

Single-Family LMI Retrofit Programs Impact Evaluation (2023)

Executive Summary

Prepared for:

New York State Energy Research and Development Authority
Albany, NY

Elizabeth Boulton

Project Manager, NYSERDA Market Characterization and Evaluation

Prepared by:

DNV

Corporate Headquarters: Katy, TX

Ari Stern, Senior Consultant, DNV

Miriam Goldberg, Sr. Principal, DNV

Antonia Sanhueza, Consultant, DNV

Daniel Bausch, APPRISE

Jackie Berger, APPRISE

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Executive summary

This evaluation was conducted by DNV for the NYSERDA EmPower+ program for the year 2023.¹ The EmPower+ program provides comprehensive home energy assessments to low- and moderate-income single-family and two-to-four-unit households, followed by the implementation of a selection of energy efficiency and beneficial electrification measures. The evaluation had two main objectives:

1. Quantify the impact of the program on participant energy consumption.
2. Provide actionable recommendations to improve the program.

Table ES-1 shows the various activities included in the evaluation, their purpose, and the achieved sample sizes for each.

Table ES-1. Study activities and purpose

Activity performed	Purpose	Sample size
Site-level billing analysis	Quantify participation's impacts on energy consumption and utility bills.	1,560 gas sites and 4,182 electric sites
Engineering analysis	Assess the adherence of the New York Home Energy Portal (NYHEP) savings estimation methodology to the New York Technical reference manual (TRM) Version 10. ²	All PY2023 participant in NYHEP
Program staff interviews	Capture program staff perceptions of program implementation and challenges. Develop understanding of program process, identify knowledge gaps for the program, and Inflation Reduction Act impacts.	8
Participant survey	Answer process questions relating to how participants entered the program, their program participation, satisfaction with various parts of participation, and perceived impacts of participation.	1,166 participant customers
Contractor survey	Answer process questions relating to contractors' experience with the program, customer education, barriers to measure uptake, and trainings	99 participating contractors
Delivered fuel analysis	Quantify energy savings resulting from participation of households that use propane, oil, or wood.	75 participants

¹ In Q3 2025, NYSERDA completed the Single Family LMI Retrofit Program Evaluation: Natural Gas and Electric Billing Analysis. This updated version of the report adds analysis and findings specific to delivered fuels.

² <https://dps.ny.gov/technical-resource-manual-version-10-filed-december-30-2022-effective-january-1-2023>

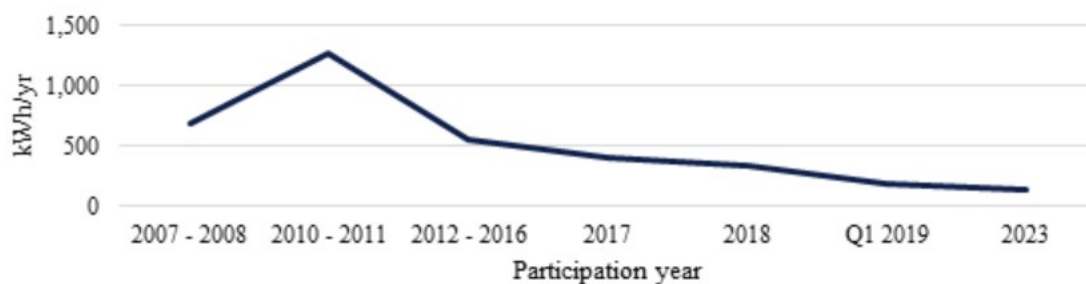
Add-on participant survey	Provide additional insights into household snapback behaviors and other household changes that could impact energy savings.	477 participant customers
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Key findings

For delivered fuel customers, participation in the LMI Retrofit Program appears to decrease delivered fuel consumption by about 14%. Delivered fuel consumption (14%) achieved a larger impact as a percentage of baseline usage than achieved for natural gas (8%) but comes with more uncertainty given the lower sample size of delivered fuel data. While the associated realization rate is 109% for all fossil fuels, these findings were not statistically significant.³

The evaluation found the program is more effective at achieving natural gas and delivered fuel savings than electric savings, which have been diminishing over time.⁴ New York State climate goals also call for electrification of heating and water heating systems, which increases electric consumption. As electric baselines get more efficient, achieving measurable electric savings by updating equipment may become increasingly difficult, and the associated payback on electric measures decline accordingly.⁵

Figure ES-1. LI electric evaluated and estimated savings historical trend



Delivered fuel consumption data collection and analysis was significantly constrained by limited cooperation from fuel suppliers and homeowners. There is no clear path obliging

³ See Section 2.4.

⁴ <https://dps.ny.gov/technical-resource-manual-version-10-filed-december-30-2022-effective-january-1-2023>

⁵ Payback period calculation assumes \$1,600 cost to deliver new refrigerator and haul away old refrigerator and average retail cost of \$0.25/kWh.

delivered fuel dealers to comply with data requests. Some dealers would only provide data when required by regulators, while other dealers relied on third-party call centers to field incoming inquiries, making it difficult to reach fuel dealer staff with decision making authority. The current consent structure proved insufficient as a few fuel suppliers required customers to request data directly. In addition, even when suppliers or homeowners were responsive, the evaluators found data gaps due varied delivery windows, cash-on-delivery practices without associated invoicing statements, and changes in fuel suppliers during the analysis period.

Changes in the way estimated savings are calculated have resulted in lower realization rates. Realization rates are an imprecise measure of what portion of the savings that the program estimated savings for a project were actually realized based on an analysis of billing data. A realization rate is a ratio of evaluated savings (determined by the billing analysis) divided by the estimated savings (calculated by the program). They do not include modeling uncertainty and do not account for all influences on energy usage such as beneficial snapback. Beneficial snapback can occur when the program increases reliance on a primary heating system while reducing use of secondary fuels. For example, some respondents reported increasing their use of a natural gas heating system and reducing their use of secondary fuels after participating because the program either repaired the gas equipment or made the gas equipment more reliable. This would result in a lower realization rate for gas because the gas usage increases.⁶

Table ES-2 shows the realization rates over time for gas participants. While PY2023 evaluated savings values are similar to previous studies, estimated savings are much higher, leading to lower realization rates. The engineering analysis found that the program software adheres well to the TRM methodologies for calculating estimated savings, and so the high estimated savings are a product of the TRM itself. In 2023, at DPS direction, the program shifted to using the TRM to calculate estimated savings rather than using a proprietary tool, EmPCalc, as was done in previous years. Unlike the TRM, the EmPCalc tool was calibrated to previous year evaluated savings. The change from EmPCalc to the TRM coincides with the increase in estimated savings and the reduction in realization rates.⁷

⁶ For a full explanation on the limits of realization rates, see Appendix B.

⁷ For electric realization rates over time, see Section 2.5.2.

Table ES-2. Historical LI gas evaluated savings, estimated savings, and realization rates

Participation year	A. Average evaluated savings (MMBtu/yr)	B. Average estimated savings (MMBtu/yr)	C. Realization rate (A/B)
2007–2008	10	14	71%
2010–2011	2	4	50%
2012–2016	12	27	44%
2016–mid 2017	8	26	31%
2017–Q1 2019	9	26	35%
2023 (Current study)	8	40	20%

There is some indication of beneficial snapback in which the program leads to positive outcomes for customers associated with an increase in energy consumption. For example, if the program repairs broken heating, cooling, or water heating equipment, the customer can use that equipment again which would result in an increase in energy consumption. Indeed, the billing analysis found that equipment repair measures were associated with negative savings. Additionally, during the add-on participant survey, 35% of respondents who used a secondary source of heating for part of their home reported using that secondary source less often after participating.

Participating contractors are mostly satisfied with the program but would like clearer guidance and more comprehensive training materials. Sixty percent of contractors indicated they were satisfied with the program, while only 25% indicated dissatisfaction. When asked for suggestions to improve the program, contractors most frequently mentioned improving communication channels between them and the program as well as program responsiveness. Contractors also requested more training materials around program requirements and measure installation for their staff. Lastly, half of contractors expressed having difficulty with NYHEP and requested the program provide more support resources for using the portal.

Participants reported high satisfaction with the program with more than half indicating they observed their utility bills decrease after participating. Eighty-three percent of respondents said they were “satisfied” or “very satisfied” with the program and there was little variation in satisfaction ratings between income status or utility.⁸ Fifty-six percent of respondents reported that their energy bills went down after participating, and low-income respondents were

⁸ See Table 2-6.

more likely to report a large decrease in energy bills.⁹ Participants with bigger jobs, as indicated by job cost, were more likely to report decreases in energy bills.¹⁰

Recommendations

Do not adopt the delivered fuels realization rates due to high levels of uncertainty and lack of statistical significance.

Consider emphasis on measurement and tracking of fossil fuel savings and beneficial electrification. A focus on fossil fuel savings and electrification may better align the program with real-world limitations and New York state climate goals.

To improve the feasibility and quality of future delivered fuel analyses of its programs, NYSERDA should consider alternative strategies for obtaining delivered fuel bills.

NYSERDA should enhance relationships with large-scale delivered fuel providers and consolidate data requests.

⁹ See Table 2-19.

¹⁰ See Table 2-20.