9=4 OR 5]

Q10. What interests or concerns did the assessor not address?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q11. Finally, how does your satisfaction with the assessment process overall compare to your expectations for other home contractor services? Are you:

[SINGLE RESPONSE]

1. Much more satisfied

2. Somewhat more satisfied
3. Equally satisfied
4. Somewhat less satisfied
5. Much less satisfied

[ASK ALL]

Q12. Thinking of your level of involvement in the energy assessment, would you say it required:

[SINGLE RESPONSE]

1. Too much involvement
2. Too little involvement
3. About the right amount of involvement
98. Don't know

[ASK ALL]

Q13. Which of the following items did your assessor install or provide on the day of your home energy assessment?

[MATRIX QUESTION]

Item	(1) Assessor installed item	(2) Assessor provided item, but did not install	(3) Did not receive item	(98) Don't recall
a. LED light bulb(s)				
b. Advanced power strip(s)				
c. Water-saving showerhead(s)				
d. Water-saving faucet aerator(s)				
e. Brush to clean refrigerator coils				

[ASK ALL]

Q14. Did your assessor seal your home against air leakage at the time of the audit? Doing this would have extended the length of the audit from the typical one-to-two hours to approximately six-to-eight hours.

[SINGLE RESPONSE]

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

[ASK IF Q13 ANY =1 OR 2]

Q15. Which of the following items from the assessment does your household regularly use?

[MATRIX QUESTION]

Item	(1) Regularly use	(2) Do Not Regularly Use	(98) Don't know
a. [Display if Q13a<>Did not receive device or don't know] LED light bulb(s)			
b. [Display if Q13b<>Did not receive device or don't know] Advanced power strip(s)			
c. [Display if Q13c<>Did not receive device or don't know] Water-saving showerhead(s)			
d. [Display if Q13d<>Did not receive device or don't know] Water-saving faucet aerator(s)			
e. [Display if Q13e<>Did not receive device or don't know] Brush to clean refrigerator coils			

[IF ANY ITEM IN Q15 "DO NOT REGULARLY USE" IS SELECTED]

Q16. Why does your household not use the items you received during the assessment?

[MATRIX QUESTION]

[DISPLAY ONLY MEASURES FOR WHICH Q15 "Not currently installed" IS SELECTED] Item	Reason for not using device [OPEN-ENDED RESPONSE]:
LED light bulb(s)	
Advanced power strip(s)	
Water-saving showerhead(s)	
Water-saving faucet aerator(s)	
Brush to clean refrigerator coils	

[IF Q15: "REGULARLY USE" IS SELECTED FOR ANY ITEM]

Q17. Please rate your satisfaction with the items you received during your energy assessment:

[MATRIX QUESTION: SCALE]

[DISPLAY ONLY MEASURES FOR WHICH Q15: "REGULARLY USE" IS SELECTED] Item	1-Not at all satisfied	2-Not very satisfied	3-Somewhat satisfied	4-Mostly satisfied	5-Very satisfied
LED light bulb(s)					
Advanced power strip(s)					
Water-saving showerhead(s)					
Water-saving faucet aerator(s)					
Brush to clean refrigerator coils					

[IF Q17 = 1 OR 2 FOR ANY ITEM]

Q18. Why aren't you satisfied with your:

[MATRIX QUESTION: SCALE]

[DISPLAY ONLY MEASURES FOR WHICH Q17=1 OR 2] Item	Reason for dissatisfaction:
LED light bulb(s)	
Advanced power strip(s)	
Water-saving showerhead(s)	
Water-saving faucet aerator(s)	
Brush to clean refrigerator coils	

[ASK ALL]

Q19. Thinking about the information you received at the end of your assessment about your home and how you could save energy, to what extent do you agree that:

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1-Do not at all agree	2-Mostly do not agree	3-Agree Somewhat	4-Mostly Agree	5-Completely Agree	98-Don't recall/ don't know
The information was clear						
You learned something new about how your home uses energy						
You knew how to move forward to make the recommended improvements						
You understood the rebates you could receive from National Grid for making improvements						
It was clear how you could apply for a 0% HEAT loan to finance the recommended improvements						

[ASK ALL]

Q20. Now that you have experienced a home energy assessment from National Grid, what would you consider to be a fair price to pay for an energy assessment like the one you received?

[SINGLE RESPONSE]

1. Up to $300
2. Up to $200
3. Up to $100
4. Up to $50
5. You would not pay for an energy assessment like the one you received

98. Don't know

C.3. Measures Taken

[ASK ALL]

Q21. Did your home energy assessment find any conditions in your home that could prevent you from installing insulation and air sealing? These conditions could include knob and tube wiring, combustion safety concerns, moisture concerns, or structural concerns.

[SINGLE RESPONSE]

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

[ASK ALL]

Q22. Which of the following items, if any, did your assessor recommend for you to install in your home?

[MULTIPLE RESPONSE]

1. Insulation or air sealing
2. Heating and cooling equipment
3. Thermostat
4. Refrigerator
5. My assessor did not recommend any of those items
98. Don't know

[ASK IF Q21A<>5 OR 98]

Q23. Please select the option that best describes the action you took, or plan to take, in response to your energy assessment's recommendations in each of the following areas:

[MATRIX QUESTION]

Item	1-Already made recommended improvements	2-Plan to make recommended improvements within the next 6 months	3-Will not make recommended improvements within 6 months	98 DK
a) [IF Q21a = 1] Insulation or air sealing				
b) [IF Q21a = 2] Heating and cooling equipment				
c) [IF Q21a = 3] Thermostat				
d) [IF Q21a = 4] Refrigerator				

[IF ANY ITEM IN Q23=3]

Q24. Why did you decide not to make the improvements your energy assessment recommended in each of the following areas?

[MATRIX QUESTION]

Item	Did not need it	Could not afford it	Loan application was denied	Did not want to use approved contractor	Not convinced of value	Completing work would have been too inconvenient	Did not know how to proceed with work	96 Other	98 DK
a) [IF Q23a)=3] Insulation or air sealing									
b) [IF Q23b)=3] Heating and cooling equipment									
c) [IF Q23c)=3] Thermostat									
d) [IF Q23d)=3] Refrigerator									

[IF Q23A)=1]

Q25. How important were each of the following factors in your decision to make insulation and air sealing improvements?

[MATRIX QUESTION: SCALE; RANDOM]

[LOGIC] Item	1-Not at all important	2-Not very important	3-Somewhat important	4-Very important	5-Extremely important
National Grid rebates					
Availability of 0% financing HEAT Loan					
Recommendations from my assessor					
Recommendations from another contractor					
Recommendations from a family member, friend, neighbor, or colleague					
Potential to save on energy bills					
Potential to increase the comfort of my home					
Potential to reduce my environmental impact					

[IF Q23A)=1]

Q26. Please rate how satisfied you were with each of the following aspects of your experience with your insulation and air sealing upgrade and the contractor that completed it*:*

[MATRIX QUESTION: SCALE; RANDOM]

[LOGIC] Item	1: Not at all satisfied	2: Not very satisfied	3: Somewhat satisfied	4: Very satisfied	5: Extremely satisfied	98 Don't know
Contractor's level of professionalism						
Amount of time it took to complete the work						
Involvement needed from me						
Improvement in comfort resulting from the insulation and air sealing work						
Energy savings resulting from the insulation and air sealing work						
Overall experience						

[IF Q23A)=1]

Q27. If someone asked you about your experiences with the insulation and air sealing upgrade, would you encourage them to do something similar?

[SINGLE RESPONSE]

1. Yes
2. No

[IF Q27=2]

Q28. Why wouldn't you encourage others to make insulation and air sealing upgrades?

1. [OPEN-ENDED RESPONSE]

[IF Q23A)=1]

Q29. What, if anything, do you wish you had known before completing your insulation and air sealing upgrades that would have helped you better prepare for the experience?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q30. What, if anything, have you done to save energy in your home since completing your home energy assessment **[if any item in Q23=1 pipe in: "other than the following?** [List **items for which Q23=1]"]**?

1. [OPEN-ENDED RESPONSE]

C.4. Financing [ASK ALL]

[ASK ALL]

Q31. Were you aware that National Grid works with lenders to offer 0% financing to help you pay for insulation, air sealing improvements, and new heating and cooling equipment?

[SINGLE RESPONSE]

1. Yes
2. No

[IF (Q31=1) AND ((Q23A = 1 OR 2 OR 3) OR (Q23B = 1 OR 2 OR 3)), INDICATING A RECOMMENDATION WAS MADE FOR INSULATION/SEALING AND/OR HEATING/COOLING]

Q32. Did you apply for a HEAT Loan – National Grid's 0% financing offer – to help pay for improvements recommended in your energy assessment?

[SINGLE RESPONSE]

1. Yes
2. No
98. DON'T KNOW

[IF Q32=2]

Q33. Why didn't you apply for a 0% interest HEAT Loan for the improvements recommended in your energy assessment? Please select all that apply:

[MULTIPLE RESPONSE]

1. Did not need a loan: had funds available
2. Did not want to take on debt or commit to monthly payments
3. Did not think you would qualify
4. Did not want to go through the loan application process
5. Wanted a loan you could repay over a longer time period
6. Not pursuing the recommendation improvements at this time
7. Other, please specify: [OPEN-ENDED RESPONSE]
98. DON'T KNOW

[IF Q23A)=1 OR Q23B)=1]

Q34. How did you pay for the improvements your energy assessment recommended?

[MATRIX, REORDER OPTIONS]

	(1) Yes	(2) No
1. 0% interest HEAT Loan		
2. Cash, check or credit card with intention to repay in full at the end of		

the month		
3. Credit card with intention to repay over time		
4. Financing or payment plan from the contractor		
5. Loan other than 0% interest HEAT Loan		
96. Other		

[IF Q23A)=1 OR Q23B)=1] AND [IF Q34 <>1(HEAT LOAN NOT SELECTED) AND Q31=1]

Q35. Why didn't you receive a HEAT loan?

[SINGLE RESPONSE]

1. My application was denied
2. My application was approved, but I did not complete my project
3. My application was approved, but I decided to complete my project without the loan
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. DON'T KNOW

[IF Q35=3]

Q36. Why did you decide not to move forward with the loan after applying?

1. [OPEN-ENDED RESPONSE]

[IF Q35=1]

Q37. To help National Grid understand how it can help more people access loans for energy efficiency upgrades, please tell us why your loan application was denied:

[MULTIPLE RESPONSE]

1. Low credit score
2. Too much other debt
3. Past bankruptcy or other problem with financial history
4. Lack of credit history
5. Employment or income status
96. Other
98. DON'T KNOW
99. I'D RATHER NOT SAY

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q38. What was appealing about the 0% interest HEAT Loan you used to pay for the improvements your energy assessment recommended? Please select all that apply:

[MULTIPLE RESPONSE]

1. 0% interest rate
2. Convenience
3. Ability to repay project costs over time

4. Ease of qualifying for the loan
5. Choice of lenders available to work with
96. Other
98. Don't know

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q39. How important was the availability of the 0% interest HEAT Loan in your decision to complete the improvements your energy assessment recommended?

[SINGLE RESPONSE]

1. Not at all important
2. Not very important
3. Somewhat important
4. Very important
5. Extremely important
98. DON'T KNOW

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q40. Which of the following options best describes what you would have done if you had not received the 0% interest HEAT loan for the improvements your energy assessment recommended?

[SINGLE RESPONSE]

1. I would not have done a project at all
2. I would have delayed the project more than six months
3. I would have done a smaller or less expensive project
4. I would have done exactly the same project
96. OTHER, PLEASE SPECIFY: [OPEN-ENDED RESPONSE]
98. DON'T KNOW

[IF Q40=2, 3 OR 4]

Q41. How would you have paid for the improvements your energy assessment recommended if you had not received the HEAT loan?

[MULTIPLE RESPONSE]

1. Cash or check
2. Credit card
3. Financing or payment plan from the contractor
4. Loan other than HEAT loan specifically for energy upgrades
96. Other
98. DON'T KNOW

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q42. Which of the following options would you have selected to finance the improvements your energy assessment recommended, had the zero percent HEAT loan not been available?

[SINGLE RESPONSE]

1. A seven-year loan at 3% interest. For example, for a $5,00 loan you would pay $66 a month for seven years.
2. A ten-year loan at 5% interest. For example, for a $5,000 loan, you would pay $53 a month for ten years.
3. I would not finance the energy efficiency improvements without the 0% loan.
96. Other

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q43. Please rate your satisfaction with the following elements of your experience obtaining your 0% HEAT Loan for the improvements your energy assessment recommended:

[MATRIX QUESTION: SCALE]

[LOGIC] Item	1: Not at all satisfied	2: Not very satisfied	3: Somewhat satisfied	4: Very satisfied	5: Extremely satisfied	98 DK
The ease of the initial loan application						
The time taken for loan approval						
The ease of the paperwork you had to complete to close the loan after approval						
Your experience with [PIPE IN LENDER]						
Your overall experience with taking the loan						

[IF ANY ITEM IN Q43 =1, 2, OR 3]

Q44. How could your experience with the loan have been improved?

1. [OPEN-ENDED RESPONSE]

[IF ANY Q34=1 (RECEIVED HEAT LOAN)]

Q45. If someone asked you about your experiences with the 0% HEAT Loan product, would you encourage them to use a HEAT Loan?

[SINGLE RESPONSE]

1. Yes
2. No

[IF Q45=2]

Q46. Why wouldn't you encourage others to use the 0% HEAT Loan?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q47. National Grid is working with other organizations in Rhode Island to develop a new way to finance energy efficiency upgrades and renewable energy systems. This new financing product will allow homeowners to pay the cost of energy efficiency upgrades in installments as special assessment on their property tax bill. When the homeowner moves, the obligation to repay the remaining loan will remain with the house where the energy efficient improvements were installed.

How appealing is that type of financing product to you?

[SINGLE RESPONSE]

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

[IF Q47=1 OR 2]

Q48. Why is a financing product that you would repay on your property tax bill not appealing to you?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q49. Considering both the type of financing product we just described and the 0% loan available from National Grid, which of the following financing options would you be most likely to pursue for future energy efficiency upgrades?

[SINGLE RESPONSE]

1. A loan repaid as an assessment on your property tax bill
2. The existing 0% HEAT Loan
3. Financing from some other source
4. None of the above: You would not finance an energy efficiency upgrade
5. Not applicable: You do not plan to pursue future energy efficiency upgrades
6. Uncertain: You would need more information to decide between financing offers

C.5. Demographics [ASK ALL]

Thank you for your responses so far. We have just a few more questions that will help National Grid ensure its energy efficiency services are reaching all Rhode Islanders.

[ASK ALL]

Q50. Including yourself, how many people currently live in your home year-round?

[SINGLE RESPONSE]

1. Response [FORCE NUMERIC RESPONSE]

[ASK ALL]

Q51. Which of the following ranges includes your total annual household income in 2015, before taxes?

[SINGLE RESPONSE]

1. Under $20,000
2. $20,000 to under $30,000
3. $30,000 to under $40,000
4. $40,000 to under $50,000
5. $50,000 to under $60,000
6. $60,000 to under $80,000
7. $80,000 to under $100,000
8. $100,000 to under $120,000
9. $120,000 or more
98. Don't know
99. Prefer not to answer

[ASK ALL]

Q52. What is the highest level of education you have completed so far?

[SINGLE RESPONSE]

1. No schooling
2. Less than high school
3. Some high school
4. High school graduate or equivalent (such as GED)
5. Trade or technical school
6. Some college (including Associate degree)
7. College degree (Bachelor’s degree)
8. Some graduate school
9. Graduate degree, professional degree
10. Doctorate
99. I’d rather not say

[ASK ALL]

Q53. What is your race? Please select all that apply:

[MULTIPLE RESPONSE]

1. White
2. Black, African American
3. American Indian or Alaska Native
4. Asian
5. Native Hawaiian or Other Pacific Islander
96. Other
99. I'd rather not say

[ASK ALL]

Q54. Are you of Hispanic, Latino, or Spanish origin?

[SINGLE RESPONSE]

1. Yes
2. No
99. I'd rather not say

Thank you for your time. Your responses will be very valuable in helping National Grid improve the services it offers to help people in Rhode Island save energy.

[IF S2 <> 1 OR S3 <> 1] DISPLAY SCREENOUT LANGUAGE

Based on your responses you are not eligible to complete this questionnaire. Thank you for your time and willingness to help us.

Appendix D. Participant Survey Frequencies

This section includes the results from all questions included in the participant survey fielded from June 29th, 2016 through July 5th, 2016. Table notes indicate the survey instrument question number associated with the results.

D.1. Screening Questions

Table D-1: S1 - Our records show your household received a free EnergyWise Home Energy Assessment through National Grid, performed by RISE Engineering. Is this correct?

	COUNT	PERCENT
Yes – my household received the energy assessment	352	99.2%
No – my household did not receive an energy assessment	2	.6%
Don't know	1	.3%

Table D-2: S2 - In the past year, have you had someone come to your home to identify opportunities to make your home more energy efficient? If so, we are going to refer to that experience as your energy assessment.

	COUNT	PERCENT
Yes – my household received an energy assessment	1	33.3%
No – my household did not receive an energy assessment	2	66.7%

Table D-3: S3 - We would like to hear from a household member that was involved in the energy assessment experience. Are you that person?

	COUNT	PERCENT
Yes – I was involved in the energy assessment experience	1	100.0%
No – I am not involved in the energy assessment experience	0	0.0%

D.2. Energy Assessment and Savings

Table D-4: Q1 - Why were you interested in having an energy assessment performed on your home? Were you seeking opportunities to... (Multiple Responses Allowed)

MOTIVATORS	WEATHERIZATION GROUP (N = 105)	AUDIT GROUP (N = 150)	LOAN GROUP (N= 97)	TOTAL (N = 352)
Reduce energy bills	88.6%	78.0%	82.5%	**82.4%**
Help environment & community	42.9%	30.7%	35.1%	**35.5%**
Make home more comfortable*	50.5%	36.0%	50.5%	**44.3%**
Prepare home for sale	5.7%	4.7%	4.1%	**4.8%**
Improve recently purchased home	19.0%	19.3%	28.9%	**21.9%**
Other	5.7%	6.0%	7.2%	**6.3%**

* $x^2 < 0.05$

Table D-5: Q2 - Did one person come to your house to conduct the energy assessment, or was it a two-person team?

ONE PERSON (N=197)		TWO-PERSON TEAM (N=149)		DON'T KNOW (N=4)	
Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
197	56.3%	149	42.6%	4	1.1%

Table D-6: Q3 - Prior to your audit, had you hired other home improvement service providers, like remodelers, plumbers, or HVAC contractors?

YES		NO		DON'T KNOW	
Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
109	31.2%	234	67.0%	6	1.7%

Table D-7: Q4 - In general, how would you rate your experience with the home improvement service providers you worked with prior to your energy assessment? Was it:

	WEATHERIZATION GROUP (N=37)	AUDIT GROUP (N=39)	LOAN GROUP (N=32)	TOTAL (N=108)
Positive (1 – 2)	89.2%	82.1%	87.5%	**86.1%**
Neutral (3)	5.4%	10.3%	0.0%	**5.6%**
Negative (4 – 5)	5.4%	7.7%	12.5%	**8.3%**

Table D-8: Q5 - Relative to your expectations for other home contractor services, would you say that scheduling the home energy assessment was:

	Weatherization Group (N=100)	Audit Group N=141)	Loan Group (N=93)	Total (N=334)
Easier (1 – 2)	72.0%	73.8%	77.4%	**74.3%**
Neutral (3)	23.0%	19.1%	20.4%	**20.7%**
Harder (4 – 5)	5.0%	7.1%	2.2%	**5.1%**

Table D-9: Q6 - What was difficult about scheduling the assessment?

	Count	Percent
Long wait period	10	62.5%
Poor customer service	6	37.5%

Table D-10: Q7 - Compared to your expectations for other home contractor services, was the assessor's behavior:

	Weatherization Group (N=100)	Audit Group (N=140)	Loan Group (N=94)	Total (N=334)
More professional (1 – 2)	60.0%	58.6%	56.4%	**58.4%**
Equal (3)	39.0%	37.9%	42.6%	**39.5%**
Less professional (4 – 5)	1.0%	3.6%	1.1%	**2.1%**

Table D-11: Q9 - Compared to your expectations for other home contractor services, how responsive was the assessor to your interests and concerns? Would you say:

	Weatherization Group (N=99)	Audit Group (N=143)	Loan Group (N=92)	Total (N=334)
More responsive (1 – 2)	67.7%	62.2%	75.0%	**67.4%**
Equal (3)	30.3%	30.1%	23.9%	**28.4%**
Less responsive (4 -5)	2.0%	7.7%	1.1%	**4.2%**

Table D-12: Q11 - How does your satisfaction with the assessment process overall compare to your expectations for other home contractor services? Are you:

	Weatherization Group (N=102)	Audit Group (N=137)	Loan Group (N=95)	Total (N=334)
More satisfied (1 – 2)	74.5%	66.4%	74.7%	**71.3%**
Equal (3)	24.5%	21.9%	24.2%	**23.4%**
Less satisfied (4 – 5)	1.0%	11.7%	1.1%	**5.4%**

Table D-13: Q12 - Thinking of your level of involvement in the energy assessment, would you say it required:

	Weatherization Group (N=100)	Audit Group (N=142)	Loan Group (N=95)	Total (N=337)
Too much involvement	3.0%	2.1%	1.1%	**2.1%**
Too little involvement	2.0%	5.6%	2.1%	**3.6%**
About the right amount of involvement	95.0%	92.3%	96.8%	**94.4%**

Table D-14: Q13 - Which of the following items did your assessor install or provide on the day of your home energy assessment? (N=352)

Measure type	Assessor installed item	Assessor provided item, but did not install	Did not receive item	Don't recall
LED light bulb(s)	86.1%	3.7%	9.1%	1.1%
Advanced power strip(s)	29.5%	59.1%	10.5%	.9%
Water-saving showerhead(s)	4.0%	2.6%	90.1%	3.4%
Water-saving faucet aerator(s)	2.3%	1.1%	92.6%	4.0%
Refrigerator coil brush	26.7%	58.0%	13.6%	1.7%

Table D-15: Q14 - Did your assessor seal your home against air leakage at the time of the audit?

Yes		No		Don't know	
Count	Percent	Count	Percent	Count	Percent
60	17.0%	267	75.9%	25	7.1%

Table D-16: Q15 - Which of the following items from the assessment does your household regularly use?

Measure type	Regularly use	Do not regularly use	Don't know
LED light bulb(s) (N=316)	96.5%	3.2%	0.3%
Advanced power strip(s) (N=312)	77.2%	20.5%	2.2%
Water-saving showerhead(s) (N=23)	78.3%	13.0%	8.7%
Water-saving faucet aerator(s) (N=12)	66.7%	25.0%	8.3%
Refrigerator coil brush (N=298)	43.6%	54.0%	2.3%

Table D-17: Q16 - Why does your household not regularly use the items you received during the assessment? Advanced Power Strip(s)

	COUNT	PERCENT
Too complicated	14	30.2%
Not applicable / No use	16	26.4%
Already using	7	18.9%
Not working well	6	13.2%
Other	10	11.3%

Table D-18: Q16 Why does your household not regularly use the items you received during the assessment? Refrigerator Coil Brush

	COUNT	PERCENT
Use rarely	60	42.5%
Forget	33	23.4%
Uninterested	7	18.4%
Difficult to use	26	10.6%
Other	15	4.9%

Table D-19: Q17 - Please rate your satisfaction with the items you received during your energy assessment:

MEASURE TYPE	NOT SATISFIED (1 – 2)	SOMEWHAT SATISFIED (3)	SATISFIED (4 – 5)
LED light bulb(s) (N=299)	2.3%	5.0%	92.6%
Advanced power strip(s) (N=236)	2.1%	6.8%	91.1%
Water-saving showerheads(s) (N=17)	5.9%	5.9%	88.2%
Water-saving faucet aerator(s) (N=8)	0.0%	12.5%	87.5%
Refrigerator coil brush (N=125)	.8%	6.4%	92.8%

Table D-20: Q19 - Thinking about the information you received at the end of your assessment about your home and how you could save energy, to what extent do you agree that:

	DO NOT AGREE (1 – 2)	SOMEWHAT AGREE (3)	AGREE (4 – 5)
Learned something new about home energy usage (N=342)	7.6%	14.3%	78.1%
Clear how to apply for HEAT Loan* (N=309)	10.4%	10.4%	79.3%
Understood rebate opportunities from National Grid* (N=337)	8.0%	9.8%	82.2%
The information was clear (N=345)	4.3%	10.7%	84.9%
Knew how to make recommended improvements* (N=345)	4.9%	9.6%	85.5%

* Non-parametric test <0.05

Table D-21: Q20 - Now that you have experienced a home energy assessment from National Grid, what would you consider to be a fair price to pay for an energy assessment like the one you received?

	Count	Percent
Up to $300	28	8.0%
Up to $200	58	16.6%
Up to $100	77	22.0%
Up to $50	35	10.0%
You would not pay for an energy assessment like the one you received	90	25.7%
Don't know	62	17.7%

D.3. Measures Taken

Table D-22: Q21 - Did your home energy assessment find any conditions in your home that could prevent you from installing insulation and air sealing? These conditions could include knob and tube wiring, combustion safety concerns, moisture concerns, or structural concerns.

Yes		No		Don't know	
Count	Percent	Count	Percent	Count	Percent
78	22.3%	243	69.4%	29	8.3%

Table D-23: Q21A - Which of the following items, if any, did your assessor recommend for you to install in your home?

Measures	Weatherization Group (N=105)	Audit Group (N=150)	Loan Group (N=97)	Total (N=352)
Insulation or air sealing*	98.1%	60.0%	84.5%	**78.1%**
Heating and cooling equipment*	6.7%	17.3%	36.1%	**19.3%**
Thermostat	22.9%	18.0%	18.6%	**19.6%**
Refrigerator	1.9%	6.7%	1.0%	**3.7%**
My assessor did not recommend any of those items*	0.0%	17.3%	0.0%	**7.4%**
Don't know	0.0%	4.7%	0.0%	**2.0%**

* x^2 <0.01

Table D-24: Q22 - Please select the option that best describes the action you took, or plan to take, in response to your energy assessment's recommendations in each of the following areas:

	Refrigerator (N=3)	Thermostat (N=42)	Heating and Cooling (N=42)	Insulation and Air Sealing (N=185)
Already made recommended	33.3%	78.6%	83.3%	96.2%

improvements				
Plan to make recommended improvements within the next 6 months	0.0%	9.5%	4.8%	1.1%
Will not make recommended improvements within 6 months	33.3%	7.1%	11.9%	2.2%
Don't know	33.3%	4.8%	0.0%	.5%

* Includes Weatherization and Loan participants only.

* Includes respondents who reported that their assessor made recommendations for each measure only.

Table D-25: Q23 - Why did you decide not to make the improvements your energy assessment recommended in each of the following areas?

	Insulation and Air Sealing (N=26)	Heating and cooling (N=13)	Thermostat (N=5)	Refrigerator (N=5)
Did not need it	3.8%	7.7%	20.0%	0.0%
Could not afford it	23.1%	53.8%	20.0%	20.0%
Loan application was denied	3.8%	7.7%	0.0%	0.0%
Did not want to use approved contractor	0.0%	0.0%	0.0%	0.0%
Not convinced of value	15.4%	7.7%	20.0%	20.0%
Completing work would have been too inconvenient	15.4%	0.0%	0.0%	0.0%
Did not know how to proceed with work	11.5%	7.7%	0.0%	20.0%
Other	26.9%	7.7%	40.0%	40.0%
Don't know	0.0%	7.7%	0.0%	0.0%

Table D-26: Q24 - How important were each of the following factors in your decision to make insulation and air sealing improvements?

	Not important (1 – 2)	Somewhat important (3)	Important (4 – 5)
Other contractor recommendations (N=175)	61.7%	22.3%	16.0%
Family, friend, neighbor recommendations (N=178)	45.5%	26.4%	28.1%
HEAT Loan (N=183)	37.7%	11.5%	50.8%
Potential to reduce environmental impact (N=184)	7.6%	24.5%	67.9%
Assessor recommendations (N=183)	8.2%	20.8%	71.0%
National Grid rebates (N=181)	6.1%	16.0%	77.9%
Potential to increase comfort of home (N=184)	1.1%	9.2%	89.7%
Potential to save on energy bill (N=184)	.5%	3.3%	96.2%

Table D-27: Q25 - Please rate how satisfied you were with each of the following aspects of your experience with your insulation and air sealing upgrade and the contractor that completed it: (N=186)

	Not satisfied (1 – 2)	Somewhat satisfied (3)	Satisfied (4 – 5)	Don't know
Overall experience	2.7%	6.5%	90.9%	0.0%
Amount of time to complete work	1.1%	9.7%	88.2%	1.1%
Contractor's professionalism	3.8%	8.6%	87.1%	.5%
Involvement needed from participant	2.7%	8.1%	87.0%	2.2%
Improvement in comfort*	1.6%	11.3%	69.9%	17.2%
Energy savings	3.2%	9.7%	61.1%	25.9%

* Non-parametric test <0.01

Table D-28: Q26 - If someone asked you about your experiences with the insulation and air sealing upgrade, would you encourage them to do something similar?

Yes		No		Don't know	
Count	Percent	Count	Percent	Count	Percent
175	95.1%	2	1.1%	7	3.8%

Table D-29: Q28 - What, if anything, do you wish you had known before completing your insulation and air sealing upgrades that would have helped you better prepare for the experience? (N=84)

	Count	Percent
Nothing	54	60.7%
Financing Information	1	29.2%
How to prepare home for assessment	26	9.0%
Other	8	1.1%

Table D-30: Q29 - What, if anything, have you done to save energy in your home since completing your home energy assessment (n=208)

	Count	Column N %
Nothing	31	33.3%
Insulation	14	15.1%
HVAC	14	15.1%
Lighting	9	9.7%
Change energy use behavior	8	8.6%
Solar	7	7.5%
New appliance(s)	6	6.5%
Follow recommendations	2	2.2%

	Count	Column N %
Other	2	2.2%

* Excludes Weatherization and Loan groups.

D.4. Financing

Table D-31: Q30 - Were you aware that National Grid works with lenders to offer 0% financing through their HEAT loan program to help you pay for insulation, air sealing improvements, and new heating and cooling equipment?

Weatherization Group (N=105)		Audit Group (N=150)		Loan Group (N=97)	
Yes	No	Yes	No	Yes	No
64.8%	35.2%	70.0%	30.0%	90.7%	9.3%

Table D-32: Q31 - Did you apply for a HEAT Loan – National Grid's 0% financing offer – to help pay for improvements recommended in your energy assessment?

Yes		No		Don't know	
Count	Percent	Count	Percent	Count	Percent
102	45.5%	120	53.6%	2	.9%

Table D-33: Q32 - Why didn't you apply for a 0% interest HEAT Loan for the improvements recommended in your energy assessment? Please select all that apply: (N=120)

	Count	Percent
Did not need loan, had funds available	61	50.8%
Did not want to take on debt or commit to monthly payments	28	23.3%
Did not think you would qualify	4	3.3%
Did not want to go through application process	11	9.2%
Wanted longer repayment period	1	.8%
Not pursuing recommended improvements	15	12.5%
Other	14	11.7%
Don't know	4	3.3%

Table D-34: Q33 - How did you pay for the improvements your energy assessment recommended? Select all responses that apply. (N=209)

	Count	Percent
HEAT Loan	97	46.4%
Cash, check or credit card repay at end of month	105	50.2%

Credit card repay over time	3	1.4%
Financing plan from contractor	5	2.4%
Loan other than HEAT Loan	7	3.3%
Other	11	5.3%

Table D-35: Q34 - Why didn't you receive a loan?

	COUNT	PERCENT
My application was denied	0	0.0%
My application was approved, but I did not complete my project	0	0.0%
My application was approved, but I decided to complete my project without the loan	1	100.0%
Don't know	0	0.0%

Table D-36: Q37 - What was appealing about the 0% interest HEAT Loan you used to pay for the improvements your energy assessment recommended? Please select all that apply: (N=97)

	COUNT	PERCENT
0% interest rate	96	99.0%
Convenience	42	43.3%
Ability to repay over time	64	66.0%
Ease of qualification	51	52.6%
Choice of lenders	34	35.1%
Other	0	0.0%
Don’t know	0	0.0%

Table D-37: Q38 - How important was the availability of the 0% interest HEAT Loan in your decision to complete the improvements your energy assessment recommended? (N=97)

	COUNT	PERCENT
Not important (1 – 2)	1	1.0%
Somewhat important (3)	18	18.6%
Important (4 – 5)	78	80.4%

Table D-38: Q39 - Which of the following options best describes what you would have done if you had not received the 0% interest HEAT loan for the improvements your energy assessment recommended?

	UNDER $20K - $50K* (=14)	$50K - $100K* (N=40)	$100K+* (N=24)	TOTAL (N=78)
I would not have done a project at all	35.7%	17.5%	8.3%	**17.9%**
I would have delayed the project more than six	14.3%	35.0%	20.8%	**26.9%**

months				
I would have done a smaller or less expensive project	35.7%	20.0%	58.3%	**34.6%**
I would have done exactly the same project	14.3%	27.5%	12.5%	**20.5%**

* x^2 <0.05

Table D-39: Q40 - How would you have paid for the improvements your energy assessment recommended if you had not received the HEAT loan?

	UNDER $20K - $50K (N=9)	$50K - $100K (N=33)	$100K+ (N=22)	TOTAL (N=64)
Cash or check	11.1%	21.2%	36.4%	**25.0%**
Credit card	33.3%	18.2%	13.6%	**18.8%**
Financing from contractor	22.2%	6.1%	18.2%	**12.5%**
Loan other than HL for energy upgrades	33.3%	21.2%	22.7%	**23.4%**
Other	0.0%	12.1%	0.0%	**6.3%**
Don't know	0.0%	27.3%	9.1%	**17.2%**

Table D-40: Q41 - If the 0% interest HEAT Loan option had not been available, but the following alternative loan products had been, which of the following options would you have selected to finance the improvements your energy assessment recommended? (N=97)

	COUNT	PERCENT
A seven-year loan at 3% interest. For example, for a $5,00 loan you would pay $66 a month for seven years.	37	38.1%
A ten-year loan at 5% interest. For example, for a $5,000 loan, you would pay $53 a month for ten years.	2	2.1%
I would not finance the energy efficiency improvements without the 0% loan.	54	55.7%
Other	4	4.1%

Table D-41: Q42 - Please rate your satisfaction with the following elements of your experience obtaining your 0% HEAT Loan for the improvements your energy assessment recommended: (N=97)

	NOT SATISFIED (1 – 2)	SOMEWHAT SATISFIED (3)	SATISFIED (4 – 5)
Your experience with lender	1.0%	4.1%	94.8%
Your overall experience with taking loan	1.0%	6.2%	92.8%
The time taken for loan approval	2.1%	8.2%	89.7%
Ease of initial loan application	2.1%	13.4%	84.5%
The ease of paperwork after approval	3.1%	11.3%	84.5%

Table D-42: Q43 - How could your experience with the loan have been improved? (N=19)

	Count	Percent
Confusing paperwork and process	7	36.8%
Process took too long	4	21.1%
Nothing	6	31.6%
Don't know	2	10.5%

Table D-43: Q44 - If someone asked you about your experiences with the 0% HEAT Loan product, would you encourage them to use a HEAT Loan? (N=97)

Yes		No	
Count	Percent	Count	Percent
96	99.0%	1	1.0%

Table D-44: Q46 - National Grid is working with other organizations in Rhode Island to develop a new way to finance energy efficiency upgrades and renewable energy systems. This new financing product will allow homeowners to pay the cost of energy efficiency upgrades in installments as a special assessment on their property tax bill. When the homeowner moves, the obligation to repay the remaining loan will remain with the house (and its new owner(s)) where the energy efficient improvements were installed. How appealing is that type of financing product to you? (N=352)

Not appealing (1 – 2)		Somewhat appealing (3)		Appealing (4 – 5)		Don't know	
Count	Percent	Count	Percent	Count	Percent	Count	Percent
105	29.8%	112	31.8%	106	30.1%	29	8.2%

Table D-45: Q47 - Why is a financing product that you would repay on your property tax bill not appealing to you? (N=80)

Deterrent to potential buyer	Prefer separate loan and tax	Taxes too high already	Do not need financing	Other
31.3%	22.5%	13.8%	21.3%	11.3%

Table D-46: Q48 - Considering both the type of financing product we just described and the 0% loan available from National Grid, which of the following financing options would you be most likely to pursue for future energy efficiency upgrades? (N=80)

The existing 0% HEAT Loan	Uncertain: You would need more information to decide between financing offers	None of the above: You would not finance an energy efficiency upgrade	Not applicable: You do not plan to pursue future energy efficiency upgrades	A loan repaid as an assessment on your property tax bill
47.1%	23.6%	13.2%	9.8%	6.3%

D.5. Demographics

Table D-47: Q49 - Including yourself, how many people currently live in your home year-round? (N=338)

NUMBER OF PEOPLE IN HOUSEHOLD	PERCENT
0	2.1%
1	17.8%
2	39.9%
3	16.3%
4	14.2%
5	6.2%
6	2.1%
7	.9%
8	.6%

Table D-48: Q50 - Which of the following ranges includes your total annual household income in 2015, before taxes?

HOUSEHOLD INCOME	WEATHERIZATION GROUP (N=68)	AUDIT GROUP (N=108)	LOAN GROUP (N=82)	TOTAL (N=258)
Under $20,000	1.5%	.9%	0.0%	**.8%**
$20,000 to under $30,000	1.5%	5.6%	4.9%	**4.3%**
$30,000 to under $40,000	5.9%	6.5%	4.9%	**5.8%**
$40,000 to under $50,000	5.9%	7.4%	8.5%	**7.4%**
$50,000 to under $60,000	8.8%	9.3%	9.8%	**9.3%**
$60,000 to under $80,000	20.6%	23.1%	9.8%	**18.2%**
$80,000 to under $100,000	25.0%	19.4%	30.5%	**24.4%**
$100,000 to under $120,000	13.2%	11.1%	9.8%	**11.2%**
$120,000 or more	17.6%	16.7%	22.0%	**18.6%**

Table D-49: Q51 - What is the highest level of education you have completed so far? (N=351)

	COUNT	PERCENT
No schooling	0	0.0%
Less than high school	1	.3%
Some high school	2	.6%
High school graduate or equivalent (such as GED)	33	9.4%
Trade or technical school	12	3.4%
Some college (including Associate degree)	66	18.8%
College degree (Bachelor's degree)	84	23.9%
Some graduate school	17	4.8%
Graduate degree, professional degree	88	25.1%
Doctorate	21	6.0%
I'd rather not say	27	7.7%

Table D-50: Q52 - What is your race? Please select all that apply (N=352)

	COUNT	PERCENT
White	279	79.3%
Black/African American	9	2.6%
American Indian/Alaska Native	1	.3%
Asian	4	1.1%
Native Hawaiian or Pacific Islander	0	0.0%
Other	11	3.1%
Rather not say	49	13.9%

Table D-51: Q53 - Are you of Hispanic, Latino, or Spanish origin? (N=348)

YES		NO		I'D RATHER NOT SAY	
Count	Percent	Count	Percent	Count	Percent
14	4.0%	290	83.3%	44	12.6%