Measure Adoption Rate and Attitudinal Survey for Residential Energy Assessments and Rating Projects

Executive Summary

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Introduction

Program Description

The New York State Clean Energy Fund (CEF) Single Family Residential Plan, Residential Initiative is comprised 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.

Through both the Residential Energy Assessment Program and the Home Energy Ratings pilot, consumers are provided 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[1] and the Pearl Certification.[2] 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 also include low-to-moderate-income participants as well.

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.[3]

Summary of Evaluation Objectives and Methods

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") validated energy savings and calculated realization rates in accordance with International Performance Measurement and Verification Protocol (IPMVP) standards (e.g., using Option C) for a subset of audits in the MAR assessment.

An additional objective of this evaluation was an attitudinal assessment of participants, including process-related research.

[1] https://www.nyserda.ny.gov/Residents-and-Homeowners/At-Home/Home-Energy-Audits-and-Ratings/Home-Energy-Score
[2] https://www.nyserda.ny.gov/Residents-and-Homeowners/At-Home/Home-Energy-Audits-and-Ratings/Pearl-Home-Certification
[3] NYSERDA, https://www.nyserda.ny.gov/About/Funding/Clean-Energy-Fund

The table below summarizes the objectives of this study, as well as the research questions and data sources used to meet those objectives.

Study objectives, research questions, and methods

Research Objective	Purpose (Evaluation Questions)	Data Sources & Analytic Methods
Assess participant measure adoption rate (MAR) of energy efficiency home improvements	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 were these measures adopted?	NYSERDA project data; survey of participant end-users; MAR
Assess cost of investment in energy efficiency home improvements made by participants	Of the energy efficiency measures adopted resulting from program activities, what is the associated cost(s) of investments made by the participant?	NYSERDA project data; survey of participant end-users
Assess participants' investments toward achieving clean energy goals	What are the energy savings attributable to program activities and associated with investments in energy efficiency home improvements?	NYSERDA project data; survey of participant end-users
Validate energy savings estimates for a representative number of projects for each of the three programs, respectively	Of the energy audits or ratings with installed recommended energy measures, what is the energy savings realization rate?	Validation of energy savings utilizing utility consumption data for a subset of MAR respondents
Compare the accuracy of the tools used by the Residential Energy Assessments, Home Energy Score and Pearl Certification programs to estimate energy savings of a project prior to install	Which of these tools estimated energy savings with the most accuracy? Why did some tools estimate energy savings more accurately than others?	Pre/post consumption analysis to identify distinct adjustment factors by recommendation category; propensity analysis to identify recommendation categories associated with high positive or negative discrepancies
Assess improvements made to residential supply chain actors' offers for providing energy efficiency and clean energy services	Which improvements with respect to service offerings that have been adopted resulted from program activities? What improvements have been made to the supply chain actors' sales process?	NYSERDA project data; survey of home energy ratings contractors and home inspectors, and audit program contractors
Assess improvements in contractors' sales resulting from reduced consumer acquisition costs, faster sales process	Has the Home Energy Score, Pearl Certification, or Residential Energy Assessments offer impacted the residential consumer awareness of energy efficiency, the uptake of energy upgrades, or the conversion rates for contractors?	NYSERDA project data; survey of home energy ratings contractors; survey of audit program contractors
Demographics and Decision Making; Inform CLCPA [a] and NYSERDA's response to COVID-19	Of these participants, what percentage is low- to moderate-income (LMI)? Of these participants, what percentage are based in disadvantaged communities?	NYSERDA project data; contractor survey; survey of participant end-users

Research Objective	Purpose (Evaluation Questions)	Data Sources & Analytic Methods
	Of participating contractors, what percentage are working in disadvantaged communities? How has the COVID-19 pandemic impacted the adoption of energy efficiency home improvements? How has COVID-19 impacted the household profile (i.e., increase in household members, working or schooling remotely, etc.)	
Non-energy benefits to customers	What non-energy benefits were experienced by customers who adopted measures, and to what extent?	Survey of participant end-users
Assess indirect benefits to the program	What energy benefits resulted from measure installations that were influenced by the audit but that were not directly recommended?	Survey of participant end users
Assess which delivery approach is most effective	Do the ratings programs have higher MAR, verified gross, or attributable gross compared to the audit program? Are there meaningful differences between the two ratings programs in terms of these metrics?	Cross-program comparison of results by location and other key characteristics, to the extent practical given population counts

[a] Source: https://legislation.nysenate.gov/pdf/bills/2019/S6599

Key Results

Evaluators calculated measure adoption rates (MAR) and savings realization rates (SRR) for each of the programs. For the Residential Energy Assessment Program and the Home Energy Score pilot, the MAR quantifies the percentage of savings recommended through the audit program that customers self-reported as installed. For the Pearl Certification pilot, the team used Pearl points as the basis for MAR, in lieu of savings since the pilot did not quantify or track recommended savings. The evaluated time period for each program and the long-term MAR (after more than 1 year since the audit or rating), can be seen in the following table.

Measure adoption rate by program

Program	Evaluated Time Period	Measure Adoption Rate		
		Overall	Electricity	Fossil Fuel
Residential Energy Assessment Program	January 1, 2020 – December 31, 2021	38.8%	50.8%	37.7%
Home Energy Score Pilot	January 1, 2019 – December 31, 2021	39.8%	51.6%	39.4%
Pearl Certification Pilot	January 1, 2019 – December 31, 2021	37.9%	N/A	N/A

In addition to the MAR calculation, the evaluation team also attempted to perform a pre-post energy consumption analysis. The consumption data analysis (billing analysis) provides estimates of participating customer household energy savings using consumption records from utility billing data. Results from this analysis provide an alternative empirical assessment of program activity that can be viewed in comparison to the MAR results. The billing analysis, however, requires more lag time than the survey-based MAR results and, as a result, at this early stage in the programs' existence, the billing analysis results are limited in a number of ways, therefore the evaluation team is not recommending application of the billing analysis results at this time. Further consumption data will be collected through subsequent rounds of this evaluation to bolster the results of the pre-post analysis.

Findings and Recommendations

The following summarize the findings and recommendations that the team identified as part of this study. The team offers five findings and five recommendations based on the impact evaluation research.

Finding 1

Overall customers reported being very satisfied with their experience with these programs reporting overall satisfaction levels between 4.0 and 4.3 out of 5 for each of the three programs. The areas that received the lowest scores were the quality and value of recommendations and with the thoroughness of the report.

Recommendation 1

Evaluators recommend that the program provide additional tools and training that could help contractors develop consistent and thorough recommendations. This training could cover the most common, or important from a program perspective, types of energy efficiency measures, what information the auditors should be collecting in the homes, and what information should be included in the report to the customers. Many of the contractors have expertise and focus on one area; however, training could give them more education on all of the different measures that the program wants to have recommended. It could also help contractors focus on certain areas that may be of interest to the program in the future, such as electrification.

Finding 2

About 20% of the contractors identified that they participate in several NYSERDA programs that offer energy audits in addition to the Residential Energy Assessments program, and that while all programs require collection of the same or similar customer and building data, each program has its own required data collection forms and processes. These contractors identified this as an inefficiency that increases the paperwork and administrative burden on contractors to manage multiple processes.

Recommendation 2

Collaborate across audit and rating programs to standardize data collection and administrative processes. Consider adopting a common data collection form and/or process for core customer and/or building information with opportunities to supplement with program-specific data needs.

Finding 3

The evaluated MAR for the REA fossil measures is 38%, statistically significantly lower than the program assumption of 46%. However, the MAR from this study may be somewhat understated since many of the survey respondents had received the audit less than two years prior to the survey. The evaluated MAR for the REA electric measures is not statistically significantly different from the program assumption.

For the pilots, the evaluated MAR for audits delivered by contractors was slightly higher than the program assumption of 45%, but the result for inspectors was well below the program assumption of 30%. However, the MAR from this group of homeowners may be somewhat understated since many of the survey respondents had received the audit less than two years prior to the survey and were in the process of buying the home at the time of the audit.

Recommendation 3

Retain the current MAR assumptions for the Residential Energy Assessment program, and re-evaluate the MAR in the next round of this study, with more participants who have longer elapsed time since the audit.

For future pilots that rely on inspectors, consider assuming a lower MAR than was assumed for the Home Energy Score and Pearl pilots.

Finding 4

Natural gas realization rates for total savings were 77%, 92%, and 119%, respectively for the REA program, the HES pilot, and the Pearl pilot. For REA, the realization rate lower than 1 reflects the lower than assumed MAR. However, natural gas realization rates will not be applied to reported savings until the completion of Phase 2 of the evaluation, to ensure sufficient confidence and precision in the results of the analysis. Note this evaluation uses an incremental sampling approach which aggregates results over the course of successive phases to reach desired confidence and precision levels over time. For all three initiatives, Evaluation estimates of average recommended savings per home are in line with the program assumptions.

Recommendation 4

No change is recommended to the savings estimates for recommended measures based on this study given prior program adoption of savings calculation changes associated with the move to a common platform (NYHEP).

Finding 5

Electric realization rates from this study were not found to be meaningful.

Recommendation 5

For the next evaluation round for this program, consider further steps to exclude effects of fuel switching on both electric and natural gas savings. Also consider steps to include a larger number of homes in the billing analysis to improve the reliability of these savings estimates.