

Residential Measure Adoption Rate Phase 2 Impact and Process Evaluation (1/1/2022 – 6/30/2023)

Final Report

Prepared for:

New York State Energy Research and Development Authority
Albany, NY

Cory Blad
Project Manager, NYSERDA

Prepared by:

DNV

Corporate Headquarters: Katy, TX

Ari Stern, Senior Consultant, DNV

Aaron Schrader, Senior Consultant, DNV

Miriam Goldberg, Senior Principal, DNV

Jackie Berger, President, APPRISE

Dan Bausch, Senior Project Director, APPRISE

Record of Revision

Document Title
Residential Measure Adoption Rate Phase 2 Impact and Process Evaluation June 30 2026

Revision Date	Description of Changes	Revision on Page(s)
June 30 2026	Original Issue	Original Issue

Notice

This report was prepared by DNV in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter “NYSERDA”). The opinions expressed in this report do not necessarily reflect those of NYSERDA or the state of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the state of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the state of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe on privately owned rights and will assume no liability for any loss, injury, or damage resulting from or occurring in connection with the use of information contained, described, disclosed, or referred to in this report.

NYSERDA makes every effort to provide accurate information about copyright owners and related matters in the reports we publish. Contractors are responsible for determining and satisfying copyright or other use restrictions regarding the content of reports that they write, in compliance with NYSERDA’s policies and federal law. If you are the copyright owner and believe a NYSERDA report has not properly attributed your work to you or has used it without permission, please email print@nyserda.ny.gov.

Information contained in this document, such as web page addresses, are current at the time of publication.

Table of contents

<u>Record of Revision</u>	i
<u>Notice</u>	ii
<u>Executive summary</u>	ES-1
<u>1 Introduction</u>	1
<u>1.1 Program description</u>	1
<u>1.2 Summary of evaluation objectives and methods</u>	2
<u>1.3 Limitations to validity</u>	3
<u>1.3.1 Lack of consumption data</u>	3
<u>1.3.2 Limited project-specific data for TRM validation</u>	4
<u>2 Results, findings, and recommendations</u>	5
<u>2.1 Gross energy savings results</u>	5
<u>2.1.1 Measure adoption rate and program energy savings</u>	5
<u>2.1.1.1 Detailed Residential Energy Assessment Program MAR findings</u>	7
<u>2.1.2 MAR by measure</u>	11
<u>2.1.3 Electrification and electrification-ready MAR</u>	13
<u>2.2 TRM adherence analysis results</u>	19
<u>2.3 Reported savings realization rates</u>	24
<u>2.4 Participant survey results</u>	26
<u>2.4.1 Customer satisfaction</u>	27
<u>2.4.2 Non-energy benefits</u>	29
<u>2.4.3 Participation</u>	31
<u>2.4.4 Motivations</u>	34
<u>2.4.5 Financial incentives</u>	38
<u>2.4.6 Customer demographics</u>	40
<u>2.5 Contractor interviews</u>	41
<u>2.5.1 Contractor recommendations</u>	42
<u>2.5.2 Program influence</u>	43
<u>2.5.3 Program involvement</u>	43
<u>2.5.4 Customer interaction</u>	44
<u>2.6 Training and staffing</u>	45
<u>2.7 Disadvantaged communities</u>	45
<u>2.7.1 Program energy savings and increased usage</u>	46
<u>2.7.2 Measure adoption rate</u>	47

2.7.3	Customer satisfaction	47
2.8	Recommendations and Responses	49
3	Methods	51
3.1	MAR methods	51
3.2	Sampling	51
3.3	TRM adherence analysis methods	53
3.4	Participant survey methods	54
3.5	Contractor survey methods	54
Appendix A	Detailed Contractor Interview Results	A-1

List of figures

Figure 1-1. Residential Energy Assessment Program overall savings MAR by phase	3
Figure 2-1. Overall savings measure adoption rate by program.....	7
Figure 2-2. Residential Energy Assessment Program overall savings MAR by phase	8
Figure 2-3. Residential Energy Assessment Program overall savings MAR by year	9
Figure 2-4. How do you use your new heat pump equipment?	16
Figure 2-5. What equipment was previously used for cooling?	16
Figure 2-6. When previous equipment and new heat pump equipment are used for cooling.....	17
Figure 2-7. Amount of cooled space.....	18
Figure 2-8. Temperature of cooled space	19
Figure 2-9. Customer satisfaction summary	28
Figure 2-10. Non-energy benefit summary – Phase 2 responses.....	30
Figure 2-11. Program influence on decision to make additional energy efficiency improvements	34
Figure 2-12. Motivations – air leakage	35
Figure 2-13. Motivations – duct sealing.....	35
Figure 2-14. Motivations – heating systems	36
Figure 2-15. Motivations – water heater	36
Figure 2-16. Motivations – insulation.....	37
Figure 2-17. Motivations – thermostats	37
Figure 2-18. Motivations – lighting.....	38
Figure 2-19. Motivations – windows.....	38
Figure 2-20. Reported income	40
Figure 2-22. Customer satisfaction summary by DAC status	48
Figure 2-23. Audit recommendation summary by DAC status	49

List of tables

Table 1-1. Study objectives, research questions, and methods	3
Table 2-1. Measure adoption rate by program at three years or more since audit	6
Table 2-2. Audit recommended energy savings and increased usage	10
Table 2-3. Audit recommended and installed energy savings (adjusted gross impact).....	11

<u>Table 2-4. Audit recommended and installed increased usage (adjusted gross impact).....</u>	11
<u>Table 2-5. Residential Energy Assessment Program savings MAR at three years or more since audit by measure group</u>	12
<u>Table 2-6. Electrification/electrification-ready savings MAR</u>	13
<u>Table 2-7. Electrification/electrification-ready savings MAR by fuel</u>	14
<u>Table 2-8. Electrification/electrification-ready electricity MAR</u>	15
<u>Table 2-9. Engineering analysis attrition by measure</u>	20
<u>Table 2-10. Engineering analysis results – Shell measures</u>	22
<u>Table 2-11. Engineering analysis results – HVAC replacement measures.....</u>	23
<u>Table 2-12. Engineering analysis results – Water heater replacement measures</u>	24
<u>Table 2-13. Program reported savings</u>	24
<u>Table 2-14. Program reported increased usage</u>	25
<u>Table 2-15. Evaluated savings and usage example.....</u>	26
<u>Table 2-16. Would you recommend the audit/rating to a friend, family member, or neighbor?</u>	29
<u>Table 2-17. Since making/implementing your energy efficiency improvements, have you or anyone in your household experienced a change in the number of sick days you/they take from work and / or school? (If no one in your household attends work or school, please select "N/A")......</u>	31
<u>Table 2-18. How much time passed between your first learning about the program and then starting to participate in it?</u>	31
<u>Table 2-19. Which of the following, if any, have you done differently because of what you learned from your audit?</u>	32
<u>Table 2-20. Since the audit/rating was completed, have you implemented energy efficiency or other home projects that would impact your home energy use that were not recommended in the audit/rating assessment?</u>	33
<u>Table 2-21. Since the audit/rating was completed, have you implemented energy efficiency or other home projects that would impact your home energy use that were not recommended in the audit/rating assessment?</u>	33
<u>Table 2-22. Did you receive any rebates, tax credits or other incentives to help pay for the measure? (Percent who responded “Yes”).....</u>	39
<u>Table 2-23. Who provided the rebate, tax credit or other incentive for the measure? Select all that apply.</u>	39
<u>Table 2-24. How many people, including yourself, currently live in your home?</u>	41
<u>Table 2-25. Do you have any recommendations on how NYSERDA could improve the Program? (Multiple responses allowed)</u>	43
<u>Table 2-26. Audit recommended energy savings and increased usage by DAC status</u>	46
<u>Table 2-27. Measure adoption rate by DAC status.....</u>	47
<u>Table 3-1. Sample design by fuel type.....</u>	52
<u>Table 3-2. Target completes and expected relative precision</u>	53

Executive summary

This evaluation is the second of a three-phase evaluation for the Residential Energy Assessment (REA) Program and associated pilot programs (Home Energy Score and Pearl Certification).¹ The first phase (i.e., Phase 1) evaluation covered participants from 2019 through 2021 and was published in April 2024.² This evaluation (i.e., the “Phase 2” evaluation) covers participants from January 1, 2022, through June 30, 2023, as well as follow-up data collection with Phase 1 respondents. The REA program provides energy audits to market-rate participants that include recommendations for home energy improvements. The objectives of this study were to assess the measure adoption rate (MAR) by participants of home energy improvement recommendations, estimate realization rates, and assess participant and contractor satisfaction and experience with the program.

Approach

The study included surveys of two participant groups to estimate MAR and gain perspectives on the program. The first survey was for respondents to the Phase 1 survey who indicated during Phase 1 that they had not yet installed one or more recommended measures. This survey was meant to determine if the Phase 1 respondents installed measures after more time passed. The second survey was for Phase 2 participants, since they had not previously been surveyed. The Phase 1 follow-up survey achieved 279 completes, and the Phase 2 survey achieved 225 completes. The evaluation also included in-depth interviews with 20 contractors to gain insights on program processes and potential improvements, and an engineering review of project-level files completed by contractors for 2,088 projects to assess the adherence of program savings estimation methodologies to the New York Technical Resource Manual.³

¹ This evaluation report is based on the evaluation plan titled Residential Measure Adoption Rate Phase 2 Impact and Process Evaluation (1/1/2022 – 6/30/2023) filed May 2024 and can be found here: <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={00E5A58F-0000-C938-A9EF-F2D3B0ACD5D8}&DocTitle=ResidentialAuditsRatings.MarketImpactEvaluationPlan.May%202024>

² <https://www.nysersda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/Program-Evaluation/Matter-No1602180NYSERDAResidentialAuditsRatingsMarketImpactEvaluationReportSeptember-2024.pdf>

³ <https://dps.ny.gov/technical-resource-manual-trm>

This evaluation was not able to conduct a consumption data analysis because the waivers required to request utility billing data could not be confirmed for Phase 2 participants.⁴ Furthermore, natural gas utility account numbers, which are also needed to request utility billing data for these participants, could not be obtained. Therefore, as discussed in more detail in Section 1.3, Limitations to validity, the study was unable to calculate realization rates.

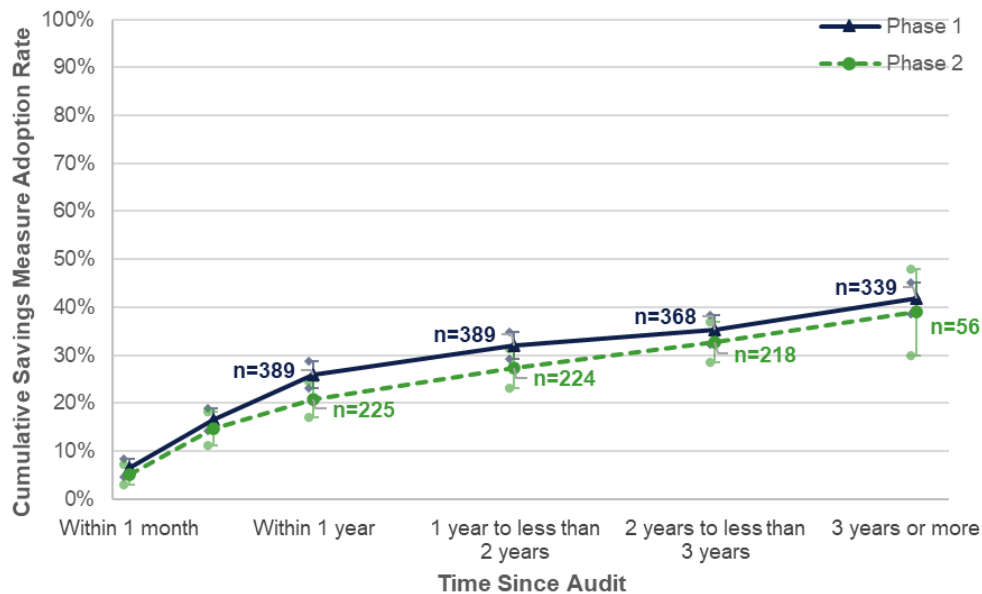
Results

The MAR for Phase 2 participants in the REA program is significantly lower than the MAR for Phase 1 participants. This could be a result of the COVID-19 pandemic lockdown evaluated as part of the Phase 1 study. In the Phase 1 contractor survey, contractors identified increased customer demand for improvements to their home as well as increased adoption of recommended energy efficiency measures, likely due to the prevalence of working from home during the pandemic. Contractors identified that demand was highest from 2020 to 2022, but that demand was returning closer to pre-pandemic levels in 2023 as more employers encouraged in-office work. While the magnitude of the difference between Phases 1 and 2 at 3 years or more since audit, 2.9%, is statistically significant, only 25% of the Phase 2 projects had 3 years or more pass between the audit and the time of the survey (Figure 1-1).⁵

⁴ The project did not have the budget to support the manual review of waivers required due to the unplanned lack of data resulting from the transfer from Uplight to NYHEP. See Section 1.3.1 Lack of consumption data.

⁵ Said differently, 75% of Phase 2 projects had yet to reach three-years since participation and so are not included in the “3 years or more” value at this time.

Figure 1-1. Residential Energy Assessment Program overall savings MAR by phase



The program is doing a better job accounting for electric penalties in fuel-switching scenarios, though there is still room for improvement. In the Phase 1 evaluation, the evaluation contractor found that 5% of projects with heat pump fuel-switching recommendations included an electric penalty in the estimated savings. In Phase 2, 26% of heat pump fuel-switching projects included an electric penalty.⁶ In instances when the estimated savings do not include an electric penalty, the estimated electric savings in the program tracking data are typically 0 (i.e., no electric penalty, no electric savings). In the engineering analysis, the evaluation contractor found that most projects that included a heat pump recommendation did not include enough information to calculate savings.⁷ This missing information, such as missing details about baseline equipment, could perhaps be causing the estimated electric penalty of 0 kWh.

Participants who installed heat pumps indicated an overall increase in cooling load after installing the heat pumps. All participants who installed heat pumps indicated that the heat pump is used for cooling. However, 11% indicated that the space was not previously cooled, while another 6% indicated that the space was previously cooled by fans or an evaporative cooler. Additionally, participants who installed heat pumps were asked, when they cooled space before

⁶ Since these are all fuel switching scenarios, 100% should have an electric penalty.

⁷ Missing information included details about the existing equipment such as capacity.

and after installing heat pumps, if they changed the amount of space they cooled since installing heat pumps, and if they changed the temperature they cooled space to since installing heat pumps. While most individual respondents reported no changes, overall, the percentage of respondents who said they cooled most or all hot days, as defined by the respondent, increased from 51% before installing heat pumps to 61% after installing heat pumps. Twenty-one percent of respondents indicated increasing the area of space they cool since installing heat pumps, while none said they decreased the area. Forty-seven percent of respondents indicated that they keep the area that they previously cooled at a lower temperature since installing heat pumps. These data indicate the value of heat pump installations to enhance comfort during warmer months for a substantial portion of surveyed homes.

For examined measures, estimated savings are more conservative than would have been estimated by New York State Technical Resource Manual (TRM) algorithms. The evaluation contractor team calculated savings using TRM methodologies for insulation, HVAC replacement, and water heater replacement measures. Together, these measures accounted for 79% of estimated savings in the Phase 2 population. For almost every measure, TRM methodology resulted in savings estimates that were larger than the savings estimated by the program using program software. The only exceptions (i.e., cases where the program estimated savings were higher than would have been estimated using TRM methodology) were heat pump fossil fuel savings, instantaneous water heater fossil fuel savings, and storage water heater fossil fuel savings. While the evaluation contractor did not have enough documentation of program methodologies to assess the drivers of differences between program estimated savings and TRM estimated savings, the evaluation contractor found in an EmPower+ evaluation, conducted concurrently to this evaluation, that EmPower+ savings estimation tools were calibrated to previous evaluations and thus purposefully estimated conservatively lower savings. A similar approach may be the cause of the difference here.

Recommendations

Recommendation 1: Maintain the more conservative MAR assumption of 38% from the Phase 1 study rather than adopt the updated value of 41% estimated from this study. Prior to the Phase 1 study, the program used an assumed MAR of 46%. As a result of the Phase 1 study, NYSERDA chose to replace the 46% MAR with 38% to be conservative in reporting savings. The analogous MAR value in this study is 41%, which is slightly higher than 38% because more time has passed, allowing more participants to adopt measures. This 41% is only

slightly higher than the 38%, and thus this evaluation recommends that NYSERDA keep the 38% assumption, with added confidence from this study that it is not an overestimate.

Recommendation 2: Wait for the consumption analysis in Phase 3 to adopt reliable realization rates for natural gas and electricity. The Phase 1 evaluation recommended no change to savings estimates based on the consumption analysis done as part of Phase 1 due to statistically insignificant findings. Instead, the Phase 1 evaluation recommended waiting for the consumption analysis intended for Phase 2. Since there was no Phase 2 consumption analysis (see Section 1.3.1, Lack of consumption data), this evaluation recommends waiting for the Phase 3 consumption analysis to determine realization rates. This evaluation also includes a recommendation to build a decision-point into the Phase 3 evaluation once the billing data is available. The Phase 3 evaluation contractor should provide NYSERDA with an assessment of how many participants have a useful amount of consumption data for analysis and NYSERDA should decide whether to move forward with the rest of the Phase 3 evaluation at that time. If there is not enough usable consumption data, NYSERDA could elect to not proceed with Phase 3 as to not waste resources.

1 Introduction

1.1 Program description

The New York State Clean Energy Fund (CEF) Single Family Residential Plan, Residential Initiative consists of market interventions with a goal of driving energy savings and electrification in single-family housing. This initiative includes the Residential Energy Assessment Program and the Home Energy Ratings pilot program.

Both the Residential Energy Assessment (REA) Program and the Home Energy Ratings (HER) pilot provide consumers with clear, relevant, and actionable information about the energy performance of their homes to help them make informed decisions about energy improvements. The Residential Energy Assessment Program provides free energy audits, and the Home Energy Rating pilot was designed to test two rating systems: the U.S. Department of Energy's Home Energy Score and the Pearl Certification.⁸ The pilot was designed to engage with residential contractors and home inspectors to deliver these home energy ratings.

Both the Residential Energy Assessment Program and the Home Energy Ratings pilot focus on market-rate participants but may serve low-income and moderate-income participants as well if they are responsive during participant recruitment.

This evaluation of these programs has been conducted to meet the requirements of the Performance Management, Analyses & Evaluation Plan section of the Clean Energy Fund (CEF) Compiled Investment Plan.⁹

In 2025, NYSEDRA started piloting a virtual audit tool that they intend to have replace the Residential Energy Assessments and Home Energy Ratings pilots. Starting in 2026, potential participants will be able to complete the virtual audit and then be directed to either the Comfort Homes program or the EmPower+ program, while the Residential Energy Assessments program and the Home Energy Rating pilot will shut down. The REA program ended report generation on December 16, 2025.

⁸ <https://www.nyserda.ny.gov/Residents-and-Homeowners/At-Home/Home-Energy-Audits-and-Ratings/Pearl-Home-Certification>

⁹ NYSEDRA, <https://www.nyserda.ny.gov/About/Funding/Clean-Energy-Fund>

1.2 Summary of evaluation objectives and methods

This evaluation is the second of a three-phase evaluation for the Residential Energy Assessment Program and Pilots. The evaluation for the first phase (i.e., “Phase 1”) evaluated projects that participated from 2019 through 2021 and was published in April 2024. This evaluation (i.e., the “Phase 2” evaluation) covers participants from January 1, 2022, through June 30, 2023, as well as follow-up data collection with Phase 1 respondents.

The primary objective of this evaluation was to estimate average savings per household by residential energy rating or audit type and measure, if possible, using a Measure Adoption Rate (MAR) approach. The MAR approach quantifies the percentage of study-recommended savings that customers chose to adopt. The Impact Evaluation Team (“the team”) used the program’s estimated savings for this analysis. In addition, the team compared the program’s estimated savings with savings calculated using the New York Technical Resource Manual (TRM) specifications and considered billing analysis findings from the Phase 1 report.

Additional objectives of this evaluation included an attitudinal assessment of participant customers and contractors. For customers, the study sought to assess satisfaction with program elements, satisfaction with implemented measures, motivations for participation, and receipt of financial incentives for measures. For contractors, the study sought to assess satisfaction with program elements, perceptions of program impacts, training and staffing needs, processes for interaction between customers and contractors, and suggestions for program improvements.

Table 1-1 summarizes the objectives of this study, as well as data sources used to meet those objectives.

Table 1-1. Study objectives, research questions, and methods

Objective	Purpose	Data sources and methods
Assess participant measure adoption rate (MAR) of energy efficiency home improvements	Determine which home energy efficiency measures recommended in the audit/assessment have been adopted resulting from the audit/assessment, by energy rating/audit type, and why these measures were adopted.	<i>NYSERDA project data, survey of participant end-users; MAR</i>
Validate energy savings estimates for a representative number of projects for each of the three programs, respectively	Determine the energy savings realization rate for projects with installed measures.	<i>Validation of energy savings using engineering analysis with project files for a subset of MAR respondents using NY TRMs versions 9 and 10.^a</i>
Assess program participants' experience with the program and motivations for participating.	Gain insights on participants' satisfaction with program aspects and implemented measures. Additionally, gain insights on motivations to participate.	<i>Analysis of participant surveys.</i>
Assess contractor's experience with the program.	Gain insights from contractors on potential program improvements and training needs.	<i>Analysis of contractor surveys.</i>
a The Evaluation Contractor used TRM methods because consumption data was not available, as discussed in Section 1.3.1, Lack of consumption data.		

1.3 Limitations to validity

1.3.1 Lack of consumption data

Unlike the Phase 1 evaluation, the Phase 2 evaluation does not include a consumption data analysis. The evaluation contractor and NYSERDA project team were unable to verify if participant waivers were available to request utility billing data for Phase 2 participants. For this evaluation, the evaluation contractor would have had to verify individual signatures for each program participant for which data was being requested, redact the program applications with the signatures, and provide those redacted applications to the utility companies. Additionally, the program tracking data did not contain natural gas account numbers, which are also required to request utility billing data. Based on the experience with Phase 1, review of individual waivers was not included in the Phase 2 project scope. Despite the lack of scope, the evaluation contractor and NYSERDA collaborated to explore multiple options to address the issue, none of which proved fruitful:

Uplight data: The evaluation contractor and NYSERDA attempted to access customer program applications in a dataset provided by Uplight (the previous software platform utilized by

NYSERDA for Single Family program data), since applications are where customers provide consent to share consumption data. The Home Modernization team decided to transition from the Uplight platform to NYHEP (see below). In that process, there was significant data loss with regards to consent and natural gas utility account numbers. The Uplight data was unrecoverable.

New York Home Energy Portal (NYHEP): The evaluation contractor explored whether the NYHEP could expedite the consent review process by providing a field indicating whether consent for consumption data access had been provided by the customer on their application. Unfortunately, this indicator field was only available in NYHEP for project with application submission beginning in July 2023, and thus did not cover the projects in Phase 2.

Additionally, reviews done as part of an EmPower+ evaluation conducted concurrently with this study found the data field sparsely populated.

Since the evaluation contractor could not verify consents for participants' consumption data, the evaluation contractor relied on estimated (i.e., TRM calculated) savings to determine program-level MAR as a percentage of savings.

1.3.2 Limited project-specific data for New York TRM validation

The evaluation contractor attempted to assess the adherence of program savings estimation methodology to Versions 9 and 10 of the New York TRM. The evaluation contractor reviewed project-level files developed by contractors during project participation for 54% of Phase 2 projects. The files provided enough information to calculate estimated savings using TRM algorithms for HVAC replacements, domestic hot water (DHW) replacements, and shell insulation measures. The workbooks did not provide enough data to calculate estimated savings for any other measure, including air leakage, duct sealing, appliances, thermostats, and lighting. NYSERDA provided additional documentation on the workbook methodologies, but the documentation was insufficient to fill gaps in the project files. Therefore, the evaluation contractor focused on calculating TRM savings for HVAC replacement, water heating replacement, and insulation measures, which represented 79% of estimated savings across the population.

2 Results, findings, and recommendations

This section presents the results and findings from this evaluation.

2.1 Gross energy savings results

2.1.1 Measure adoption rate and program energy savings

The evaluation contractor team estimated the measure adoption rate (MAR) for each program based on responses to a participant survey conducted in Q2 and Q3 of 2025. The survey was fielded in two groups: 1) respondents from the Phase 1 evaluation, that participated in 2019 through 2021, who indicated at that time that they had one or more recommended measures that had not been installed, and 2) participants from 2022 through June 2023. The first group was surveyed to see if they had adopted any measures as more time passed, and the second group was surveyed because they had not previously been surveyed regarding measure adoption.

NYSERDA has learned in evaluating other audit programs that audits are used over a lengthy time period to inform ongoing investment decisions.

For the Residential Energy Assessment Program and Home Energy Score pilot, the savings MAR quantifies the percentage of savings recommended through the audit program that customers self-reported as installed. The REA usage MAR represents the percentage of electricity usage increase recommendations (e.g., heat pump fuel substitution) installed. For the Pearl Certification pilot, the team used Pearl points as the basis for MAR,¹⁰ in lieu of savings, since the pilot did not quantify or track recommended savings.

Table 2-1 shows the savings and usage measure adoption rates by fuel at three years or more since the audit for each program and the number of survey respondents analyzed for each case. The evaluated period indicates when the audits occurred. The Phase 1 evaluation included audits that occurred through December 31, 2021. The MARs for Phase 1 audits have been updated to reflect follow-up surveys completed with customers that reported one or more audit recommended measures not being installed at the time of their initial survey. The Residential

¹⁰ For more information on Pearl points see, <https://pearlscore.com/pearl-score/pearl-score-faq>. The evaluation contractor used the change in Pearl points between existing and recommended equipment to estimate the savings MAR.

Energy Assessment results also include the addition of audits completed during 2022 through Q2 2023.

Table 2-2. Measure adoption rate by program at three years or more since audit

Program	Evaluated time period	Measure adoption rate							
		Savings						Usage	
		Overall		Electricity		Fossil fuel		Electricity	
		n	Ratio	n	Ratio	n	Ratio	n	Ratio
Residential Energy Assessment Program	January 1, 2020 – June 30, 2023	395	41.2%	272	44.9%	365	40.8%	42	47.0%
Home Energy Score Pilot ^a	January 1, 2019 – December 31, 2021	38	57.3%	33	54.1%	38	57.4%	N/A	N/A
Pearl Certification Pilot ^b	January 1, 2019 – December 31, 2021	48	47.7%	N/A	N/A	N/A	N/A	N/A	N/A

a The Home Energy Score pilot population includes 174 participants. The Phase 1 evaluation sample included 42 respondents, of which 36 indicated not installing one or measures. Of those 36, 17 completed a follow-up survey in the Phase 2 evaluation.

b The Pearl Certification population includes 518 participants. The Phase 1 evaluation sample included 56 respondents, of which 53 indicated not installing one or measures. Of those 53, 30 completed a follow-up survey in the Phase 2 evaluation.

The overall savings MAR at three years or more since audit is larger than in the Phase 1 evaluation since more time has passed, thus allowing more of the homes from Phase 1 to adopt recommended measures. The Residential Energy Assessment Program overall savings MAR at three years or more since audit is 41.2% (8% relative precision at the 90% confidence level), an increase of 2.4 percentage points from the Phase 1 evaluation overall savings MAR.

The Home Energy Score pilot overall savings MAR is 57.3% (20% relative precision at the 90% confidence level), an increase of 17.4 percentage points from the Phase 1 evaluation overall savings MAR.¹¹

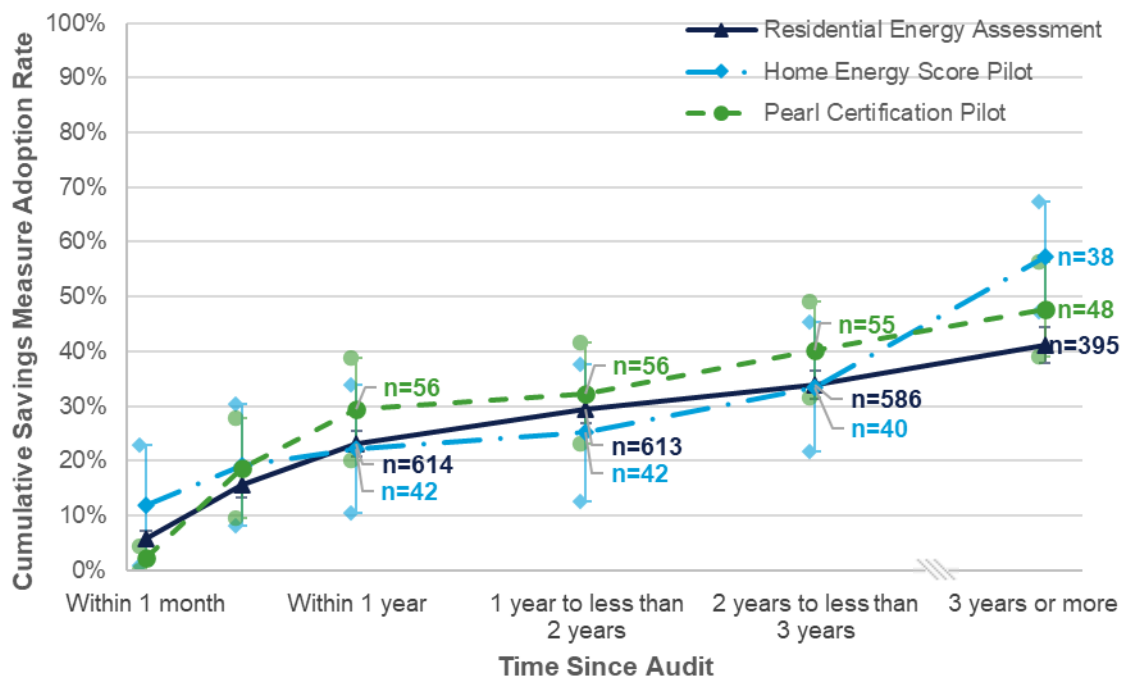
¹¹ The evaluation team designed samples for the Phase 1 and Phase 2 Residential Energy Assessment Program populations to target the desired 90/10 confidence/precision level required for the study. For the two pilot programs, due to the lower number of participants, the evaluation team attempted a census with the survey during Phase 1. In all cases, the evaluation team attempted to contact participants that completed a Phase 1 survey but had not adopted all recommendations they were asked about. The long-term MAR precision improved in the Phase 2 study for both pilot programs.

The Pearl Certification Pilot overall savings MAR is 47.7% (19% relative precision at the 90% confidence level), an increase of 9.8 percentage points from the Phase 1 evaluation overall savings MAR.

Figure 2-1 shows the overall savings MAR with 90% confidence intervals over time by program. The sample sizes decrease as time since audit increases, because fewer homes have had enough time pass since their audit to be included in the category.

As shown in Figure 2-1, the overall savings MAR increases as the time since audit increases for each program. From “within 6 months” through “3 years or more,” the Pearl Certification pilot has significantly higher MAR values than REA. REA and HES have some statistically significant differences at individual time periods since audit; however, neither program is consistently above or below the other program for the entire examined time frame.

Figure 2-2. Overall savings measure adoption rate by program



2.1.1.1 Detailed Residential Energy Assessment Program MAR findings

Given the larger sample sizes allowing for more analysis for the REA program, this section provides more detailed results for REA exclusively. The Home Energy Score and Pearl

Certification pilots do not have similar sections because they ended December 31, 2021, and have small follow-up survey sample sizes.

Figure 2-2 shows the overall savings MAR with 90% confidence intervals over time for the Residential Energy Assessment Program by phase. The sample size is annotated beginning at “within 1 year” since audit, before it begins to decrease. Importantly, the Phase 2 sample size decreases by more than 75% at “3 years or more.” The overall savings MAR for Phase 1 is significantly higher than the MAR for Phase 2 for each period. The lower Phase 2 MAR could be due to the cessation of COVID-19 pandemic lockdown policies. In the Phase 1 evaluation, contractors indicated a higher rate of home renovation and upgrade requests as customers were spending more time at home. The Phase 2 participant audits were completed after the lockdown and thus the lower MAR may represent a return to pre-pandemic levels.

Figure 2-3. Residential Energy Assessment Program overall savings MAR by phase

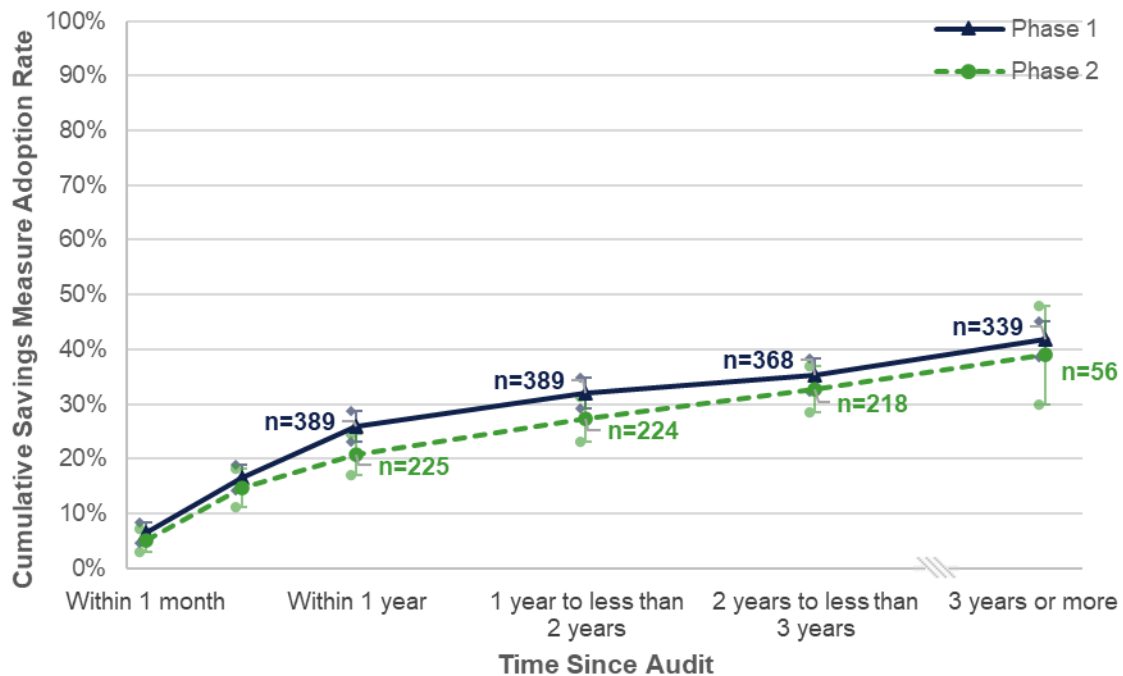


Figure 2-3 shows the overall savings MAR with 90% confidence intervals over time for the Residential Energy Assessment Program by audit year ranging from about 5% within one month of audit to about 40% three years or more from audit. Importantly, the 2023 MAR only consists of audits conducted in Q1 and Q2 of 2023. The 2023 MAR curve ends at two years to less than three years since it has not been three years or more since any of these audits. At two years to less

than three years, the 2023 MAR is statistically significantly different than the 2020, 2021, and 2022 MARs. The 2023 MAR curve flattens more quickly than 2021 and 2022 MAR curves.

As stated above, contractors identified increased homeowner demand for improvements to their house as well as increased adoption of recommended energy efficiency measures, likely due to the prevalence of working from home during the pandemic. Contractors identified that demand was highest from 2020 to 2022, but that demand was returning closer to pre-pandemic levels in 2023 as more employers encouraged in-office work. While there is insufficient evidence that the long-term MAR will be less for audits completed in 2023 onward relative to audits completed between 2020 and 2022, this should continue to be monitored as more data is collected in Phase 3.

Figure 2-4. Residential Energy Assessment Program overall savings MAR by year

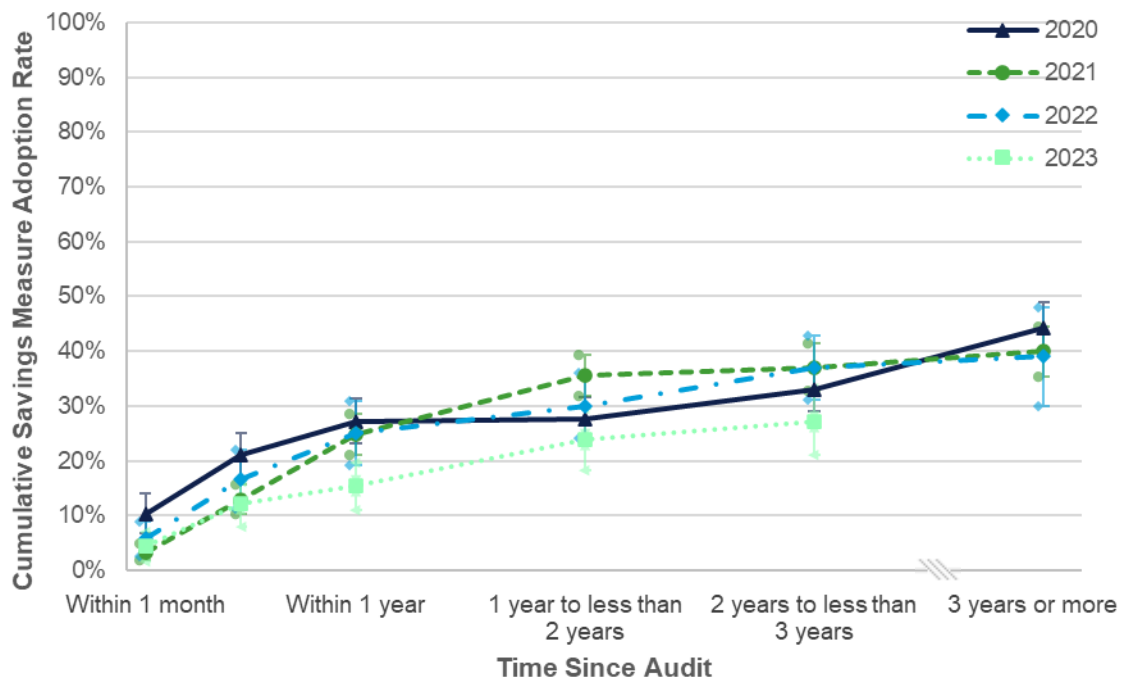


Table 2-2 shows the number of participants, audit recommended annual savings, and audit recommended usage by fuel type for Residential Energy Assessment Program audits overall and by phase.

Table 2-3. Audit recommended energy savings and increased usage

Phase	Fuel	Units	Number of participants	Audit recommended annual savings		Audit recommended annual usage	
				Total	Per participant	Total	Per participant
Phase 1	Electricity	kWh	3,397	5,967,383	1,757	574,186	169
	Natural Gas	MMBtu	2,837	123,221	43	16	0
	Other ^a		560	26,549	47	0	0
	Total ^b		3,397	170,132	50	1,975	1
Phase 2	Electricity	kWh	3,856	6,434,076	1,669	4,325,373	1,122
	Natural Gas	MMBtu	3,288	142,101	43	208	0
	Other ^a		568	41,009	72	16	0
	Total ^b		3,856	205,064	53	14,983	4
Overall	Electricity	kWh	7,253	12,401,459	1,710	4,899,560	676
	Natural Gas	MMBtu	6,125	265,322	43	224	0
	Other ^a		1,128	67,559	60	16	0
	Total ^b		7,253	375,196	52	16,959	2

a Other includes fuel oil, wood, and propane.

b Total includes electricity converted to MMBtu.

Table 2-3 and Table 2-4 apply long-term MAR (three years or more) by fuel type to the audit recommended annual savings and audit recommended annual increased usage to calculate installed annual savings and installed annual increased usage, respectively. The long-term MARs are applied at the program level, rather than by phase. The program-level long-term MARs are more robust than MARs split by phase since the Phase 2 sample size diminishes by more than 75% at three years or more. The Phase 3 evaluation will reconsider long-term MAR application by phase if there is statistical evidence that the long-term MAR is different between phases.

Table 2-3 shows the number of participants, audit recommended annual savings, the long-term savings MAR (three years or more), and the adopted annual savings by fuel type for the Residential Energy Assessment Program.

Table 2-4. Audit recommended and installed energy savings (adjusted gross impact)

Fuel	Units	Number of participants	Audit recommended annual savings		Savings measure adoption rate	Installed annual savings	
			Total	Per participant		Total	Per participant
Electricity	kWh	7,253	12,401,459	1,710	44.9%	5,572,378	768
Natural Gas	MMBtu	6,125	265,322	43	39.6%	105,192	17
Other ^a		1,128	67,559	60	46.3%	31,250	28
Total ^b		7,253	375,196	52	41.2%	154,504	21

a Other includes fuel oil, wood, and propane.

b Total includes electricity converted to MMBtu.

Table 2-4 shows the number of participants, audit recommended annual increased usage, the long-term usage MAR (3 years or more), and the adopted annual increased usage by fuel type for the Residential Energy Assessment Program. The installed annual increased usage is only shown for electricity since the sample did not include any audit recommended annual increased usage for natural gas or other fossil fuels.

Table 2-5. Audit recommended and installed increased usage (adjusted gross impact)

Fuel	Units	Number of participants	Audit recommended annual usage		Usage measure adoption rate	Installed annual usage	
			Total	Per participant		Total	Per participant
Electricity	kWh	7,253	4,899,560	676	47.0%	2,300,624	317
Natural Gas	MMBtu	6,125	224	0	N/A	N/A	N/A
Other ^a		1,128	16	0	N/A	N/A	N/A
Total ^b		7,253	16,959	2	N/A	N/A	N/A

a Other includes fuel oil, wood, and propane.

b Total includes electricity converted to MMBtu.

2.1.2 MAR by measure

Table 2-5 shows the Residential Energy Assessment Program savings measure adoption rate at three years or more since audit by measure group. For each measure group, Table 2-3 shows the number of recommended measures, the percent of measures installed, the number of measures installed, the combined electricity and fossil fuel annual savings, the savings measure adoption

rate, the installed annual savings, and the number of participants surveyed. Note, more participants were surveyed than shown in Table 2-5, since the table shows only the sample that had at least three years pass since their audit.

Table 2-6. Residential Energy Assessment Program savings MAR at three years or more since audit by measure group

Measure group	Participants surveyed	Audit recommended measures			Audit recommended annual savings		
		Count	Percent installed	Count installed	MMBtu	Measure adoption rate	Installed MMBtu
Insulation	288	16,931	33.1%	5,603	140,388	39.3%	55,153
Air Sealing	270	6,566	50.1%	3,289	44,915	51.4%	23,071
Duct Sealing	75	3,135	37.2%	1,168	11,388	35.0%	3,987
Windows	51	1,224	35.5%	435	9,220	22.0%	2,028
Heating System	206	7,486	24.1%	1,808	76,185	33.9%	25,849
Central Cooling	7	2,652	52.6%	1,394	526	21.7%	114
Window AC ^a	0	778	N/A	N/A	0	N/A	N/A
Dehumidifier	5	1,138	34.6%	393	1,151	46.0%	530
Thermostat	200	3,920	60.2%	2,359	25,705	58.0%	14,921
Water Heater	178	4,501	43.7%	1,966	40,163	43.2%	17,362
Water Conservation	25	8,135	6.2%	504	4,789	12.0%	577
Lighting	99	5,097	51.3%	2,613	15,965	53.1%	8,477
Refrigerator	9	5,242	9.7%	511	2,268	6.1%	138
Clothes Washer	15	3,649	39.5%	1,443	2,440	43.0%	1,048
Dishwasher	2	2,440	0.0%	0	94	0.0%	0
Overall	395	72,894	32.2%	23,487	375,196	41.2%	153,254

^a The Window AC measure group percent installed, count installed, measure adoption rate, and installed MMBtu are N/A since none of the participants surveyed about this measure group were three or more years removed from the audit. Five participants that were recommended window ACs completed the survey. At two years to less than three years from audit, 561 of 778 (72.1%) recommended window ACs were installed. The measure adoption rate cannot be quantified since window ACs are not associated with estimated savings or estimated increased usage.

Insulation measures were the most frequently recommended through the audits, composing nearly 25% of all recommendations and 40% of recommended annual savings. About one-third (33%) of the insulation recommendations were installed. Ultimately, insulation accounts for more than one-third of the installed savings, more than any other measure group.

More than 50% of air sealing, central cooling, thermostat, and lighting recommendations were installed. While the savings measure adoption rate for air sealing, thermostat, and lighting recommendations was also greater than 50%, the central cooling savings measure adoption rate was only 21.7%. Alternatively, less than 10% of recommended water conservation, refrigerator, and dishwasher recommendations were installed. Controls and lighting measures generally have the lowest upfront cost and are considered the most accessible to customers.

2.1.3 Electrification and electrification-ready MAR

The Residential Energy Assessment Program is interested in advancing the installation of electrification and electrification-ready measures. Table 2-6 shows the number of recommended electrification and electrification-ready measures, the percent of measures installed, the number of measures installed, the combined electricity and fossil fuel annual savings, the savings measure adoption rate, the installed annual savings, and the number of participants surveyed. The overall savings MAR for electrification and electrification-ready measures is similar to the Residential Energy Assessment Program overall.

Table 2-7. Electrification/electrification-ready savings MAR

Measure group	Parts. surveyed	Audit recommended measures			Audit recommended annual savings		
		Count	Percent installed	Count installed	MMBtu	Measure adoption rate	Installed MMBtu
Air Sealing	270	6,566	50.1%	3,289	44,915	51.4%	23,071
Attic/Roof Insulation	269	5,919	52.8%	3,124	64,180	56.9%	36,540
Basement/Crawlspace Insulation	168	4,434	31.5%	1,399	15,266	38.0%	5,805
Floor Insulation	96	2,620	6.1%	161	11,501	3.9%	444
Wall Insulation	156	3,958	21.1%	834	49,440	21.6%	10,665
Heating System - Heat Pump	57	3,848	19.6%	753	50,395	36.0%	18,148
Heating System - Secondary	0	1	N/A	N/A	0	N/A	N/A
Water Heater	0	16	N/A	N/A	0	N/A	N/A
Windows	51	1,224	35.5%	435	9,220	22.0%	2,028
Overall	343	28,586	35.0%	9,994	244,918	40.0%	96,701

Table 2-7 compares the fossil fuel savings MAR and electricity savings MAR for electrification and electrification-ready measures.

Table 2-8. Electrification/electrification-ready savings MAR by fuel

Measure group	Audit recommended annual fossil fuel savings				Audit recommended annual electricity savings			
	n	MMBtu	Measure adoption rate	Installed MMBtu	n	kWh	Measure adoption rate	Installed kWh
Air Sealing	250	40,005	50.9%	20,376	144	1,438,842	55.4%	796,627
Attic/Roof Insulation	243	60,919	57.5%	35,037	151	955,843	47.7%	456,272
Basement/Crawlspace Insulation	158	14,838	37.8%	5,606	89	125,463	48.9%	61,302
Floor Insulation	87	10,776	3.9%	423	56	212,686	2.5%	5,386
Wall Insulation	141	47,879	21.3%	10,221	90	457,541	31.6%	144,630
Heating System - Heat Pump	57	48,489	35.4%	17,174	12	558,533	45.5%	253,989
Heating System - Secondary	0	0	N/A	N/A	0	0	N/A	N/A
Water Heater	0	0	N/A	N/A	0	0	N/A	N/A
Windows	51	7,298	20.4%	1,486	27	563,300	37.8%	212,835
Overall	320	230,205	39.7%	90,324	187	4,312,207	45.4%	1,931,042

Table 2-8 compares the electricity usage MAR and electricity savings MAR for electrification and electrification-ready measures. Both the recommended and installed electricity usage increases are greater than the recommended and installed electricity savings. This represents an increase in electricity usage driven by heat pump fuel substitution recommendations and adoption.

Table 2-9. Electrification/electrification-ready electricity MAR

Measure group	Annual recommended annual electricity usage				Audit recommended annual electricity savings			
	n	kWh	Measure adoption rate	Installed kWh	n	kWh	Measure adoption rate	Installed kWh
Air Sealing	0	3,045	N/A	N/A	144	1,438,842	55.4%	796,627
Attic/Roof Insulation	0	7,477	N/A	N/A	151	955,843	47.7%	456,272
Basement/Crawlsp ace Insulation	0	47	N/A	N/A	89	125,463	48.9%	61,302
Floor Insulation	0	305	N/A	N/A	56	212,686	2.5%	5,386
Wall Insulation	0	666	N/A	N/A	90	457,541	31.6%	144,630
Heating System - Heat Pump	41	4,848,888	47.0%	2,276,801	12	558,533	45.5%	253,989
Heating System - Secondary	0	1	N/A	N/A	0	0	N/A	N/A
Water Heater	0	5,616	N/A	N/A	0	0	N/A	N/A
Windows	0	394	N/A	N/A	27	563,300	37.8%	212,835
Overall	41	4,866,438	47.0%	2,276,801	187	4,312,207	45.4%	1,931,042

In the Residential Energy Assessment Program, 95% of participants have a fossil fuel primary heating fuel. More than half (53%) of participants with a fossil fuel primary heating fuel were recommended a heat pump through the audit. According to the survey, 18% of these participants installed the recommended heat pump. Heat pump measure adoption affects both electricity and natural gas consumption. Importantly, heat pump fuel substitution has the potential to obscure electricity savings, as observed in the Phase 1 evaluation consumption data analysis. Additional questions regarding heat pump measure adoption were added to the Phase 2 participant survey instruments to provide context for consumption data analysis results. Of the 48 Residential Energy Assessment Program participants that indicated they installed the recommended heat pump, 42 responded to the heat pump questions.

Figure 2-4 shows how respondents use their new heat pump equipment. Most heat pump question respondents (90%) indicated that they use their heat pumps for both heating and cooling. Another 10% use their heat pump only for cooling only. None of the respondents use their new heat pump equipment only for heating.

Figure 2-5. How do you use your new heat pump equipment?

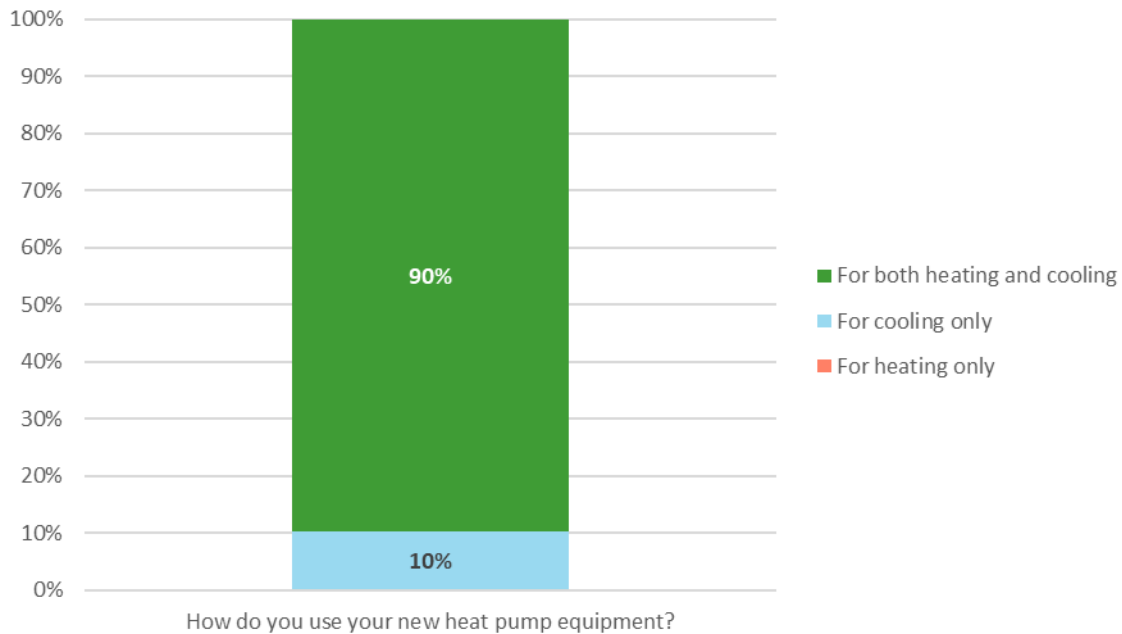
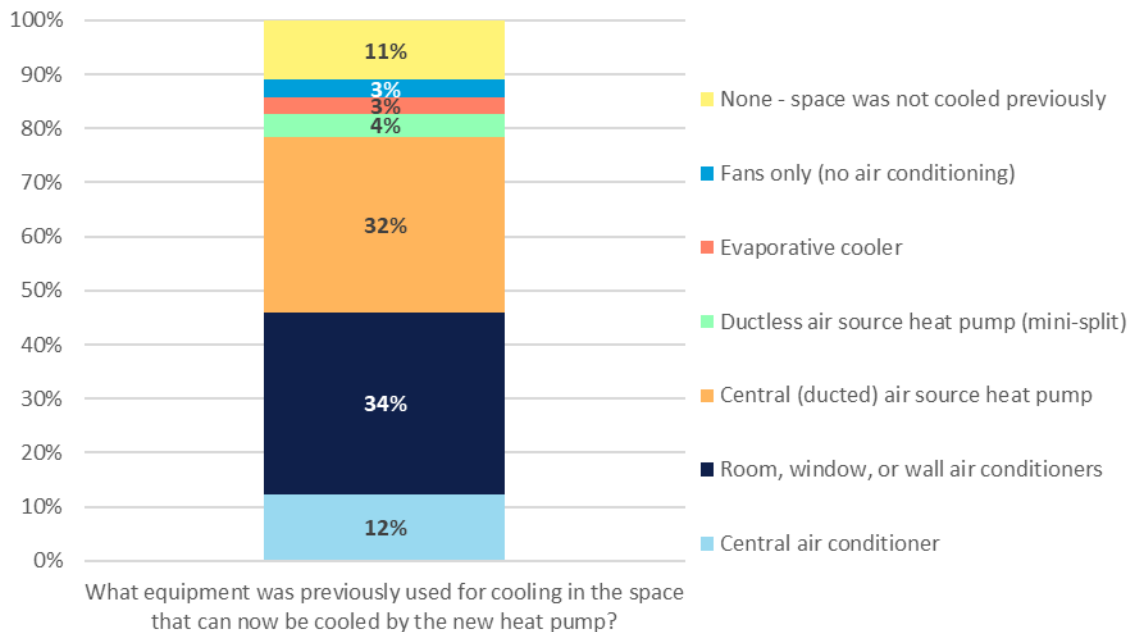


Figure 2-5 shows what equipment respondents previously used for cooling in the space now cooled by the new heat pump. Notably, 11% indicated the space was not cooled previously, while another 6% indicated that the space was previously cooled by fans (3%) or an evaporative cooler (3%).

Figure 2-6. What equipment was previously used for cooling?



For the 89% of respondents who indicated that they previously cooled the space now cooled by a heat pump, the survey asked how frequently they cooled the space using the previous equipment and how frequently they cool the space using the new heat pump equipment. Figure 2-6 shows that, overall, respondents cool spaces more now that they have heat pumps, (with 51% indicating they cooled on “all warm and hot days” or “most warm and hot days” with the previous equipment increasing to 61% with the heat pump equipment) than they did with previous equipment; however, on an individual level, most respondents indicated no change in cooling frequency (i.e., provided the same response for cooling frequency for both their previous equipment and heat pump equipment).

Figure 2-7. When previous equipment and new heat pump equipment are used for cooling

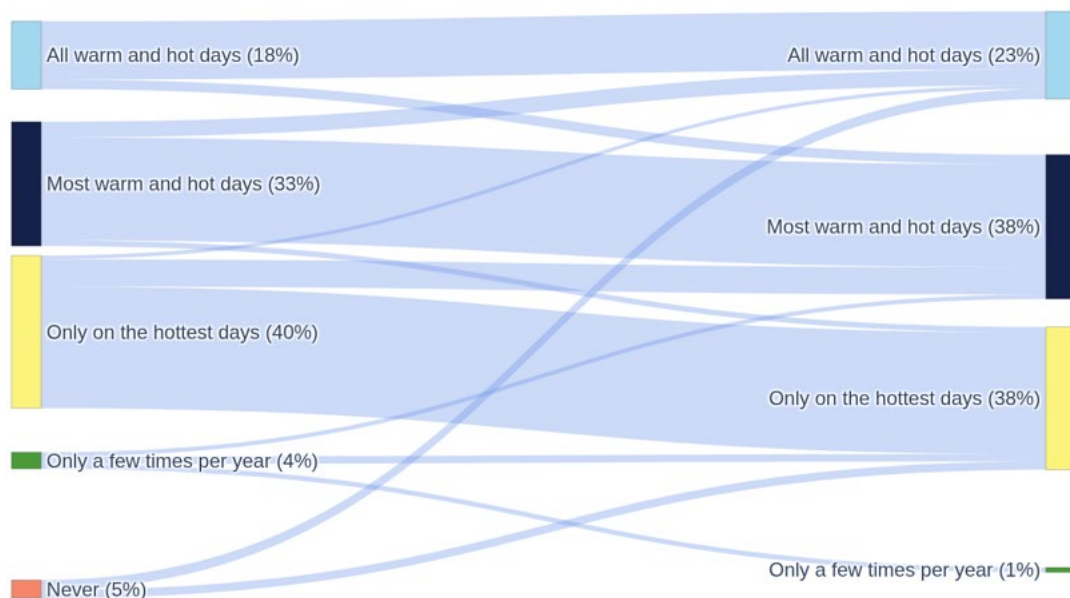


Figure 2-7 shows how the amount of cooled space in the home now compares to before the heat pump for the 89% of respondents that previously cooled the space now cooled by the new heat pump. The majority (52%) of these respondents indicated that the amount of cooled space is the same. However, 21% indicated that the cooled space is now larger, and on average, the cooled space increased from 693 square feet before the heat pump was installed to 1,548 square feet after the heat pump was installed.

Figure 2-8. Amount of cooled space

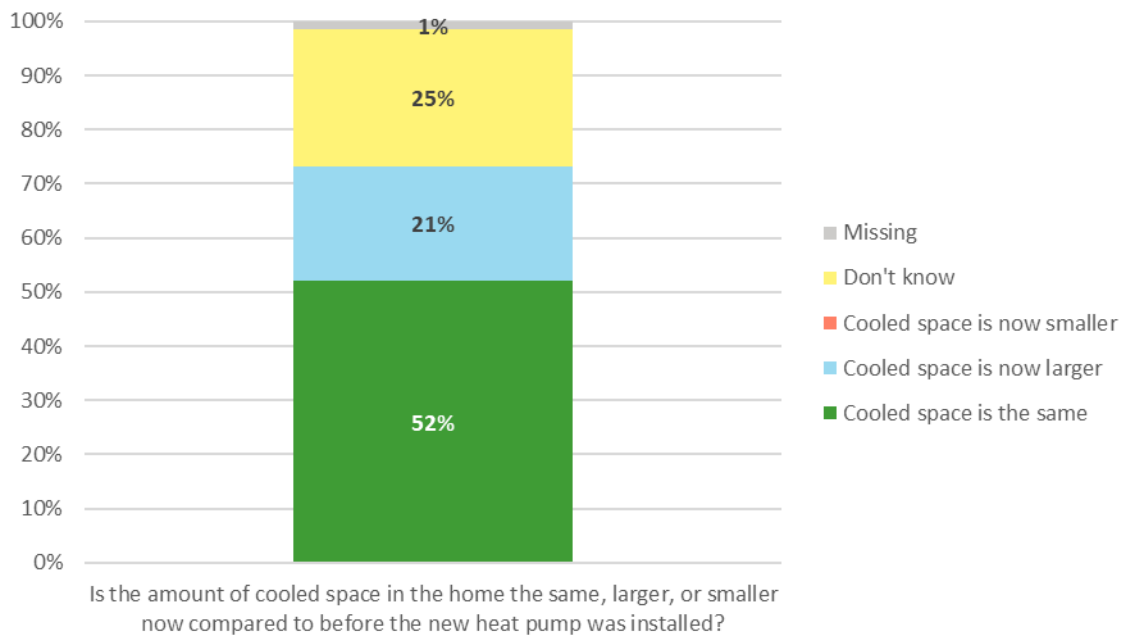
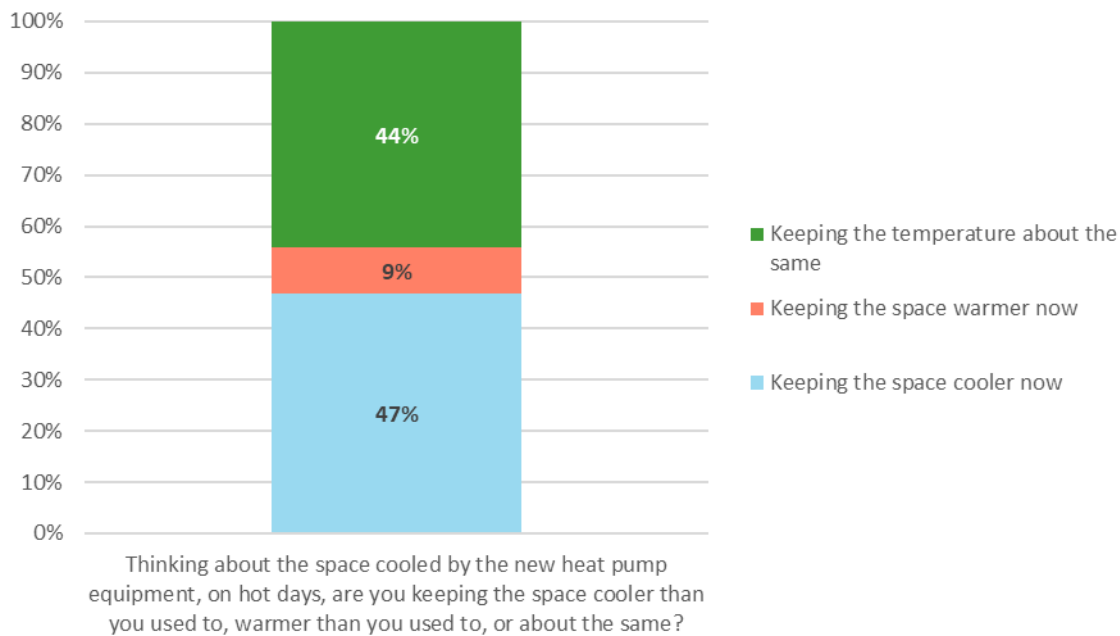


Figure 2-8 shows whether respondents keep the space cooled by the new heat pump equipment cooler, warmer, or the same, than they used to on hot days of the 89% of respondents that previously cooled the space now cooled by the new heat pump. Most of these respondents (47%) are keeping the space cooler now and, on average, now keep the space 6 degrees Fahrenheit cooler during the cooling season. However, 44% of these respondents are keeping the temperature about the same. Only 9% of these respondents are keeping the space warmer now and, on average, now keep the space 1 degree Fahrenheit warmer during the cooling season.

Figure 2-9. Temperature of cooled space



2.2 TRM adherence analysis results

The evaluation included an engineering analysis of project-level documentation to assess the adherence of the programs' savings estimation methodologies to Versions 9 and 10 of the New York Technical Reference Manual, which were in effect during Phase 2 projects' participation.¹² This effort was conducted in lieu of a consumption analysis due to data availability challenges. The evaluation contractor manually downloaded project-level workbooks completed by contractors during participation for every site in the participant survey sample and back-up sample. Ultimately, the evaluation contractor was able to find and download project-level workbooks for 2,088 projects, representing 54% of Phase 2 projects.

The project-level workbooks include a data entry sheet in which contractors input site-specific information to allow the workbook to estimate savings, including baseline equipment and shell information, efficient equipment and measure information, and other building information such as location and areas served by the measure. After reviewing a sample of workbooks, NYSERDA and the evaluation contractor team determined that the workbooks include enough data inputs to re-create savings estimates using TRM algorithms for shell, HVAC replacement, and water

¹² <https://dps.ny.gov/technical-resource-manual-trm>

heating replacement measures. For other measure types,¹³ the workbooks did not provide sufficient information to replicate savings estimates. Additionally, the workbooks were locked, making it impossible to view the equations used to estimate savings by the program. Therefore, the engineering analysis includes a review only of shell, HVAC replacement, and water heating replacement measures. Collectively, these three measure types account for 79% of savings for the Phase 2 population.

Table 2-9 shows the attrition for the TRM adherence analysis for each measure. Due to incomplete entries by contractors in some site-level files, not every file with a recommended measure had enough data to recalculate savings. Overall, the evaluated sample represented between 7% and 97% of the population, depending on the measure. Heat pumps were the most likely to be missing information in the site level file required for analysis.

Table 2-10. Engineering analysis attrition by measure

	Population^a	Count of sites with estimated savings from received project files	Counts of sites with enough data to calculate savings	Evaluated percent of population^b
Attic Roof Insulation kWh	1,025	578	540	53%
Attic Roof Insulation MMBtu	2,848	1626	1270	45%
Wall Insulation kWh	1,364	808	457	34%
Wall Insulation MMBtu	1,925	1176	494	26%
Floor Insulation kWh	1,172	680	304	26%
Floor Insulation MMBtu	1,590	972	395	25%
Boiler and Furnace MMBtu	1,448	928	493	34%
Cooling kWh	1,234	911	379	31%
Heat Pump kWh	467	376	84	18%
Heat Pump MMBtu	408	352	28	7%
HPWH kWh	kWh: 208 MMBtu: 2,229	1039	1039	97%
HPWH MMBtu		878	877	
Instantaneous kWh		22	15	
Instantaneous MMBtu		284	284	
Storage kWh		16	16	
Storage MMBtu		143	143	

¹³ Unevaluated measures types include air leakage, appliances, and thermostats.

	Population^a	Count of sites with estimated savings from received project files	Counts of sites with enough data to calculate savings	Evaluated percent of population^b
Indirect Storage kWh		1	1	
Indirect Storage MMBtu		2	2	

^a Population counts for water heaters could not be broken out by water heater type because the tracking data did not include water heater type. Water heater type was only available in project-specific files.

^b For water heaters, the evaluated share of the population was calculated by dividing the sum of water heaters in the Population column by the sum of water heater records with enough data to calculate savings.

Table 2-10 shows the engineering analysis results for shell measures. For electricity, the TRM savings were close to the estimated savings though slightly higher for both attic and wall insulation. For floors, the evaluated electric savings were 55% larger than the estimated savings. For gas, the TRM methodology consistently resulted in TRM savings that were larger than the program estimated savings ranging from 17% larger for walls, to 141% larger for floors. The evaluation contractor reviewed the available methodology documentation for the program's savings estimation tool to identify what may cause differences between program estimated and TRM savings. The program modeling methodology was not directly comparable to the TRM algorithm.¹⁴

¹⁴ The methodology showed formulas used by the program to reference savings. However, the formulas referred to cells in a workbook that was not available. The documentation showed cell numbers but did not include descriptions of what the cells represented or what the values were in the cells. The formulas did not appear to be one-for-one replications of the TRM; however the evaluation contractor could not confirm this to be the case without access to workbook linked in the documentation.

Table 2-11. Engineering analysis results – Shell measures

Savings	Total estimated savings of sites with enough data	Total TRM savings from sites with enough data	Adherence rate
Attic Roof Insulation (kWh)	194,384	201,920	104%
Attic Roof Insulation (MMBtu)	16,447	25,256	154%
Wall Insulation (kWh)	60,896	65,122	107%
Wall Insulation (MMBtu)	6,296	7,357	117%
Floor Insulation (kWh)	26,207	40,548	155%
Floor Insulation (MMBtu)	1,890	4,547	241%
Total electric (kWh)	281,487	307,590	109%
Total fossil fuel (MMBtu)	24,633	37,160	151%
Total combined savings (MMBtu)	25,593	38,209	149%

Table 2-11 shows the engineering analysis results for HVAC replacement measures. Again, the TRM savings are higher than the program estimated savings—with the exception of heat pumps. For heat pumps, the program estimates a smaller electric penalty than does the TRM, and estimates slightly higher fossil fuel savings. Note that while the estimated electric penalty is smaller than would have been estimated by the TRM, it still represents an improvement from Phase 1, when an even smaller share of heat pump participants had estimated electric penalties. When reviewing the program’s estimation methodology, the evaluation contractor found default values for replacement equipment efficiency that was lower than observed replacement equipment efficiencies. This could result in an underestimation of savings; however, it was unclear in which cases the program would use default values rather than site-specific information. Assuming the program uses site-specific values when available, there would be no underestimation of savings.

Table 2-12. Engineering analysis results – HVAC replacement measures

Savings	Total estimated savings of sites with enough data	Total TRM savings from sites with enough data	Adherence rates
Boiler and Furnace (MMBtu)	3,886	6,725	173%
Cooling (kWh)	21,258	123,003	579%
Heat Pump (kWh)	-500,903	-737,666	147%
Heat Pump (MMBtu)	2,686	2,445	91%
Total electric (kWh)	-479,645	-614,663	128%
Total fossil fuel (MMBtu)	6,571	9,170	140%
Total combined savings (MMBtu)	4,935	7,073	143%

Table 2-12 shows the adherence analysis results for water heating replacement measures. For heat pump water heaters (HPWH), the program estimated positive electric savings while the TRM method resulted in an electric penalty that canceled out any electric savings.¹⁵ However, for HPWH fossil fuel savings, the TRM methodology resulted in higher savings than the program estimation. For instantaneous water heaters, the TRM methodology resulted in higher electric savings and lower fossil fuel savings than the program estimates. For storage water heaters, the TRM methodology found negative electric savings. This was the result of fuel-switching scenarios—identified based on the fuel types entered by the contractor for the baseline and replacement equipment—not having electric penalties. For indirect water heaters, the TRM methodology resulted in higher savings for both electricity and fossil fuels.

¹⁵ The analysis excluded eight HPWH records that estimated savings of millions of kWhs. These records were outliers and involved fuel-switching that would increase electric savings. The evaluation contractor excluded these records as clearly erroneous. They are not included in either the estimated or evaluated savings.

Table 2-13. Engineering analysis results – Water heater replacement measures

Savings	Total estimated savings of sites with enough data	Total TRM savings from sites with enough data	Adherence rate
HPWH (kWh)	357,612	-639,024	-179%
HPWH (MMBtu)	11,849	14,294	121%
Instantaneous (kWh)	4,517	16,252	360%
Instantaneous (MMBtu)	2,124	1,725	81%
Storage (kWh)	12,685	-19,832	-156%
Storage (MMBtu)	947	576	61%
Indirect Storage (kWh)	2,760	5,946	215%
Indirect Storage (MMBtu)	5	12	243%
Total electric (kWh)	377,574	-636,658	-169%
Total fossil fuel (MMBtu)	14,924	16,607	111%
Total combined (MMBtu)	16,212	14,434	89%

2.3 Reported savings realization rates

Table 2-13 shows the total savings, number of participants, and measure adoption rate reported by the Residential Energy Assessment Program. The program calculated the total savings shown by applying the measure adoption rate it assumed to the audit-recommended savings. The evaluation team calculated the audit-recommended and installed savings per participant from the program reported savings, participants, and measure adoption rate.

Table 2-14. Program reported savings

Evaluated time period	Fuel	Units	Total		Measure adoption rate	Per participant	
			Savings	Parts.		Rec. savings	Installed savings
			A	B	C	D	E
			Per reporting data				E / C
January 1, 2020 - December 31, 2021	Electricity	kWh	2,025,715	3,209	46%	1,372	631
	Fossil fuel	MMBtu	49,383			33	15
January 1, 2022 - June 30, 2023	Electricity	kWh	1,791,995	3,617		1,077	495
	Fossil fuel	MMBtu	49,720			30	14
	Electricity	kWh	3,817,710	6,826			1,216

Evaluated time period	Fuel	Units	Total		Measure adoption rate	Per participant	
			Savings	Parts.		Rec. savings	Installed savings
			A	B	C	D	E
			Per reporting data			E / C	A / B
Overall	Fossil fuel	MMBtu	99,103			32	15

Table 2-14 is similar to Table 2-13, but Table 2-14 shows the total increase in usage reported by the program, rather than the total savings. The evaluation team calculated the recommended usage (i.e., estimated increase in energy consumption after implementing recommendations) and installed usage (i.e., estimated increase in energy consumption based on measure adoption rate for each measure) per participant from the reported values. The audit installed increased usage per participant (column “E”) is calculated as the total reported increased usage (column “A”) divided by the total reported number of participants (column “B”). The audit recommended increased usage per participant (column “D”) is calculated as the installed increased usage per participant (column “E”) divided by the program assumed MAR (column “C”). The “usage” shown in column “A” is larger in the Phase 2 time period (January 1 2022 to June 30 2023) than in the Phase 1 time period (January 1, 2020 to December 31, 2021) indicating that the program did a better job in Phase 2 at estimating electric penalties associated with heat pumps than the program did in Phase 2.

Table 2-15. Program reported increased usage

Evaluated time period	Fuel	Units	Total		Measure adoption rate	Per participant		
			Usage	Parts.		Rec. usage	Installed usage	
			A	B		C	D	E
			Per reporting data			E / C	A / B	
January 1, 2020 - December 31, 2021	Electricity	kWh	308,821	3,209	46%	209	96	
	Fossil fuel	MMBtu	-			-	-	
January 1, 2022 - June 30, 2023	Electricity	kWh	1,428,336	3,617		858	395	
	Fossil fuel	MMBtu	-			-	-	
Overall	Electricity	kWh	1,737,158	6,826		553	254	
	Fossil fuel	MMBtu	-			-	-	

The evaluation team is unable to estimate realization rates for Phase 2 projects due to the aforementioned data limitations. While the Residential Energy Assessment Program tracking data provided for these projects supports analysis (e.g., measure adoption rate estimation), it is insufficient for impact analysis (i.e., realization rate estimation). To estimate realization rates for these participants, utility billing data are required to support consumption data analysis. Both customer consent and utility account numbers are necessary to request utility billing data for these participants. However, the evaluation team was not able to access the customer consent or natural gas utility account numbers needed to request utility billing data for these participants due to the switch from Uplight to NYHEP.

In the absence of Phase 2 realization rates, the team calculated evaluated savings by applying the Phase 1 total savings realization rates to the program-reported values. Due to the issues described above, the evaluation team does not recommend the program report on these values. Table 2-15 shows the evaluated savings for informational purposes only. The Phase 1 realization rates shown were calculated as the ratio of the evaluated to reported total savings. The Phase 1 consumption data analysis was the basis for the evaluated savings. Notably, the natural gas realization rate is not statistically different from 1, while the electricity realization rate is not statistically significant at the 90% confidence level. The electricity realization rate is not shown, nor applied since it is not statistically significant.

Table 2-16. Evaluated savings and usage example

Evaluated time period	Fuel	Units	Reported totals		Realization rate	Evaluated totals	
			Savings	Usage		Savings	Usage
January 1, 2020 - December 31, 2021	Electricity	kWh	2,025,715	308,821	N/A	N/A	N/A
	Fossil fuel	MMBtu	49,383	-	81.8%	40,418	-
January 1, 2022 - June 30, 2023	Electricity	kWh	1,791,995	1,428,336	N/A	N/A	N/A
	Fossil fuel	MMBtu	49,720	-	81.8%	40,694	-
Overall	Electricity	kWh	3,817,710	1,737,158	N/A	N/A	N/A
	Fossil fuel	MMBtu	99,103	-	81.8%	81,111	-

2.4 Participant survey results

This section presents the results of two participant surveys conducted as part of the study. The first survey was of Residential Energy Assessment participants from January 2022 through June

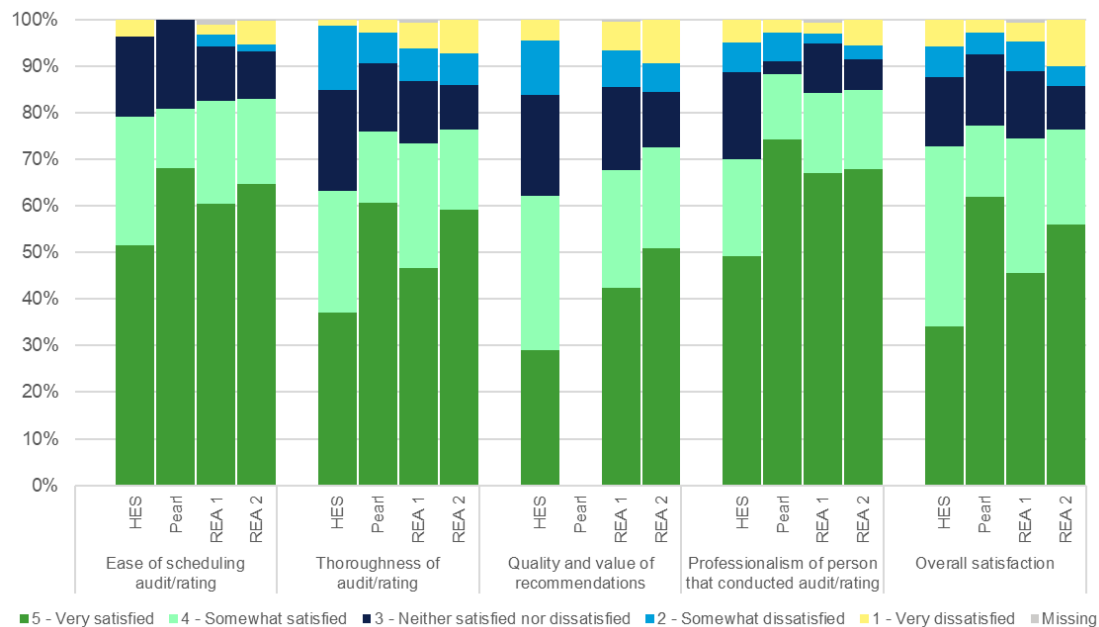
2023. These are the participants from Phase 2 of this evaluation and are referred to as “REA 2.” The second survey was from Phase 1 participants (January 2019 through December 2021), who indicated in the Phase 1 survey, that they had not yet implemented some recommended measures. This group had participants from the Residential Energy Assessments program, the Home Energy Score Pilot, and the Pearls Certification Pilot. Those three groups of participants are referred to as REA 1, HES, and Pearl respondents respectively.

2.4.1 Customer satisfaction

The survey asked REA 2 respondents to rate their satisfaction with various aspects of the program using a range of 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied.” Figure 2-9 compares the responses from REA 2 respondents to responses collected during the Phase 1 evaluation for HES, Pearl, and REA 1 respondents.

Though there were no statistically significant differences, REA 2 respondents appeared more likely to report being “very satisfied” with the overall program (56%) than were REA 1 participants (46%). This increase could have been driven by REA 2 participants indicating higher satisfaction with the “Thoroughness of the audit/rating” than did REA 1 participants (59% of REA 2 participants said they were “very satisfied” compared to 47% of REA 1 participants) as well as “quality and value of recommendations” (51% for REA 2 compared to 42% for REA 1). No less than 60% of participants were very or somewhat satisfied across categories and programs. Consistent with the Phase 1 evaluation, more than 70% of participants in the Phase 2 evaluation were very or somewhat satisfied overall across programs. On average, the ease of scheduling and professionalism categories received the highest scores across all three programs.

Figure 2-10. Customer satisfaction summary



The survey for REA 2 participants asked if participants would recommend the program to a friend, family or neighbor. More than 4 out of 5 (82%) said they would recommend the program (Table 2-14). Those who said they would not recommend the program were asked why. The most frequently cited response related to dissatisfaction with the contractors, with respondents expressing that contractors seemed to be trying to sell measures, were not interested in talking about measures they did not sell or had poor communication. Others mentioned that they did not receive a thorough audit report. One respondent said, “I didn't receive full results of audit. The contractor only audited things that they service,” and another said, “the auditor did not support my goal of phased electrification of my home, so I didn’t really trust his recommendations. Additionally, the auditor was unable to advise me on how to integrate the proposed measures with other work I wanted to do on my home. They wanted to do them as a standalone project, which I felt would be less efficient than integrating them with a planned re-siding of the front of my home.”

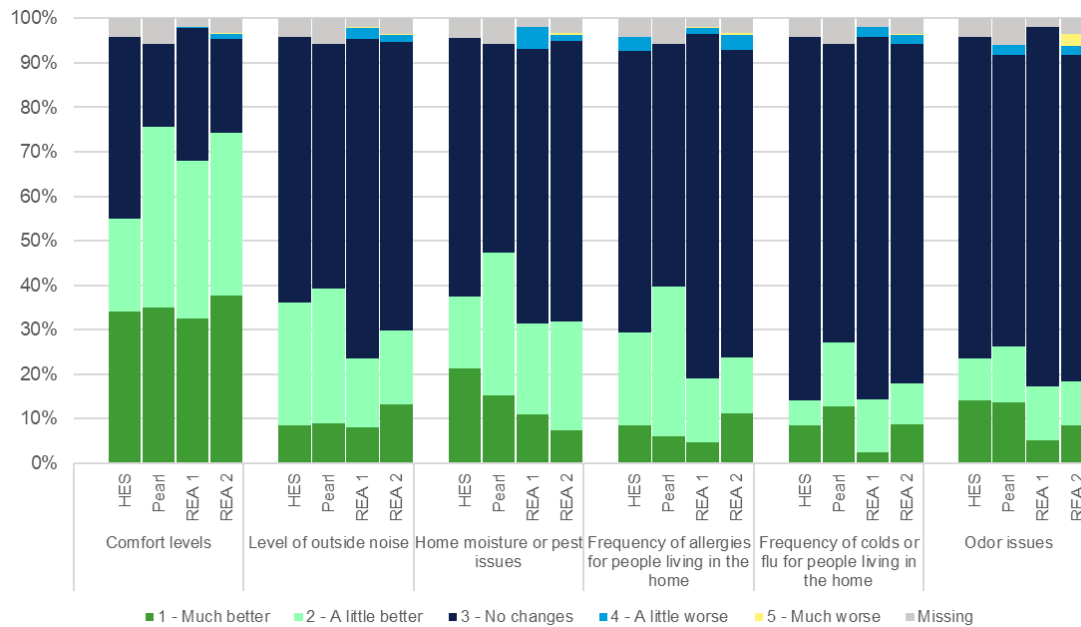
Table 2-17. Would you recommend the audit/rating to a friend, family member, or neighbor?

Response	REA 2
Yes	82%
No	12%
Don't know	6%

2.4.2 Non-energy benefits

The surveys asked all respondents to indicate how various aspects of their home had changed as a result of participating in the program, using a scale from 1 to 5, where 1 represents that the aspect had gotten “much better” and 5 indicates “much worse,” with 3 representing “no changes.” Figure 2-10 compares the responses from this evaluation across each respondent type. Respondents indicated noticing the most improvement for “comfort levels” at about 70% of each respondent type, except HES, saying their home comfort levels had gotten “much better” or “a little better” as a result of participating in the program. One customer said, “[Because of the insulation project] in the attic, the consistency of the temperature in the winter is much better. The rooms in the extremities of the house are warmer than they normally would be in the winter. Also, I feel like I saved a bit of money from lower heating costs.” In all other cases, a majority of respondents indicated they had observed no change resulting from the program.

Figure 2-11. Non-energy benefit summary – Phase 2 responses



As shown in Table 2-17, respondents were asked if they had experienced a change in the number of sick days members of their household had taken since participating in the program. A majority indicated no change; however, between 7% and 22% of respondents indicated that they had fewer sick days since participating depending on the program. Five percent of REA 2 respondents said they had more sick days since participating.¹⁶

¹⁶ REA 2 participants participated from January 2022 to June 2023 which is entirely after the Covid-19 lock down.

Table 2-18. Since making/implementing your energy efficiency improvements, have you or anyone in your household experienced a change in the number of sick days you/they take from work and / or school? (If no one in your household attends work or school, please select "N/A".)

Response	HES	Pearl	REA 1	REA 2
Yes, fewer sick days from work and / or school.	22%	11%	7%	12%
Yes, more sick days from work and / or school.	0%	0%	0%	5%
No, the same number of sick days from work and / or school.	73%	82%	90%	79%
Missing	5%	7%	2%	5%

2.4.3 Participation

As shown in Table 2-18, REA 2 respondents were more likely to participate in an energy audit sooner after learning about the program than REA 1 respondents were. Seventy-four percent of REA 2 respondents participated within 6 months of learning about the program, compared to only 53% of REA 1 respondents.

Table 2-19. How much time passed between your first learning about the program and then starting to participate in it?

Response	HES	Pearl	REA 1	REA 2
Less than 3 months	28%	32%	38%	42%
3 - less than 6 months	45%	27%	15%	32%
6 - less than 9 months	8%	11%	5%	3%
9 - less than 12 months	0%	3%	7%	7%
12+ months	3%	12%	14%	15%
Don't know	9%	15%	20%	0%
Other	6%	0%	1%	2%

Table 2-19 shows the percentage of respondents from each program that indicated changing specific behaviors as a result of their audit. The most frequently cited change was turning off lights/devices, with a majority of respondents indicating that they had started doing this differently because of the audits. Only one in five (21%) REA 2 respondents indicated changing no behaviors as a result of the audit.

Table 2-20. Which of the following, if any, have you done differently because of what you learned from your audit?

Response	HES	Pearl	REA 1	REA 2
Changed thermostat settings	49%	47%	42%	39%
Reduced use of hot water	41%	19%	23%	32%
Added "smart" home controls	36%	26%	33%	17%
Turned off lights/devices when not in use	51%	60%	54%	55%
Scheduled regular servicing or tune ups of my heating system	45%	48%	41%	44%
Replaced filters as directed by my contractor	26%	52%	45%	45%
None of the above	13%	20%	14%	21%

More than one-third of respondents indicated making some change that would impact the energy efficiency of their home beyond what was recommended by their program (Table 2-20). The most frequently cited changes were installing LEDs or ENERGY STAR appliances (Table 2-21).

Table 2-21. Since the audit/rating was completed, have you implemented energy efficiency or other home projects that would impact your home energy use that were not recommended in the audit/rating assessment?

Response	HES	Pearl	REA 1	REA 2
Yes	34%	38%	43%	37%
No	66%	62%	57%	63%
Don't know	0%	0%	0%	0%

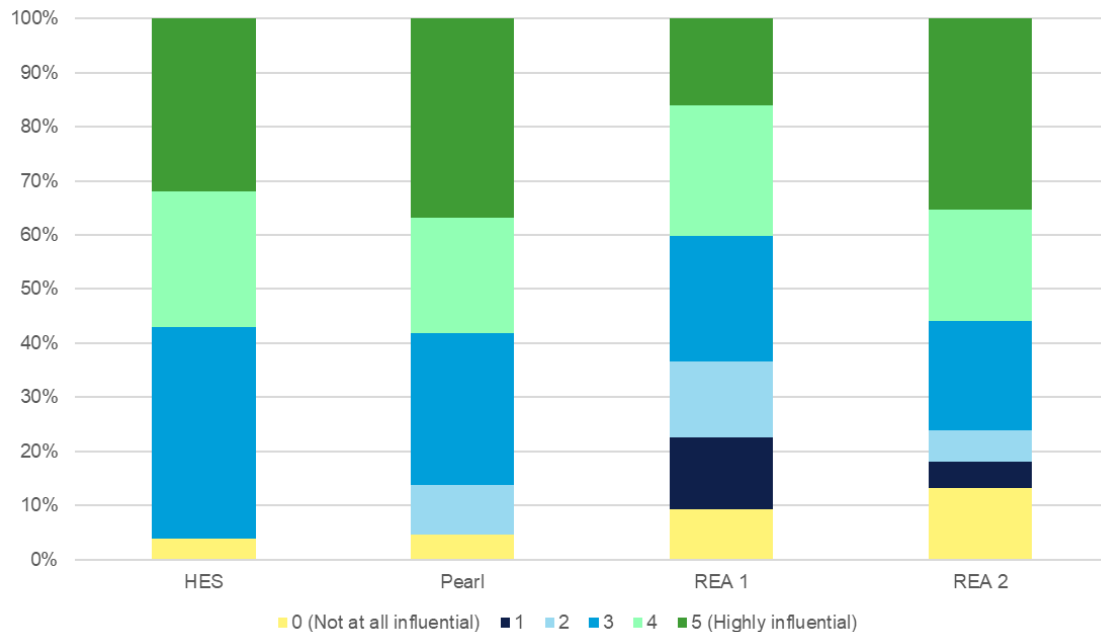
Table 2-22. Since the audit/rating was completed, have you implemented energy efficiency or other home projects that would impact your home energy use that were not recommended in the audit/rating assessment?

Response	HES	Pearl	REA 1	REA 2
Installed LED lighting	47%	48%	44%	34%
Installed ENERGY STAR washing machine	37%	25%	25%	27%
Installed ENERGY STAR dishwasher	0%	32%	29%	39%
Installed ENERGY STAR refrigerator	47%	26%	27%	31%
Installed other appliance	18%	42%	25%	10%
Added insulation	0%	21%	10%	11%
Replaced windows	0%	16%	27%	13%
Home addition	0%	0%	0%	1%
Remodeled existing space	0%	0%	4%	13%
Installed solar PV panels	18%	0%	18%	8%
Installed solar hot water	0%	0%	0%	7%
Purchased an electric vehicle	0%	0%	8%	10%
Other (Please describe):	0%	0%	0%	0%
Don't Know	47%	48%	44%	34%

More than half (58%) of REA 2 respondents indicated that the program was influential in their decision to make the energy efficiency upgrades from Table 2-21 by providing a rating of 4 or 5

out of 5 in response to a question about program influence (Figure 2-11). This was an increase from REA 1, for which only 42% provided a rating of 4 or 5. Note that REA 1 participants have had more time since participation to make upgrades and may have less recall of program influence. Additionally, it is possible that COVID-19 conditions were drivers for the REA 1 population to make more upgrades.

Figure 2-12. Program influence on decision to make additional energy efficiency improvements



2.4.4 Motivations

Figure 2-12 through Figure 2-19 show the motivation respondents indicated for implementing various measures. Overall, improving home comfort or saving money on energy bills were stated more frequently as motivations than “correcting issues” (e.g., fixing leaks or under-performing equipment) or “increasing value of the home.” Windows were an exception, with more respondents citing “correcting issues” as the motivation for upgrading their windows than any other motivation. Measures that are not included in the figures below did not have enough respondents answer the motivation questions for analysis.

Figure 2-13. Motivations – air leakage

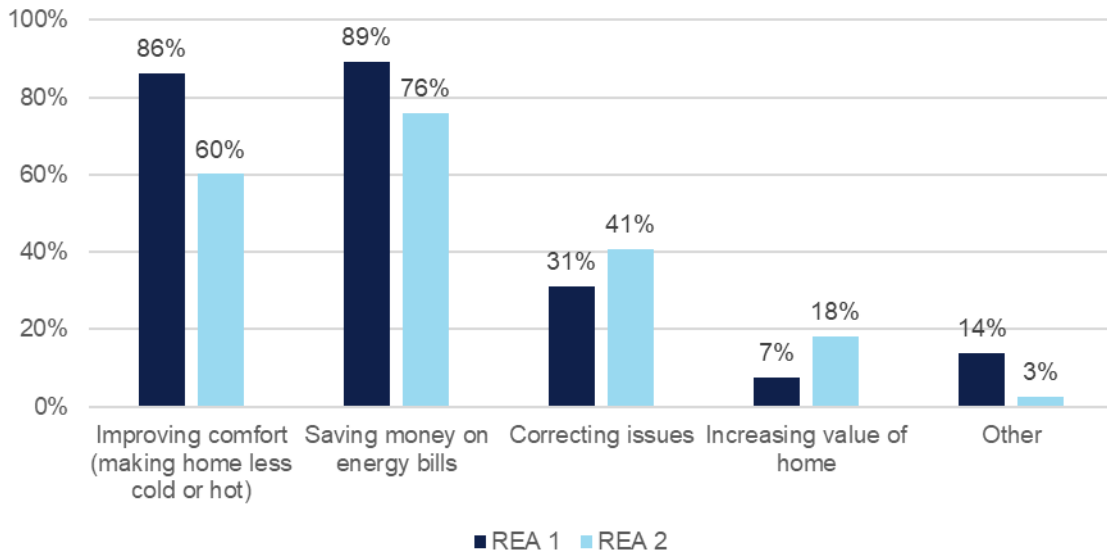


Figure 2-14. Motivations – duct sealing

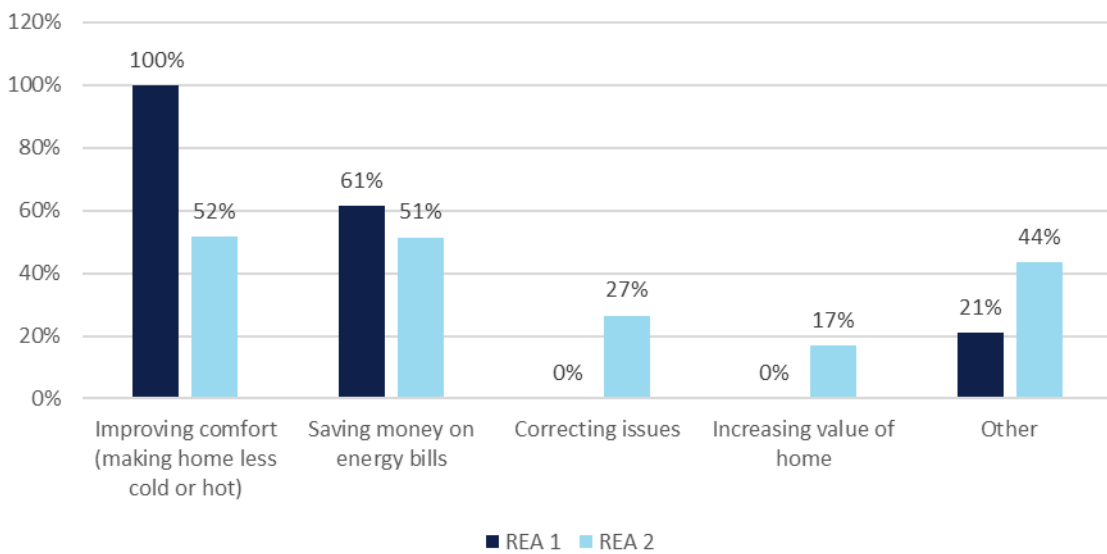


Figure 2-15. Motivations – heating systems

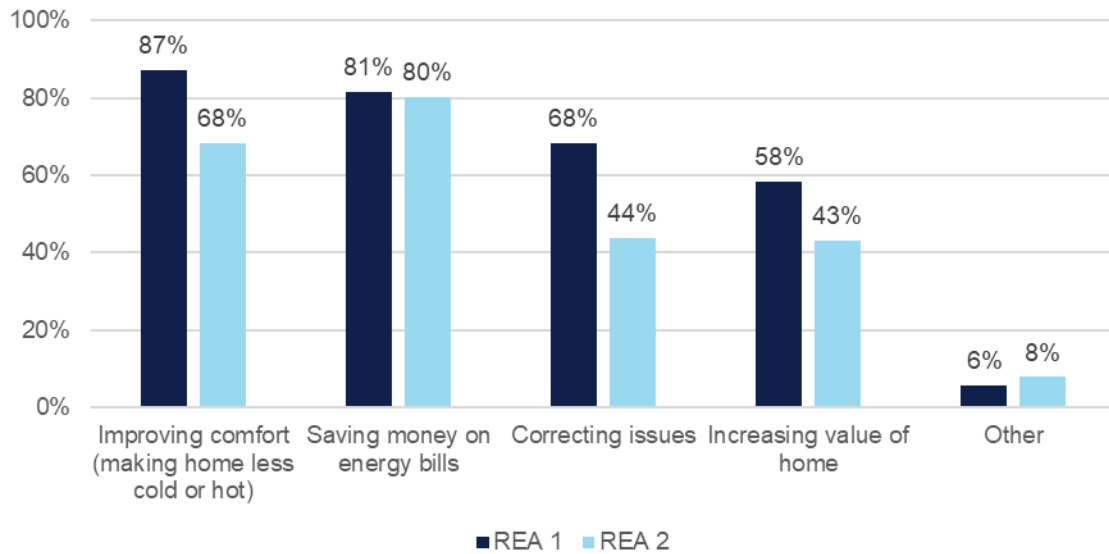


Figure 2-16. Motivations – water heater

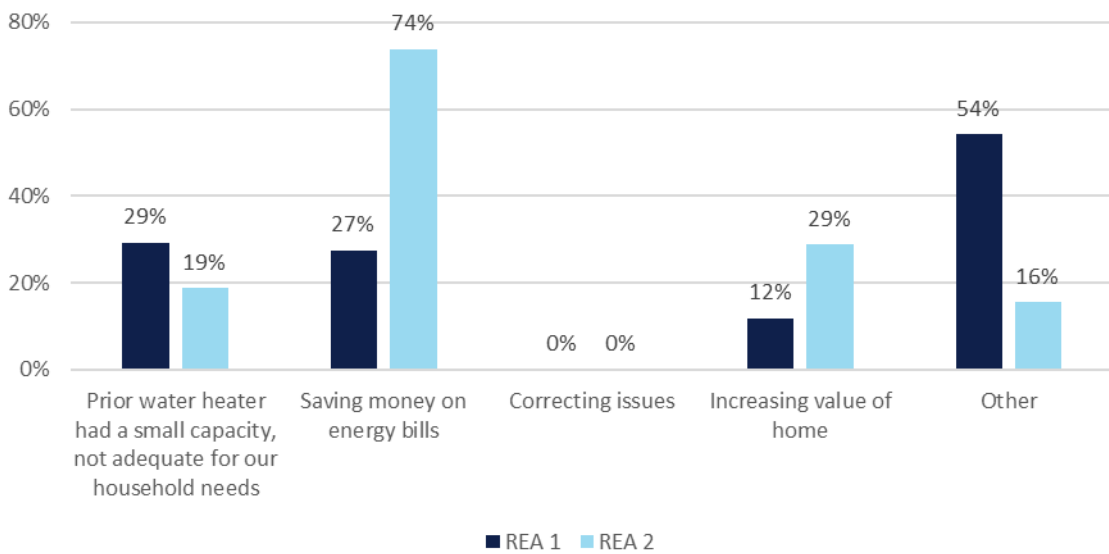


Figure 2-17. Motivations – insulation

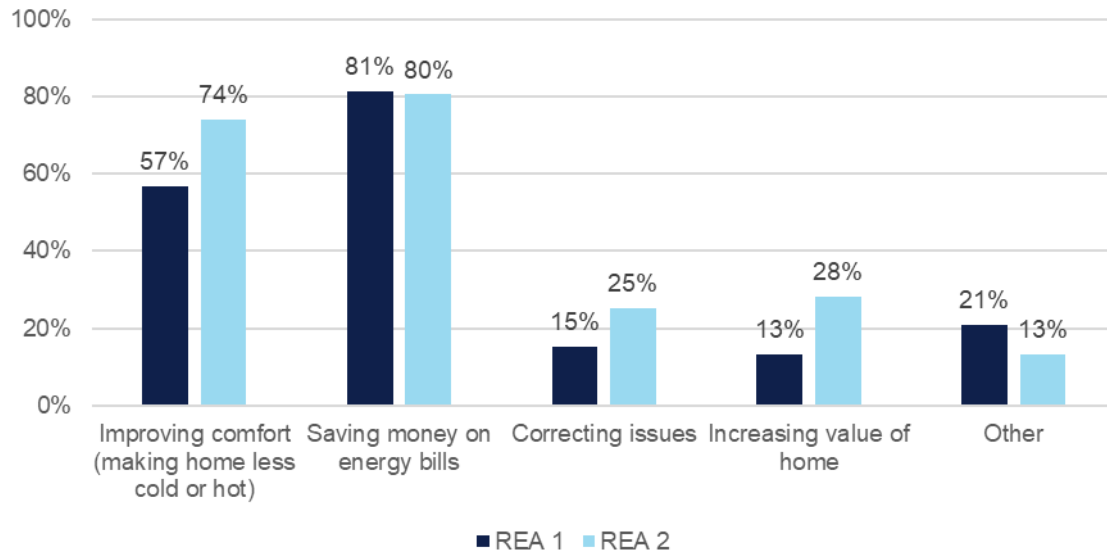


Figure 2-18. Motivations – thermostats

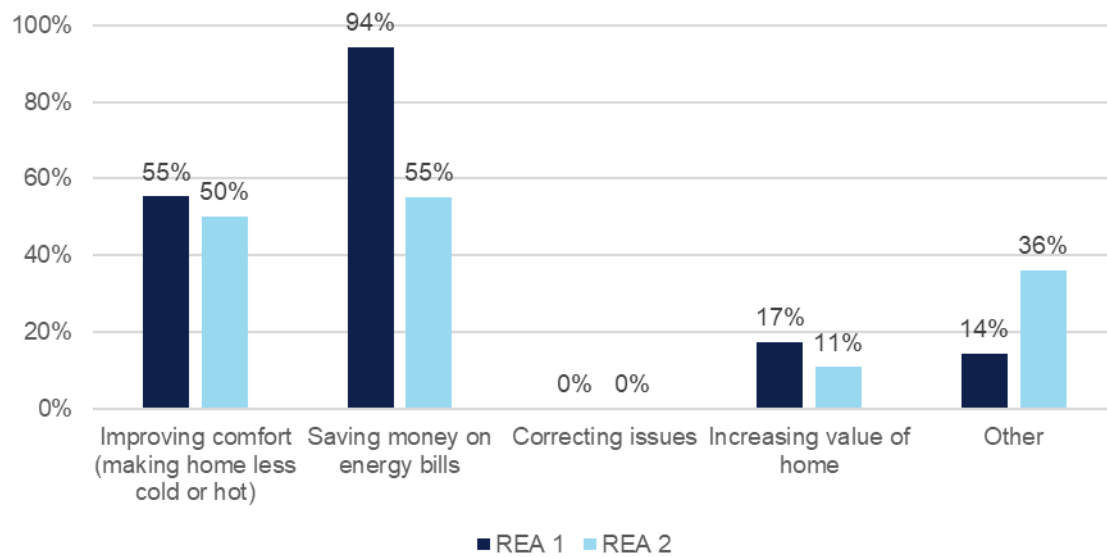


Figure 2-19. Motivations – lighting

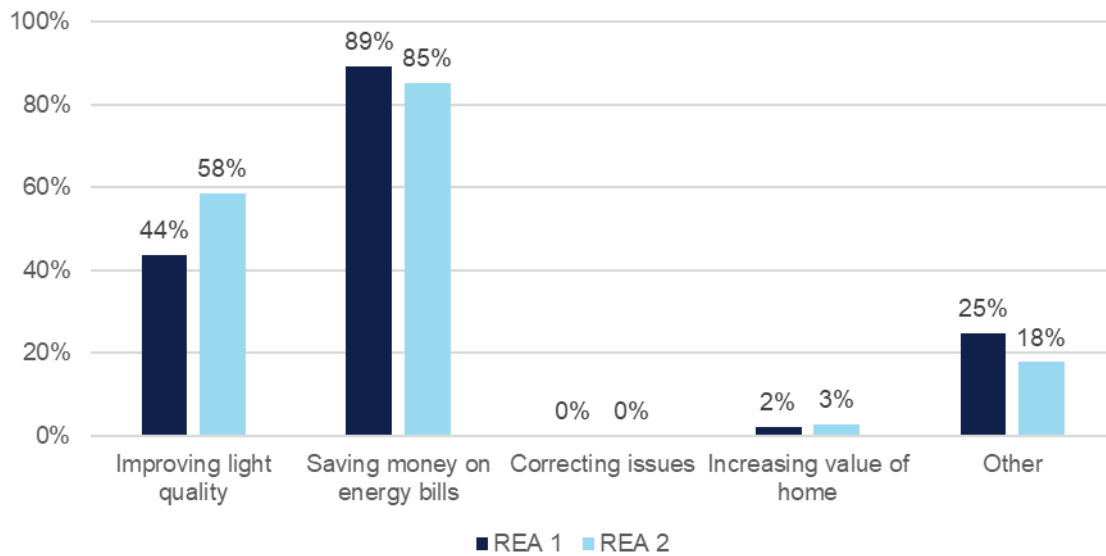
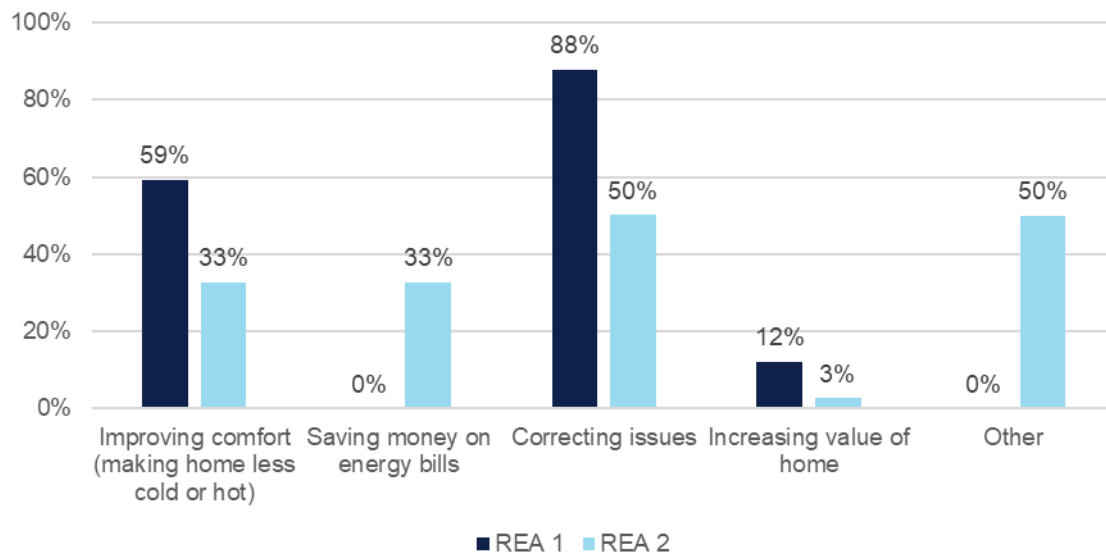


Figure 2-20. Motivations – windows



2.4.5 Financial incentives

Table 2-22 shows the share of REA 1 and REA 2 respondents for each measure who indicated receiving some type of financial incentive to help pay for the implementation of the given measure. Respondents were most likely to indicate receiving some type of financial incentive for heating system measures. Table 2-23 shows who respondents indicated provided them the

financial incentive. Depending on the measure, respondents were most likely to cite a utility company, NYSERDA, or the federal government.

Table 2-23. Did you receive any rebates, tax credits or other incentives to help pay for the measure? (Percent who responded “Yes”)

Measure	REA 1	REA 2
Air Sealing	3%	21%
Duct Sealing	0%	15%
Heating System	57%	76%
Water Heater	10%	23%
Central Cooling	100%	0%
Insulation	19%	47%
Thermostat	20%	29%
Clothes Washer	0%	0%
Dehumidifier	0%	0%
Lighting	9%	3%
Refrigerator	0%	0%
Water Conservation	0%	17%
Windows	6%	16%

Table 2-24. Who provided the rebate, tax credit or other incentive for the measure? Select all that apply.

Measure	Utility company	NYSERDA	Federal government	Manufacturer	Other	Don't know
Air Sealing	0%	100%	22%	0%	0%	0%
Heating System	15%	26%	20%	13%	9%	35%
Water Heater	49%	43%	43%	0%	0%	0%
Central Cooling	60%	0%	40%	0%	0%	0%
Insulation	9%	56%	41%	4%	8%	4%
Thermostat	28%	72%	0%	0%	0%	0%
Lighting	65%	0%	35%	0%	0%	0%
Windows	0%	0%	100%	0%	0%	0%

2.4.6 Customer demographics

Figure 2-20 shows a summary of reported household income from each of the programs, and Table 2-24 shows the number of home occupants per program. NYSERDA defines LMI households as those with incomes at or below the higher of 80% of area median income (AMI) and 80% of state median income (SMI). NYSERDA defines low-income households as having incomes at or below 60% of the SMI, or households that are income eligible for LIHEAP or WAP. When combining information provided by respondents for household income and household occupants, 6% of respondents indicated that they were part of low-income households and 5% indicated that they were part of moderate-income households.

Figure 2-21. Reported income

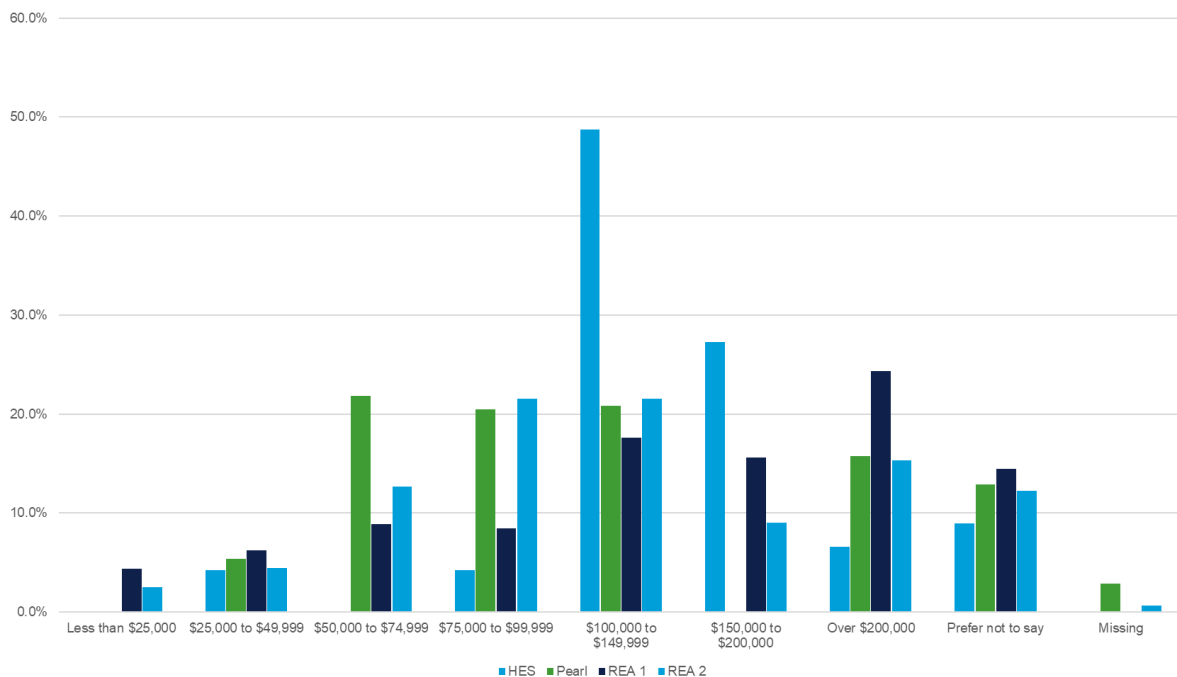
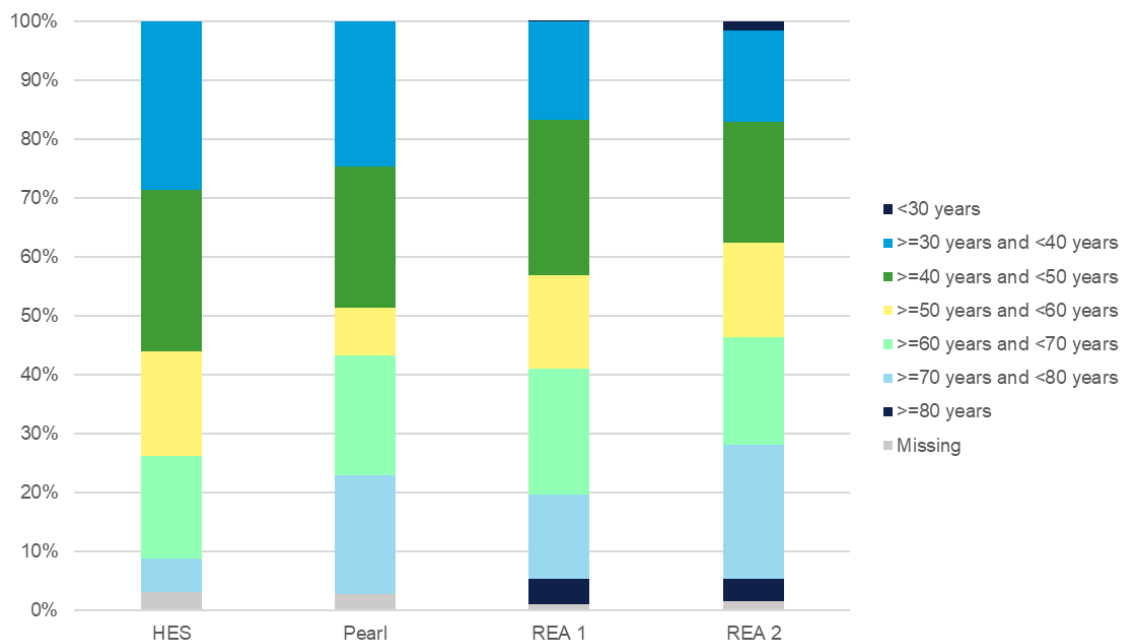


Table 2-25. How many people, including yourself, currently live in your home?

Response	HES	Pearl	REA 1	REA 2
1	24%	27%	11%	21%
2	23%	46%	37%	42%
3	37%	5%	18%	9%
4	9%	16%	22%	18%
5	6%	3%	8%	6%
6	0%	4%	2%	1%
7	0%	0%	1%	0%
8 or more	0%	0%	1%	0%

Figure 2-21 shows the age of the survey respondent. The mixes of ages were similar across programs.

Figure 2-22. Reported age of respondent



2.5 Contractor interviews

The evaluation contractor interviewed 20 participating contractors in February and March of 2025. Interviews were conducted over the phone and contractors received a \$50 incentive for

completing the interviews. To develop the sample, NYSERDA provided the evaluation contractor team with a list of all contractor companies that had participated in the Residential Energy Audit program, the Pearl Certification Pilot, or the Home Energy Star Rating Pilot in 2022 or 2023. Since an evaluation for the EmPower+ program was seeking to interview contractors at the same time, the samples were coordinated between studies. Contractor companies that participated in only the Residential Energy Audit or pilot programs were included in the sample for this study. Contractor companies that participated only in the EmPower+ program were included in the EmPower+ study sample. Companies that participated in both sets of programs were split into bins by company size and then randomly and evenly split between the two samples. Out of the 165 companies that had participated in the Residential Energy Audits program or pilots, 104 companies were ultimately included in the sample for this study. The evaluation contractor team used a census approach to reach out to contractors via phone and email, prioritizing larger companies first. Outreach ended once the team completed the targeted count of 20 interviews.

The remainder of this section summarizes the findings from the contractor interviews. For detailed results, see Appendix B.

2.5.1 Contractor recommendations

Table 2-25 summarizes the recommendations respondents made to improve the program. The following themes were most commonly cited by respondents:

- **Streamline program administration**, especially by speeding up the approval process and response time. One contractor said, “It takes too long to get answers and it causes us contractors to lose business because we have to provide homeowners answers in real time. They don’t understand why we cannot get approval or answers right away.”
- **Improve communication with customers** including by improving the customer report. One contractor said, “[The program should provide] better clarity of what program offers to public. The audit report is horrendous and embarrassing and I don’t even like giving it to people. Every time we do a house we tell them they don’t need ‘x, y, z’ and then the report tells them why they should get the ‘x y z.’ I can’t modify 90% of this report. I can change one box for recommendations, but most of the report tells them why they should get heat pumps. We tell them house is not ready for heat pumps but then the report tells them to install heat pumps.”
- **Improve the program software** to be more useful for contractors in the field. One contractor said, “It would really help contractors that are good people to have a seat at the table to help make [program planning and design] decisions. When it comes down to putting together the portal and the measures, have people who have done this work be

part of the designing process. It shows that the people running the program lack hands on knowledge.”

Table 2-26. Do you have any recommendations on how NYSERDA could improve the Program? (Multiple responses allowed)

Response	Count of respondents (n=20)	Percent of respondents (n=20)
Streamline program administration tasks	4	20%
Improve communication with customers	3	15%
Improve program software	3	15%
Increase incentives	3	15%
Increase qualifications of support staff	2	10%
More training	1	5%
None	6	30%

2.5.2 Program influence

On average, respondents indicated that during the time of their participation they would have completed 17% fewer audits without the program. That percentage increases to 38% if looking only at the respondents who said they would have completed fewer audits without the program (i.e., excluding the 50% who said they would have completed the same number of audits without the program).

One hundred percent of respondents said the program increased customer awareness about energy efficiency measures.

Eighty percent of respondents said they increased the efficiency of their offerings outside of the program since participating in the program.

2.5.3 Program involvement

Seventy-nine percent of respondents worked for companies that had participated in the residential audits program for at least three years.

The program comprises a small portion of respondents' company's home energy work: 45% of respondents said the program represented under 10% of their home energy work, and 75% said the program represented less than 30% of their home energy work.

Contractors most frequently mentioned the customer support website and centralized help desk as the most useful resources offered by the program.

Fifty percent of respondents were somewhat or very satisfied with the program, while 30% were somewhat or very dissatisfied. Satisfaction was driven by respondents feeling the program increased the amount or scopes of their projects and that program processes required a worthwhile amount of effort. Dissatisfaction was driven by contractors who felt approval times took too long and that the software was cumbersome and not aligned with their needs.

Fifty-five percent of respondents were somewhat or very satisfied with program staff and 20% were somewhat or very dissatisfied with program staff.

2.5.4 Customer interaction

A plurality of respondents said customers don't have concerns about the program, but of those that did cite customer concerns, the most frequently cited concerns were cost of the project (25%), and impact on energy bills (25%). Contractors also noted customers thinking they'll qualify for measures that they do not, or that are not offered by the program. One said, "Homeowners think they'll automatically qualify for the same measures as their family, friends, or neighbors. It's hard to explain why they do not qualify."

According to contractors, the most common barrier faced by customers is financial constraints (mentioned by 80% of contractors) followed by limited awareness or understanding of measures (mentioned by 70% of contractors).

Uptake is infrequent. Thirty-five percent of contractors said their audits result in implemented measures, "10% of the time or less," and another 20% said, "40% of the time or less." This is despite 75% of installers reporting conducting follow-up activity via phone and email.

Contractors indicated that customers do not adopt measures because of financial constraints or lack of understanding about the measure, matching the most frequently cited barriers above.

Most contractors reported not receiving much feedback from customers; however, two mentioned receiving feedback relating to program reports conflicting with their recommendations. Specifically, respondents highlighted reports recommending heat pumps when the contractor felt the house is not ready for heat pumps. One contractor said, “The report only talks about heat pumps. We tell them house is not ready for heat pumps but then the report tells them to install heat pumps. It needs weatherization. The utility bill will go up too high.”

2.6 Training and staffing

Seventy-five percent of respondents indicated their staff are Building Performance Institute (BPI) certified and 60% have energy auditors.

More than half of companies have auditors with more than 10 years of experience, only 5% had auditors with less than one year of experience on average.

Eighty-five percent of respondents said they have sufficient training opportunities for their staff, though 35% indicated facing challenges training staff in the last 12 months.

Respondents most frequently cited insulation and building shell envelope installers as the positions they find most challenging to fill (55%), followed by energy auditors (45%).

Forty percent of respondents say they have faced challenges retaining qualified staff.

2.7 Disadvantaged communities

NYSERDA’s Residential Energy Assessment Program was designed prior to implementation of New York State’s Climate Leadership and Community Protection Act (CLCPA) in 2019 and therefore was designed prior to the state’s efforts to identify disadvantaged communities (DACs) and target funding to them. However, many projects in the Residential Energy Assessment Program are located within DACs, as defined in the New York State’s criteria for DACs, as finalized by New York’s Climate Justice Working Group in March 2023.

This section compares evaluation results for participants in DACs with results for participants not in DACs. Results are not shown where the team was unable to determine whether a participant is in a DAC (e.g., missing participant address).¹⁷

2.7.1 Program energy savings and increased usage

Table 2-26 shows the number of participants, audit-recommended annual savings, increased usage by fuel, and DAC status.

Less than 15% of participants in the Residential Energy Assessment Program are in DACs. Total audit-recommended annual savings per participant were 9% greater for DAC participants than non-DAC participants on average. While DAC participants tended to have greater electricity and natural gas savings per participant than non-DAC participants, the DAC participants tended to have lower non-natural gas fossil fuel (shown as “Other” fuel in Table 2-26) audit recommended savings per participant than non-DAC participants. Audit recommended increased usage per participant was 51% less for DAC participants than non-DAC participants on average.

Table 2-27. Audit recommended energy savings and increased usage by DAC status

DAC status	Fuel	Units	Number of participants	Audit recommended annual savings		Audit recommended annual usage	
				Total	Per participant	Total	Per participant
DAC	Electricity	kWh	1,076	1,869,045	1,737	397,507	369
Non-DAC			6,079	10,390,944	1,709	4,411,663	726
DAC	Natural Gas	MMBtu	928	46,263	50	13	0
Non-DAC			5,137	216,861	42	143	0
DAC	Other ^a		148	7,378	50	0	0
Non-DAC			942	57,841	61	8	0
DAC	Total ^b		1,076	60,019	56	1,369	1
Non-DAC			6,079	310,157	51	15,204	3

^a Includes fuel oil, propane, and wood

^b Includes electricity converted to MMBtu

¹⁷ The evaluation team was unable to determine the DAC status for 98 (1.3%) of 7,253 Residential Energy Assessment Program participants.

2.7.2 Measure adoption rate

Table 2-27 shows the savings and increased usage measure adoptions rates and the number of survey respondents analyzed in estimating MAR by fuel at 3 years or more since audit for DAC and non-DAC Residential Energy Assessment Program participants. The savings MARs are similar between DAC and non-DAC participants and not statistically significantly different. However, the increased usage MARs for DAC and non-DAC participants are statistically significantly different.

Table 2-28. Measure adoption rate by DAC status

DAC status	Measure adoption rate							
	Savings						Increased usage	
	Overall		Electricity		Fossil fuel		Electricity	
	n	Ratio	n	Ratio	n	Ratio	n	Ratio
DAC	74	37.7%	43	44.1%	73	37.3%	8	10.6%
Non-DAC	311	42.1%	224	44.7%	282	41.9%	33	55.8%

2.7.3 Customer satisfaction

This section compares customer satisfaction survey responses for Residential Energy Assessment Program participants by DAC status and phase. Phase 2 participants include audits that occurred from January 1, 2022, through June 30, 2023. Phase 2 participants responded to customer satisfaction questions during Phase 2 of this evaluation. Of the Phase 2 survey respondents, 29 are in a DAC and 191 are not in a DAC. Phase 1 participants include audits that occurred from January 1, 2020, through December 31, 2021. The Phase 1 participants responded to customer satisfaction questions during Phase 1 of this evaluation and are shown here for comparison. Of the Phase 1 survey respondents, 75 are in a DAC and 304 are not in a DAC.

Figure 2-22 compares customer satisfaction with different aspects of the audit by DAC status and phase. Across the different aspects of the audit, the proportion of respondents in a DAC that were either very satisfied or somewhat satisfied increased from Phase 1 to Phase 2, while the proportion of respondents that were either very dissatisfied or somewhat dissatisfied decreased. Changes in the proportion of respondents in a non-DAC that were either very satisfied or somewhat satisfied varied across the different aspects of the audit, while the proportion of respondents that were either very dissatisfied or somewhat dissatisfied increased for each aspect.

Figure 2-23. Customer satisfaction summary by DAC status

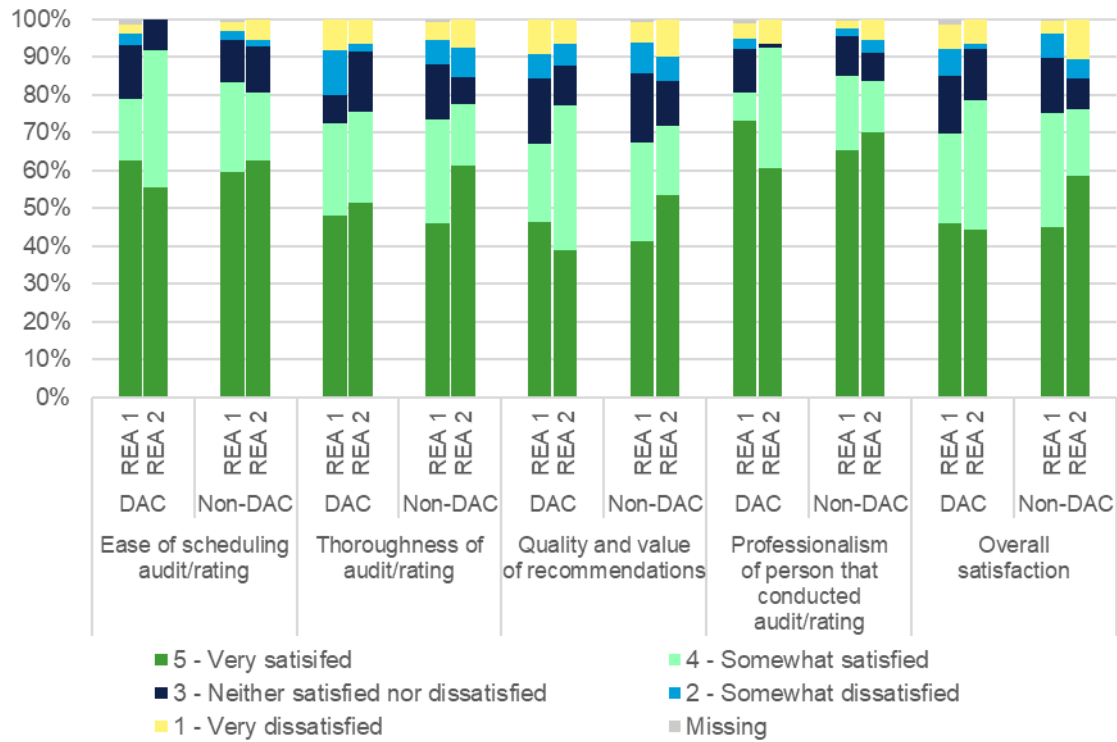
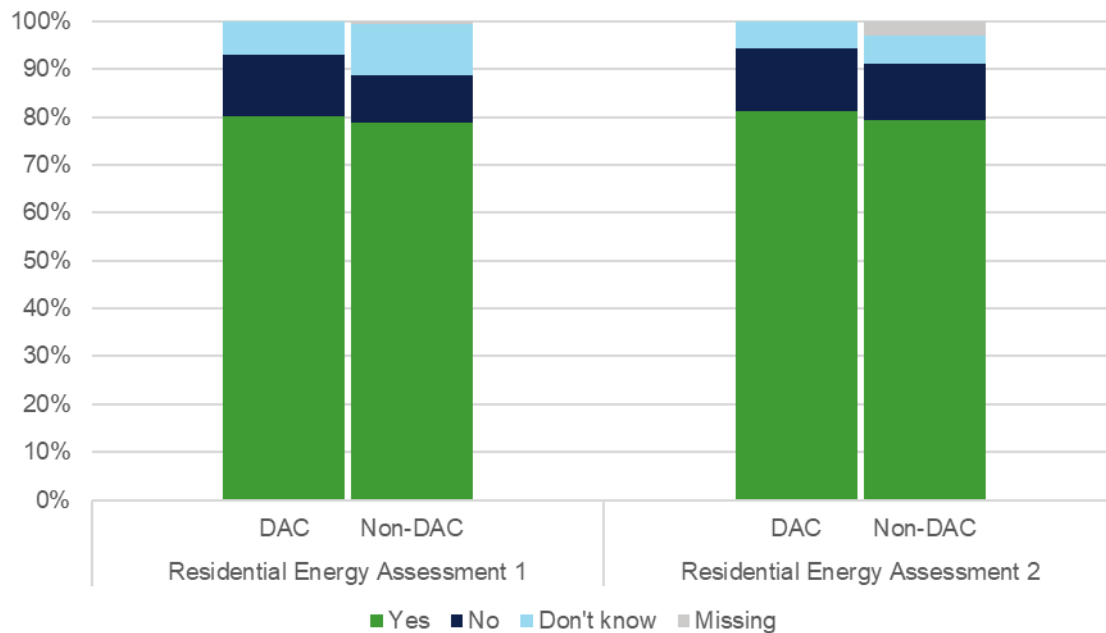


Figure 2-23 compares whether the customer would recommend the audit to a friend, family member, or neighbor by DAC status and phase. The responses are similar both by DAC status and phase.

Figure 2-24. Audit recommendation summary by DAC status



2.8 Recommendations and Responses

Residential Energy Audits Measure Adoption Rate Phase 2 Impact and Process Evaluation

Summary of Report Findings, Recommendations and NYSERDA Response to Recommendations

Key findings and associated recommendations from the Residential Energy Audits Measure Adoption Rate Phase 2 Impact and Process Evaluation include¹⁸:

Recommendation 1: Maintain the more conservative MAR assumption of 38% from the Phase 1 study rather than adopt the updated value of 41% estimated from this study. Prior to the Phase 1 study, the program used an assumed MAR of 46%. As a result of the Phase 1 study, NYSERDA chose to replace the 46% MAR with 38% to be conservative in reporting savings. The analogous MAR value in this study is 41%, which is slightly higher than 38% because more time has passed, allowing more participants to adopt measures. However, the

¹⁸ The final study can be found here <https://www.nyserdera.ny.gov/About/Publications/Evaluation-Reports/Single-Family>

evaluation team NYSERDA continue to apply the 38% MAR given greater confidence with the Phase 1 results.

Initial NYSERDA Response to Recommendation: Implemented. NYSERDA will maintain the existing Measure Adoption Rate of 38%. No further adjustments are necessary.

Recommendation 2: Wait for the consumption analysis in Phase 3 to adopt reliable realization rates for natural gas and electricity. The Phase 1 evaluation recommended no change to savings estimates based on the consumption analysis done as part of Phase 1 due to statistically insignificant findings. Instead, the Phase 1 evaluation recommended waiting for the consumption analysis intended for Phase 2. Since there was no Phase 2 consumption analysis, the evaluation team recommends waiting for the Phase 3 consumption analysis to determine realization rates.

Initial NYSERDA Response to Recommendation: Implemented. Although the Residential Energy Audit program has ended, this study may be useful in comparison to virtual energy assessment realization rates in the future.

3 Methods

3.1 MAR methods

Primary data collection relied on social science methods including surveys, interviews, and sampling approaches to collect data on the current and evolving state of the market. The evaluation team developed and conducted a survey of participant end-users' energy efficiency measure adoption and savings. NYSERDA collaborated with the evaluation team during the development of the survey instrument.

Surveys, either conducted as phone interviews or web-based surveys of Home Energy Score, Pearl Certification, or Residential Energy Assessment recipients, were used to determine the MAR. The team implemented an incremental sampling approach for this evaluation, described in more detail in Section 3.2, Sampling. The Phase 1 evaluation focused on assessing the MAR for Home Energy Score or Pearl Certification ratings conducted between 2019 and 2021, and for Residential Energy Assessment audits between 2020 and 2021. Because these energy audits are ongoing and because future updates to this study will be needed to evaluate them, the team also proposed an incremental sampling methodology to determine the MAR for Residential Energy Assessment audits moving forward for projects completed up until 2024. This evaluation, Phase 2, focused on assessing the MAR for Residential Energy Assessment audits conducted between 2022 and Q2 2023.

3.2 Sampling

There are three different participant populations within this study. For the two pilot programs, due to the lower number of participants, the team attempted a census with the survey during the Phase 1 evaluation. For the Residential Energy Assessment Program, the team designed a sample of 1,500 participants from January 2020 through December 2021 to target the 90/10 confidence/precision level required for the study. In all cases, the team attempted to contact participants that completed a Phase 1 survey but had not adopted all recommendations they were asked about.

For the Residential Energy Assessment Program, the team designed another sample of projects from January 2022 through June 2023, the Phase 2 evaluation period, to target the 90/10 confidence/precision level required for the study. The population was stratified by fuel type,

program year, and project size (i.e., program estimated savings) for the sample design. The study required about 340 completed surveys to achieve those targets. Assuming a 30% response rate for the survey required drawing a total sample of 1,140 participants. An assumed error ratio of 1.0 was used for the sample design for all fuel types and program years. The “Other” fuel type category was established for sites with fuel types including coal, wood, pellets, etc. There are only 22 “Other” fuel type customers in the program across the 2022 to 2023 Q2 study period, for which the team attempted a census.

A summary of the Phase 2 sample design by fuel type is shown in Table 3-1. Sample design by fuel type, followed by a summary of the total target completes and the expected relative precision shown in Table 3-2.

Table 3-1. Sample design by fuel type

Fuel	Program year	Participants	Combined savings (MMBtu)	Error ratio	Sample
Natural Gas	2022	1,921	134,737	1	560
Natural Gas	2023 Q1-Q2	1,146	91,298	1	335
Natural Gas	Total	3,067	226,035	1	895
Electricity	2022	103	22,561	1	30
Electricity	2023 Q1-Q2	118	2,952	1	34
Electricity	Total	221	25,513	1	64
Oil	2022	138	17,451	1	40
Oil	2023 Q1-Q2	141	11,329	1	41
Oil	Total	279	28,780	1	81
Propane	2022	156	15,724	1	46
Propane	2023 Q1-Q2	111	8,276	1	32
Propane	Total	267	24,000	1	78
Other	2022	8	274	1	8
Other	2023 Q1-Q2	14	64	1	14
Other	Total	22	338	1	22
Total		3,856	304,665	1	1,140

Table 3-2. Target completes and expected relative precision

Fuel	Program year	Participants	Combined savings (MMBtu)	Error ratio	Target completes	Expected relative precision at 90% confidence
Natural Gas	2022	1,921	134,737	1	168	10.0%
Natural Gas	2023 Q1-Q2	1,146	91,298	1	101	14.0%
Natural Gas	Total	3,067	226,035	1	269	8.0%
Other	2022	405	56,010	1	37	16.0%
Other	2023 Q1-Q2	384	22,621	1	35	32.0%
Other	Total	789	78,630	1	72	15.0%
Total		3,856	304,665	1	341	7.0%

3.3 TRM adherence analysis methods

The evaluation contractor manually downloaded project-level workbooks completed by contractors during participation for every site in the participant survey sample and back-up sample.

In coordination with NYSERDA, the evaluation contractor determined that the project-level workbooks had enough data to attempt to replicate savings estimates for HVAC replacement, water heating replacement, and shell insulation measures. The evaluation contractors calculated savings using TRM methodology for each site for each of the three measure types for which project-level workbooks had enough data. Specifically, the evaluation contractor used Version 9 of the TRM for projects conducted in 2022 and Version 10 of the TRM for projects conducted in 2023 to reflect the TRM that was in effect during each project's participation. The evaluation contractor then calculated adherence rates by dividing the estimated savings from the program recommendation data by the calculated savings using the TRM methodology.

The evaluation contractor attempted to validate the methodologies used in the program estimation tools however sufficient documentation was not available for a thorough review.

3.4 Participant survey methods

The evaluation contractor fielded two surveys for participants in the summer of 2025. The first survey was a follow-up survey for respondents from the Phase 1 participant survey who indicated that they had not implemented measures that were recommended to them as part of their energy assessment. The second survey was for Phase 2 participants. The follow-up Phase 1 participant survey used a census approach of the Phase 1 survey respondent who indicated no implementing measures. The Phase 2 survey used a stratified random sample. Respondents received a \$20 incentive for completing the survey. Respondents could complete the survey online or over the phone. Outreach was conducted via email and over the phone.

3.5 Contractor survey methods

The evaluation contractor interviewed 20 participating contractors in February and March of 2025. Interviews were conducted over the phone and contractors received a \$50 incentive for completing the interviews. To develop the sample, NYSERDA provided DNV a list of all contractor companies that had participated in the Residential Energy Audit program, the Pearl Certification Pilot, or the Home Energy Star Rating Pilot in 2022 or 2023. Since an evaluation for the EmPower+ program was seeking to interview contractors at the same time, the samples were coordinated between studies. Contractor companies that participated in only the Residential Energy Audit or pilot programs were included in the sample for this study. Contractor companies that participated only in the EmPower+ program were included in the EmPower+ study sample. Companies that participated in both sets of programs were split into bins by company size and then randomly and evenly split between the two samples. Out of the 165 companies that had participated in the Residential Energy Audits program or pilots, 104 companies were ultimately included in the sample for this study. The evaluation contractor used a census approach to reach out to contractors via phone and email, prioritizing larger companies first. Outreach ended once the evaluation team had completed the targeted count of 20 interviews.

Appendix A Detailed Contractor Interview Results

A.1 Program influence

Table A-1. During the timeframe you participated, if the Program had not been around, how would the number of home energy upgrades you performed in New York State?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)	AVERAGE PERCENT LOWER
SAME	10	50%	0%
LOWER	8	40%	38%
NO RESPONSE	2	10%	NA

Table A-2. Has the [Audits, HES, Pearl] program increased, decreased, or had no impact on the residential consumer awareness of energy efficiency?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
INCREASED	20	100%
DECREASED	0	0%
HAD NO IMPACT	0	0%

Table A-3. Did you change your sales process(es) in any way because of your participation in the program(s)?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
YES	5	25%
NO	15	75%

Verbatim descriptions of changes:

- “Changed the services that we offer. We used to offer comprehensive audit with blower door, now we moved to having more add on services. Can add on blower door, or Manual J report, or comprehensive report.”
- “We got a little more vigilant on if a project really needs an energy audit. The REA program doesn’t include mechanical testing, no blower door-- its been a little strange, people calling thinking they need an energy audit but their house might be somewhat new. It’s tough to convince homeowners to do a project if we don’t do testing. We need to be able to show them the test results and how much better or more comfortable they will be after doing projects.”

Table A-4. Since starting to participate in the program(s), has your firm increased installation of efficiency measures outside the program(s)?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
YES	16	80%
NO	3	15%
DON'T KNOW	1	5%

Table A-5. Have you received feedback from customers regarding the [Audit, HES, Pearl] Program, either positive or negative?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
YES	8	40%
NO	12	60%

Verbatim responses:

- “Not really, I don’t hear feedback from customers about the program, the feedback is mostly about our staff/contractors).”
- “Report contradicts what we said to them on site. It use to come with blower door test , audit was reduced down from the “quick audit tool”, reduced pay, quality of audit was lowered.”

A.2 Program Involvement

Table A-6. How long has your company been involved with the Program?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
LESS THAN 1 YEAR	1	5%
1-2 YEARS	3	15%
3-5 YEARS	6	30%
5-10 YEARS	6	30%
MORE THAN 10 YEARS	4	20%

Table A-7. Turning now to the NYSERDA Home Energy Audit Program, what percentage of your home energy audit work is through this NYSERDA program?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
UNDER 10%	9	45%
11-20%	2	10%
21-30%	4	20%
31-40%	0	0%
41-50%	1	5%
51-60%	0	0%
61-70%	1	5%
71-80%	1	5%
81-90%	1	5%
DON'T KNOW	1	5%

Table A-8. What program resources, if any, have you found helpful? Please select all that apply.

RESPONSE	COUNT OF MENTIONS (N=56)	PERCENT OF RESPONDENTS (N=20)
CONTRACTOR SUPPORT WEBSITE	15	75%
CENTRALIZED HELP DESK	11	55%
MANUALS AND GUIDES	8	40%
TRAINING WEBINARS	8	40%
SUPPORT TICKET SYSTEM	8	40%
TECHNICAL ASSISTANCE FOR SPECIFIC MEASURES	4	20%
NONE	1	5%
OTHER	1	5%

“Other” verbatim:

- “We used to have one account manager who was a former contractor who could see the project visually in his head and therefore could really diagnose the challenge. They eliminated the account managers, and I would like to see them come back, we need actually educated and helpful customer service representatives. We don’t need people who just read from a script and say yes or no to a measure being qualified.”

Table A-9. What improvements would you like to see in the resources, assistance, and training NYSERDA provides?

RESPONSE	COUNT OF MENTIONS (N=56)	PERCENT OF RESPONDENTS (N=20)
IMPROVED COMMUNICATION CHANNELS	10	50%
IMPROVED RESPONSIVENESS AND AVAILABILITY	9	45%
IMPROVED FEEDBACK MECHANISM FOR SUGGESTIONS	5	25%
MORE COMPREHENSIVE TRAINING MATERIALS	5	25%
MORE FREQUENT TRAINING SESSIONS	4	20%
ADDITIONAL TRAINING MATERIALS	4	20%
NO ADDITIONAL FEATURES OR IMPROVEMENTS	2	10%

Verbatim responses:

- “The measures section in the new portal doesn’t really work in the real world....The old software was intense, but it thoroughly gave us a savings value for air infiltration. I wish they would go to a utility-based model, where we provide them a project plan, they check

off on it, then move forward and savings are calculated after. REA is not suitable for small companies. I need more staff in my company to get the administrative work done. It's too much time currently to make money."

- "The incentive amount wasn't enough, program would encourage a blower door test but most homeowners wouldn't take us up on that, so we weren't able to do high quality audits and therefore we didn't get much work out of the program contacts we received. The incentive was too low for the contractors but also the homeowner."
- "NYSERDA should train the NYSERDA staff. They do not give good guidance. There is a lack of knowledge on the program. Customers get info from utility or NYSERDA website with no understanding of what REA actually does. If people have high energy bills they call the utility, the utility tells them to call us the contractor, then the people expect us to be the solvers. But homeowners are shocked when we are only looking at building shell. Then homeowners ask why we are not looking at appliances."

Table A-10. Overall, how satisfied or dissatisfied are you with the Program?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
VERY SATISFIED	2	10%
SOMEWHAT SATISFIED	8	40%
NEITHER SATISFIED OR DISSATISFIED	4	20%
SOMEWHAT DISSATISFIED	3	15%
VERY DISSATISFIED	3	15%

Table A-11. Overall, how satisfied or dissatisfied are you with the Program?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
VERY SATISFIED	3	15%
SOMEWHAT SATISFIED	8	40%
NEITHER SATISFIED OR DISSATISFIED	5	25%
SOMEWHAT DISSATISFIED	2	10%
VERY DISSATISFIED	2	10%

Table A-12. What improvements would you like to see in the resources, assistance, and training NYSERDA provides?

RESPONSE	COUNT OF MENTIONS (N=56)	PERCENT OF RESPONDENTS (N=20)
ADDITIONAL TRAINING MATERIALS	4	20%
MORE FREQUENT TRAINING SESSIONS	4	20%
MORE COMPREHENSIVE TRAINING MATERIALS	5	25%
IMPROVED RESPONSIVENESS AND AVAILABILITY	9	45%
IMPROVED COMMUNICATION CHANNELS	10	50%
IMPROVED FEEDBACK MECHANISM FOR SUGGESTIONS	5	25%
NO ADDITIONAL FEATURES OR IMPROVEMENTS	2	10%

A.3 Customer interactions

Table A-13. How satisfied or dissatisfied are you with the level of cooperation and communication from customers?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
VERY SATISFIED	4	20%
SOMEWHAT SATISFIED	6	30%
NEITHER SATISFIED OR DISSATISFIED	9	45%
SOMEWHAT DISSATISFIED	1	5%
VERY DISSATISFIED	0	0%

Table A-14. How satisfied or dissatisfied are you with the level of cooperation and communication from customers?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
VERY SATISFIED	4	20%
SOMEWHAT SATISFIED	6	30%
NEITHER SATISFIED OR DISSATISFIED	9	45%
SOMEWHAT DISSATISFIED	1	5%
VERY DISSATISFIED	0	0%

Table A-15. What are the most common customer concerns about the Program?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
COST AND COST EFFECTIVENESS	5	25%
IMPACT ON ENERGY BILLS	5	25%
INSTALLATION DISRUPTIONS	2	10%
MEASURES SELECTED	0	0%
FUTURE MAINTENANCE	0	0%
NO CUSTOMER CONCERNS	7	35%
OTHER	4	20%

Table A-16. What types of education do you offer to customers regarding energy efficiency, audits, or installations?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
IN-PERSON CONSULTATION	19	95%
PRINTED MATERIALS	8	40%
ONLINE RESOURCES	7	35%

Table A-17. What are the main challenges and/or barriers when interacting and working with customers?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
FINANCIAL CONSTRAINTS	16	80%
LIMITED AWARENESS OR UNDERSTANDINGS	14	70%
DIFFICULTY OBTAINING LANDLORD APPROVAL	4	20%
LACK OF ACCESS TO PROPERTY	3	15%
RESISTANCE TO CHANGE	1	5%

Table A-18. What percentage of NYSERDA Home Energy Audits completed by your firm have resulted in any of the recommended measures being installed?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
UNDER 10%	7	35%
11-20%	2	10%
31-40%	2	10%
41-50%	1	5%
51-60%	2	10%
61-70%	1	5%
71-80%	1	5%
80-90%	1	5%
91-100%	1	5%
DON'T KNOW	2	10%

Table A-19. Does your team follow-up with customers that have completed audits to see if they have moved forward with measure implementation after an audit?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
YES	17	85%
NO	3	15%

Table A-20. Please describe customer follow-up method.

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
PHONE AND EMAIL	14	70%
PHONE	2	10%
NO RESPONSE	1	5%

Table A-21. Please describe customer follow-up method.

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
COST SAVINGS BY UPGRADING ARE TOO LITTLE TO JUSTIFY THE PROJECT	7	35%
UNFAMILIAR WITH THE TECHNOLOGIES RECOMMENDED	5	25%
NO TIME AVAILABLE TO PURSUE	2	10%
PROJECT WOULD BE TOO DISRUPTIVE	2	10%
DECIDED TO DO IT THEMSELVES	1	5%
PAPERWORK MISTAKES MADE BY CUSTOMER	1	5%
NO RESPONSE	2	10%

A.4 Training and staffing

Table A-22. Thinking about your audit and installation staff, please indicate if those staff do or do not receive each of the following types of training?

RESPONSE	COUNT SAYING STAFF DO RECEIVE TRAINING (N=20)	PERCENT OF RESPONDENTS (N=20)
TECHNICAL TRAINING FROM YOUR COMPANY	12	60%
TECHNICAL TRAINING FROM EQUIPMENT OR PRODUCT MANUFACTURERS	5	25%
CUSTOMER SERVICE TRAINING FROM YOUR COMPANY	4	20%
TRAINING AT CONFERENCES	8	40%
CLASSES OR COURSE	16	80%

Table A-23. What certifications do your audit and installation staff hold?

RESPONSE	COUNT SAYING STAFF DO RECEIVE TRAINING (N=20)	PERCENT OF RESPONDENTS (N=20)
BPI	15	75%
BUILDING ANALYST	15	75%
ENVELOPE PROFESSIONAL	13	65%
ENERGY AUDITOR	12	60%
BUILDING ANALYST TECHNICIAN	10	50%
BUILDING ANALYST PROFESSIONAL	10	50%
AIR LEAKAGE CONTROL INSTALLER	6	30%
RETROFIT INSTALLER TECHNICIAN	5	25%

Table A-24. What are the average years of experience of staff performing audits (home energy assessments)?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
LESS THAN 1 YEAR	1	5%
2-5 YEARS	4	20%
6-10 YEARS	4	20%
MORE THAN 10 YEARS	11	55%

Table A-25. What are the average years of experience of staff performing audits (home energy assessments)?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
2-5 YEARS	3	16%
6-10 YEARS	2	11%
MORE THAN 10 YEARS	11	58%
NO RESPONSE	3	16%

Table A-26. Do you feel that you receive sufficient training to complete high-quality work in the Program(s)?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
YES	17	85%
NO	3	15%

Table A-27. Which positions, if any, has your company found challenging to fill in the last 12 months?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
INSULATION/BUILDING SHELL OR ENVELOPE INSTALLERS	11	55%
ENERGY AUDITORS	9	45%
ADMINISTRATIVE STAFF	1	5%
HVAC/MECHANIC INSTALLERS	1	5%
PROJECT MANAGERS OR SUPERVISORS	0	0%
NONE	5	25%

Table A-28. In the last 12 months, has your company faced any of the following challenges and barriers regarding staffing?

RESPONSE	COUNT OF RESPONDENTS (N=20)	PERCENT OF RESPONDENTS (N=20)
RETAINING QUALIFIED STAFF	8	40%
TRAINING AND CERTIFYING STAFF	7	35%
PAYING COMPETITIVE SALARY/WAGES	3	15%
PROVIDING ENOUGH WORK FOR AVAILABLE STAFF	3	15%