

Single-Family LMI Retrofit Programs Impact Evaluation (2023)

Appendices

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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Appendix A Measure category mapping

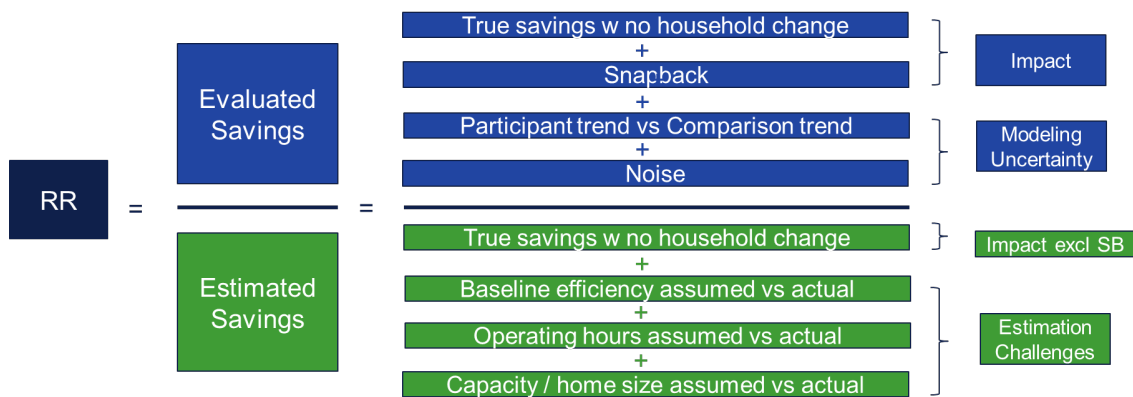
Table A-1. Measure group classification

Measure group	Measure
Air Sealing and/or Insulation	Air sealing
	Air infiltration
	Attic insulation
	Wall insulation
	Other insulation
	Building shell
DHW replacement	DHW - replacement
Thermostat	thermostats
Heating replacement	Heating replacement
	Primary heating and cooling
Equipment repair	DHW - repair
	Heating repair
Refrigerator/Freezer Replacement	Freezer replacement
	Refrigerator replacement
Other	Pipe wrapping
	Shower heads
	Water heater
	Other
	CFL/LED
	Appliances & lighting

Appendix B Realization rate limitations

Note, realization rates are not a perfect measure of program impact because they involve estimation challenges and modeling uncertainty. Figure B-1 shows the inputs to a realization rate (“RR”). Realization rates reflect only the extent to which evaluated savings, resulting from the billing analysis, match the estimated savings, from program software. An RR of 100% indicates that the evaluated savings match the estimated savings, and that the program therefore did a good job estimating savings.

Figure B-1. Realization rate composition



Four components make up evaluated savings. Two of those components are related to the actual impact of the program and include the following:

- **True savings with no household change** represents actual changes in energy consumption resulting from program participation without accounting for any changes in the household such as changes in the number of occupants or behavioral changes.
- **Snapback** represents changes resulting from program participation that result in increased energy consumption. For example, if the program repairs a broken furnace, gas consumption would increase. Additionally, if the program leads the participant to reduce their reliance on delivered fuels in favor of using gas, it would lead to an increase in gas consumption. Snapback reduces evaluated savings and therefore reduces the realization rate.

The remaining two components of evaluated savings are sources of modeling uncertainty:

- **Participant trend vs comparison trend** represents the attempt to account for all factors impacting energy consumption other than program participation. The approach matches participants to a comparison group of a similar population. The analysis looks at how the comparison group energy consumption changed over the same period of time examined for participants and removes that change in energy consumption from the participant observed

change thus isolating only the change resulting from program participation. The uncertainty arises from the assumption that the comparison group is a good match to the participant group and had similar behaviors.

- **Nosie** refers to simple uncertainty related to the statistical analysis of the billing data.

The estimated savings is also composed of four components. The first is the estimated impact:

- True savings with no household change for estimated savings is calculated using TRM algorithms rather than billing data. Estimated savings does not include any snapback (SB)

The remaining three components are estimation challenges in which assumptions from the TRM may not match the actual values for a site:

- Baseline efficiency assumptions may not match actual baseline efficiency values.
- Assumed operating hours may not match actual operating hours.
- Assumed capacity and home size may not match the actual values.

Appendix C EmPower+ Add-On Participant Survey Memo from APPRISE

I. Introduction

NYSERDA's EmPower+ program helps low- and moderate-income (LMI) households in New York State save energy and money by making qualifying energy improvements to their primary residence.

As part of an evaluation of the EmPower+ program, APPRISE conducted a detailed 15-minute survey with program participants to document their experiences and satisfaction with the program. This survey was conducted in early 2025 with a sample of 3,000 participants from 2023. APPRISE completed a detailed memo summarizing the findings from the survey.

At the request of NYSERDA and the evaluation team, APPRISE designed and implemented an additional five-minute add-on participant survey with EmPower+ low-income participants who had not been sampled for the original survey. The purpose of the add-on survey was to gather quantitative information on household snapback behaviors and other household changes that could impact EmPower+ energy savings, including use of supplemental wood or wood pellets. The add-on survey was conducted from August to September 2025 by web and telephone, achieving a 52% response rate.

This memo provides a summary of the findings from the add-on survey.

II. Survey Methodology

This section provides information on the add-on survey sample and methodology.

A. Survey Sample

The sample frame for the survey was furnished by NYSERDA and included all active EmPower+ low-income participants from July to December 2023.¹

APPRISE stratified low-income participants by electric utility area, cost category (less than \$1,500, \$1,500 to \$10,000, or greater than \$10,000), and wood or wood pellet main heating, resulting in 16 distinct strata.² All participants previously sampled for the original participant survey were removed prior to selection. Within each stratum, sampling rates were set to achieve the targeted number of completes based on the response rate goals. A census of the wood main heat strata was included to allow for detailed analysis of this key program segment. The final

¹ The add-on survey did not include moderate-income participants. These represent a small share of EmPower+ participants, and all 2023 moderate-income participants were previously sampled for the main participant survey.

² This design was similar to the prior participant survey. The cost category is based on project incentives in the program database. Review of the data show that any customer contributions are not included. However, review of the data shows that only a small number of projects include customers contributions on these low-income projects. Even in cases where the measure costs are higher than the allowable NYSERDA amount, there can be other sources of funding to cover additional project costs.

survey sample was comprised of 1,000 participants. The sample design and stratification are shown in Table C-1.

Table C-1. EmPower+ add-on survey sample design and stratification

Stratum	Electric Utility Area	Job Cost Category	Total Low-Income Participants in Sample Frame	Total Excluding Cases Sampled for Original Survey	Sample Selected for EmPower+ Survey
Stratum 1	National Grid	Low	694	495	62
Stratum 2	National Grid	Medium	1,420	1,224	63
Stratum 3	National Grid	High	857	571	62
Stratum 4	RG&E	Low	315	204	62
Stratum 5	RG&E	Medium	774	573	63
Stratum 6	RG&E	High	410	212	62
Stratum 7	NYSEG	Low	344	223	62
Stratum 8	NYSEG	Medium	630	438	63
Stratum 9	NYSEG	High	453	259	62
Stratum 10	Con Edison	Low	338	213	62
Stratum 11	Con Edison	Medium	341	215	62
Stratum 12	Con Edison	High	235	35	35
Stratum 13	Other	Low	403	254	62
Stratum 14	Other	Medium	478	300	63
Stratum 15	Other	High	257	62	62
Stratum 16	Wood or Wood Pellet Main Heat	N/A	133	93	93
TOTAL			8,082	5,371	1,000

Survey results were weighted to present results that are representative of the low-income program population. The weighting adjusts for differential sampling and response within strata.³

B. Survey Design and Implementation

APPRISE designed the add-on participant survey as a mixed mode web/telephone survey. APPRISE programmed the approved interviewer and web surveys in Qualtrics. The survey was approximately five minutes for non-wood users and ten minutes for wood users. Topics included the following.

- Changes in Rooms Heated or Cooled Since Participation
- Changes in Temperature Settings Since Participation
- Changes in Household Size Since Participation
- Uses of Primary and Supplemental Heating
- Wood and Wood Pellet Usage

The survey was fielded with the full sample in August through September of 2025. Table C-2

³ Table D-1 to Table D-3 show unweighted results for the respondents. All other tables show weighted estimates.

summarizes the outreach conducted for the survey.

- Advance Letter: Participants were fielded for the survey in batches. Batch 1 of participants were sent an advance letter on 8/8/25, Batch 2 on 8/18/25, and the final batch was sent an advance letter on 8/22/25. The advance letter explained the purpose of the survey and provided information to complete the survey online or by phone.
- Inbound Calling: Trained APPRISE interviewers completed surveys with respondents who called the APPRISE toll-free phone number.
- Outbound Calling: Telephone calls were made to participants who had not completed the survey beginning on 8/13/25 for Batch 1, 8/22/25 for Batch 2, and 8/27/25 for Batch 3. Calls were made at varied times on weekdays, evenings, and weekends. A total of seven attempts were made to live cases.
- Emails: Outreach and reminder emails were sent to participants with available email addresses. A total of three emails were sent to live cases with email addresses.

The survey was closed on September 12th, 2025, after exceeding the targeted survey completion goal. The survey did not provide a monetary incentive to respondents.

Table C-2. Survey outreach

Contact Method	Sample Group		
	Batch 1	Batch 2	Batch 3
First Advance Letter	8/8/2025	8/18/2025	8/22/2025
First Advance Email	8/12/2025	8/22/2025	8/26/2025
Survey Calling Implementation	8/13/2025	8/22/2025	8/27/2025
First Reminder Email	8/20/2025	8/26/2025	9/3/2025
Second Reminder Email	8/26/2025	9/3/2025	9/8/2025
Final Reminder Email	9/3/2025	9/11/2025	9/11/2025
Survey Closed	9/12/2025	9/12/2025	9/12/2025

C. Survey Response

Table C-3 furnishes information on the final disposition for the entire sample.

- Surveys were completed with 477 of the 1,000 total participants, a 48% completion rate.
- Seven percent of the sample was found to be ineligible because they did not recall participating in the program, moved, or did not have measures installed.
- After removing ineligible cases, the survey response rate was 52%.
- Overall, 91% of participants who were reached and able to complete the survey cooperated and participated.
- Seventy-two percent of survey respondents completed the survey on the telephone with an APPRISE interviewer and 28% completed the survey online.

The survey margin of sampling error is 3.7% with a 90% confidence level.

Table C-3. Survey response

Survey Response Status	Survey Sample	
	#	%
Total	1,000	100%
Ineligible – Does Not Recall	18	2%
Ineligible – Audit Only	34	3%
Ineligible - Moved	23	2%
Non-working Number	56	6%
Wrong Number	50	5%
Other Phone Issue	12	1%
Missing Phone Number	4	<1%
Too Ill to Participate	2	<1%
Hearing/Language Barrier	5	1%
Deceased	2	<1%
Voicemail / No Answer	276	28%
Refusal	37	4%
Not Available for Duration of Survey	4	<1%
Completed Survey	477	48%
Completed via Phone	343	72%
Completed Online	134	28%
Eligibility Rate	-	93%
Cooperation Rate	-	91%
Response Rate	-	52%

III. Survey Findings

This section provides the findings from the add-on survey.

A. Program Participant and Survey Respondent Characteristics

Table C-4 presents the distribution of the survey respondents, survey sample, and the survey frame by utility area. The distribution differs for the sample frame and the survey sample because the smaller utilities and wood main heat participants were oversampled, but the distribution of survey respondents generally matches the survey sample.

Table C-4. Utility area

Utility Area	All Participants (Sample Frame)	Survey Sample	Survey Respondents
Observations	8,082	1,000	477
National Grid	37%	19%	19%
RG&E	19%	19%	17%
NYSEG	18%	19%	20%
Con Edison	11%	16%	16%
Other	14%	19%	17%
Wood	2%	9%	10%

Utility Area	All Participants (Sample Frame)	Survey Sample	Survey Respondents
Observations	8,082	1,000	477
Total	100%	100%	100%

Note: Other includes Central Hudson Gas and Electric, Long Island Power Authority (LIPA), Municipal Electric, Orange and Rockland, and Public Service Enterprise Group (PSEG).

Table C-5 compares the distribution of the sample frame, sample, and respondents by job cost category for participants. The distribution of participants who responded to the survey generally matches the survey sample.

Table C-5. Job cost category

Job Cost	All Participants (Sample Frame)	Survey Sample	Survey Respondents
Observations	8,082	1,000	477
< \$1,500	26%	31%	27%
\$1,500-\$10,000	45%	31%	33%
> \$10,000	27%	28%	29%
Wood	2%	9%	10%
Total	100%	100%	100%

B. Changes in Rooms Heated or Cooled Since Participation

Respondents were asked about the changes in number of rooms that are heated during the winter or cooled during the summer since the EmPower+ work was completed. A majority of the participants reported that there were no changes in the number of rooms heated during the winter (94%) or cooled during the summer (89%). About an equal percentage of participants reported more rooms heated or cooled as reported fewer rooms.

Table C-6. Changes in number of rooms heated/cooled

Since the work was completed in your home, are you heating/cooling the same number of rooms, more rooms, or fewer rooms in your home during the winter/summer?		
Change in Number of Rooms	Winter	Summer
Observations	477	
More Rooms	2%	4%
Fewer Rooms	3%	5%
No Change	94%	89%
Don't Know	2%	2%
Refused	0%	<1%
Total	100%	100%

The survey asked respondents who reported heating or cooling more rooms about their reason for this change. Table C-7 displays the results. Since the number of respondents who received

these questions is very small (only ten for heating and 20 for cooling), there are high margins of error and the results should be viewed with caution.⁴ However, these results indicate that the respondents who increased heated rooms primarily did so because EmPower+ helped improve their ability to heat or cool their home or to have more affordable energy bills, and those who cooled more rooms did so for varied reasons.

Table C-7. Reasons for change in heated/cooled space

Why are you heating/cooling more rooms during the winter/summer compared to before you participated in EmPower+?¹		
Reason for Change	Winter	Summer
Observations	10	20
Program Services Helped to Lower Energy Bills	69%	25%
Program Services Helped to Heat/Cool the Home Better	56%	41%
Another Reason Related to the Program	9%	22%
Another Reason NOT Related to the Program	16%	57%

¹ This is also true for other tables where the number of observations is small based on low-incidence responses or smaller subgroups.

Note: Respondents could select multiple responses; asked for respondents who said they heated/cooled more rooms.

C. Changes in Temperature Settings Since Participation

The survey asked participants if they had made changes to their temperature settings since participation. Table C-8 shows that a majority of respondents did not change their temperature setting in the summer (76%) or in the winter (68%).

Table C-8. Changes to temperature settings

Since the upgrades were completed in your home, have you changed the usual temperature setting of the home in the winter/summer?		
Response	Winter	Summer
Observations	477	
Yes	30%	21%
No	68%	76%
Don't Know	3%	3%
Total	100%	100%

Respondents who reported changing their usual temperature settings in the winter or summer were asked about whether they raised or lowered the temperature. Twenty percent of participants reported that they lowered the temperature in the winter (decreasing heating usage) compared to only 8% who reported raising the temperature (increasing heating usage). For

⁴ This is also true for other tables where the number of observations is small based on low-incidence responses or smaller subgroups.

cooling, 12% reported that they raised the usual summer temperature in the summer (decreasing cooling usage) while only eight reported lowering the temperature (increasing cooling usage).⁵

Table C-9. Type of change to usual thermostat temperature settings

How did you change the usual temperature setting in the winter/summer?		
Response	Winter	Summer
Observations	477	477
Lowered the Temperature	20%	8%
Raised the Temperature	8%	12%
No Change	68%	76%
Don't Know	4%	4%
Total	100%	100%

D. Changes in Household Size Since Participation

Table C-10 presents the changes in the number of household members after the work was completed. Eighty-eight percent of participants reported that their household had the same number of people as when the work was completed, 7% reported more people in the home, and 5% reported fewer people in the home.

Table C-10. Changes in household size

After the work was completed in your home in 2023, were there more people, less people, or about the same number of people living in your home during 2024?	
Observations	477
More People	7%
Less People	5%
Same Number of People	88%
Refused	<1%
Total	100%

E. Uses of Primary and Supplemental Heating

The survey asked participants about their main heating equipment fuel. The most common main heating equipment fuel was natural gas (64%), followed by electricity (14%), fuel oil

⁵ The prior participant survey also asked respondents the same questions about changes to their usual temperature setpoint settings. The results for the add-on survey showed a lower incidence of thermostat changes, but both surveys showed a consistent trend in which the percentage of households changing the thermostat to reduce heating or cooling usage exceeded the percent that made changes which increase usage, indicating snapback due to thermostat changes is not impacting program savings. The variation across the surveys is likely due to differences in survey field timing, survey design, question order priming, and survey sampling approaches.

(10%), and propane (8%). Only 2% of 2023 participants use wood or wood pellets for their primary heating equipment.

Table C-11. Main heating equipment fuel

What fuel is used by your home's main heating equipment?	
Observations	477
Natural Gas	64%
Electricity	14%
Fuel Oil/Kerosene	10%
Propane	8%
Wood	1%
Wood Pellets	1%
Other	<1%
Don't Know	3%
Total	100%

Table C-12 displays information on whether participants used a different fuel from the fuel they reported using for their main heating equipment before work was done by EmPower+. While the majority of participants (90%) used the same fuel before and after work was completed, 7% reported using a different fuel.

Table C-12. Changes in fuel

Did you use the same fuel for your home's equipment before you had work done by EmPower+, or did you use a different fuel? ¹	
Observations	463
Yes – Used the Same Fuel	90%
No – Used a Different Fuel	7%
Don't Know	1%
Total	100%

¹ Only respondents who answered that they know their home's main heating equipment fuel were asked this question.

Table C-13 shows that 46% of participants who reported using a different fuel before EmPower+ work was completed used natural gas, followed by fuel oil (30%) and propane (17%) before the work was completed. Seven percent reported previously using wood for the primary heating needs. Overall, about two-thirds of the participants who switched fuels reported using electricity as the current primary equipment fuel, consistent with program efforts to promote electrification via fuel switching. This may be one cause of the lower-than-expected electric savings found in the billing analysis.

Table C-13. Prior main heating equipment fuel

What was the fuel you used before for your main heating equipment? ¹	
Observations	41
Natural Gas	46%

What was the fuel you used before for your main heating equipment?¹	
Fuel Oil/Kerosene	30%
Propane	17%
Wood	6%
Wood Pellets	1%
Electricity	1%
Total	100%

¹ Only respondents who indicated that they used a different fuel for their main heating equipment before they had work done by EmPower+ were asked this question.

Participants were also asked about whether they had a second source that supplements heating in their homes. Table C-14 shows that 36% reported that they have a supplementary heating source.

Table C-14. Second source of heat

Besides your main heating equipment, do you use a second source to help heat parts of your home?	
Observations	477
Yes	36%
No	63%
Don't Know	<1%
Total	100%

Table C-15 displays participants' reported second sources for heating. Half of the respondents (51%) who use a second source for heating reported using portable heaters. Eighteen percent reported using a fireplace, and 17% reported using wood or pellet stoves for their second source of heating. Only 3% of participants use heat pumps for secondary heating, and only 2% use a furnace or boiler.

Table C-15. Secondary heating equipment type

Which of the following is used as a second source for heating parts of your home?	
Observations	186
Portable Heaters	51%
Fireplace	18%
Wood or Pellet Stove	17%
Gas Stoves	4%
Built-in Electric Units	3%
Ductless Heat Pump	3%
Furnace or Boiler	2%
Other	1%
Don't Know	1%
Refused	1%

Total	100%
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¹ Only respondents who indicated that they used a second source for heating were asked this question.

Table C-16 shows that 62% of respondents who indicated that they used a second source for heating reported that their second source of heating used electricity, followed by wood (15%) and natural gas (9%).

Table C-16. Second source of heat fuel

What fuel is used by the second source for heating parts of your home?¹	
Observations	185
Electricity	62%
Wood	15%
Natural Gas	9%
Wood Pellets	7%
Propane	6%
Fuel Oil/Kerosene	2%
Total	100%

¹ Only respondents who indicated that they used a second source for heating parts (portable heater, fireplace, wood or pellet stove, wood pellets, and others) of their home were asked this question.

Participants who reported that they had a second source for heating were asked about whether they used the same fuel for their second heating equipment before and after they had work done by EmPower+. As shown in Table C-17, only 4% said they used a different fuel.

Table C-17. Changes in second source fuel

Did you use the same fuel for your home's second heating equipment before you had work done by EmPower+, or did you use a different fuel?¹	
Observations	186
Yes – Used the Same Fuel	92%
No – Used a Different Fuel	4%
Don't Know	1%
Refused	3%
Total	100%

¹ Only respondents who indicated that they used a second source for heating were asked this question.

Table C-18 shows that for participants who used a different fuel for their second heating equipment before work completion, the most common fuels were electricity (24%), wood (21%), and fuel oil (10%).

Table C-18. Changes in second source of heat fuel

What was the fuel you used before for your second heating equipment?¹	
Observations	7
Electricity	24%
Wood	21%

What was the fuel you used before for your second heating equipment? ¹	
Fuel Oil/Kerosene	10%
Wood Pellets	2%
Refused	43%
Total	100%

¹ Only respondents who indicated that they used a different fuel for their second heating source before they had work done by EmPower+ were asked this question.

Table C-19 displays participants' changes in second heating equipment usage since participating in EmPower+.

- All Participants with Secondary Heating: Thirty-seven percent reported using their secondary heating less than before services and only 10% reported using it more often than before services.
- Participants using Wood for Secondary Heating: Ten percent reported increased usage, and 35% reported decreased usage.
- Participants using Wood Pellets for Secondary Heating: Twenty-eight percent reported increased usage, and 30% reported decreased usage.
- Participants using Any Delivered Fuel for Secondary Heating: Including all non-metered delivered fuels (propane, oil, wood, and wood pellets), 37% reported no change in usage, 15% said usage increased after participation, and 48% said that usage had decreased after program services.
- Percent of EmPower+ Low-Income Population: The participants who reduced secondary heating are approximately 13% of the total EmPower+ low-income population while those who increased usage are 4%. Five percent of the population reduced secondary delivered fuel usage compared to 2% that reported an increase.
- Savings Estimate Impacts: Based on the survey findings, the billing analysis may have a small underestimate of secondary heating savings from EmPower+ services.

Table C-19. Changes in second heating equipment usage

Since you participated in EmPower+, are you using your second heating equipment as often, more often, or less often in the winter than before? ¹				
Participants with Secondary Heating	All Secondary Fuel Types	Wood	Wood Pellets	Any Delivered Fuel
Observations	186	29	12	56
Increased Usage After Services	10%	10%	28%	15%
Reduced Usage After Services	37%	35%	30%	48%
No Change	52%	54%	42%	37%
Refused	1%	0%	0%	0%
Total	100%	100%	100%	100%
Estimated Percent of EmPower+ Population with Increased Usage	4%	1%	1%	2%
Estimated Percent of EmPower+ Population with Reduced Usage	13%	3%	1%	5%

¹ Only respondents who indicated that they used a second source for heating were asked this question.

Participants who reported changes in their second heating equipment usage were asked about their reason for using it more or less than before. As shown in Table C-20, common reasons for using the second source of heating more after participation include lack of insulation (23%), colder winters (23%), new heating equipment (22%), and the main heating equipment not working (21%).

Table C-20. Reasons for increased secondary heating usage

Why are you using the second source for heating more than you were before you participated in EmPower+?	
Observations	20
Lack of Insulation	23%
Colder Winters	23%
New Heating Equipment	22%
Main Heating Equipment Not Working	21%
House is Colder	8%
Personal Conditions	6%
Other	4%

Note: This was an open-ended question.

Table C-21 shows that reasons for using the second source less compared to before participation include the house being more insulated (30%) and warmer (25%), and the new heating equipment being more efficient (12%).

Table C-21. Reasons for reduced secondary heating usage

Why are you using the second source for heating less than you were before you participated in EmPower+?	
Observations	71
House is More Insulated	30%
House is Warmer/Doesn't Require as Much Heat	25%
New Heating Equipment is More Efficient	12%
Conserve Energy and Costs	7%
Heating Equipment was Removed/Replaced	5%
Less Convenient	4%
Less Power Outages	2%
Other	11%
Refused	5%

Note: This was an open-ended question.

F. Wood Usage

This section asked participants who indicated that they use wood for their main and secondary heating equipment about their wood usage. Table C-22 shows that while the number of cords used by households varied during the most recent winter (which occurred after EmPower+ participation), 29% of households used about one cord, and 23% used half a cord or less. About one-quarter used three or more cords.

Table C-22. Wood usage unit estimate for most recent winter (after services complete)

During the past winter (October 2024 to March 2025), how many cords of wood did your household use? ¹	
Observations	46
Half a Cord or Less	23%
About One Cord	29%
About Two Cords	21%
About Three Cords	4%
About Four Cords	7%
Five Cords or More	15%
Don't Know	1%
Total	100%

¹ Only respondents who indicated that they used wood for their home's main or secondary heating equipment were asked this question.

Participants were asked about the difference in wood usage during two winters before EmPower+ participation compared to the winter after EmPower+ participation.⁶ As shown in Table C-23, 41% of wood-using participants reported a reduction in wood usage from the winter before participation (during 2023/2024) to the winter after program services, while 23% reported an increase in usage. Similarly, comparing usage from the earlier 2022/2023 winter to the winter after services, 32% of wood participants recalled a reduction in usage and 26% reported an increase. These results show a larger portion of wood-using households reported reducing wood usage after EmPower+ services than reported increasing usage, indicating a net reduction in use of wood after program participation.

Table C-23. Comparison of wood usage in winters before / after EmPower+ participation

How did your use of wood compare to your use of wood this past winter? ¹		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	46	46
Reduced Usage After Services	41%	32%
No Change in Usage	35%	33%
Increased Usage After Services	23%	26%
Don't Know	1%	9%
Total	100%	100%

¹ Only respondents who indicated that they used wood for their home's main or secondary heating equipment were asked this question.

⁶ The prior winters before participation were October 2023 to March 2024 and October 2022 to March 2023. The winter after participation was October 2024 to March 2025.

Respondents who reported reduced or increased wood consumption in the winter after EmPower+ services were asked to estimate the range of how much wood consumption changed. Table C-24 and Table C-25 show the results.

- **Reduced Usage After Services:** The largest percent of respondents who reduced wood usage after program services indicated they used one to 25% more wood in the winters before EmPower+ (32% reported this for the 2023/2024 winter and 40% reported it for the 2022/2023 winter).
- **Increased Usage After Services:** The largest percent of respondents who increased wood usage after receiving program services indicated they used one to 25% less wood in the winters before EmPower+ (42% reported this for the 2023/2024 winter and 31% reported it for the 2022/2023 winter).

Table C-24. Percent wood usage was higher in winters before EmPower+ participation

How much <u>more</u> wood did you use compared to your use of wood this past winter? ¹ (This indicates a reduction in usage after EmPower+ services)		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	18	13
1-25%	32%	40%
26-50%	19%	17%
51-75%	1%	0%
76-100%	11%	14%
Over 100%	13%	2%
Don't Know	23%	27%
Total	100%	100%

Table C-25. Percent wood usage was lower in winters before EmPower+ participation

How much <u>less</u> wood did you use compared to your use of wood this past winter? ¹ (This indicates an increase in usage after EmPower+ services)		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	9	7
1-25%	42%	31%
26-50%	5%	19%
51-75%	0%	2%
76-100%	26%	23%
Don't Know	27%	25%
Total	100%	100%

¹ Only respondents who used more or less wood in past winters were asked the applicable question.

Respondents were asked about the reasons for the changes in wood usage from the winters before services to the winter after services. Forty-seven percent of respondents said the changes were due to improved home conditions, and 33% reported that they are currently using a different appliance with a different fuel. Only 1% mentioned winter weather changes to explain the differences in usage.

Table C-26. Reasons for changes in wood usage before/after services

What were the main reasons for the differences in the amount of wood you used three winters ago compared to this past winter?¹	
Observations	20
Improved Home Conditions	47%
Using Different Appliance with Different Fuel	33%
Not Convenient or Hard to Maintain	16%
Not Familiar with Wood Appliances	8%
Personal Preference	4%
Worse Home Conditions	1%
Changes in Winter Conditions	1%

Note: This was an open-ended question.

¹ Only respondents who indicated that they used more or less wood three winters ago than the past winter were asked this question.

G. Wood Pellet Usage

Participants who reported that they use wood pellets for their main and secondary heating equipment were asked about their wood pellet usage. As shown in Table C-27, the majority of respondents (84%) reported using one to 3,000 pounds (33%) and 3,001 to 6,000 pounds of wood pellets (51%) during the most recent winter (after EmPower+ participation was complete). Only 10% reported using more than 6,000 pounds.

Table C-27. Wood pellet usage unit estimate for most recent winter (after services complete)

During the past winter (October 2024 to March 2025), how many pounds of wood did your household use?¹	
Observations	24
1-3,000 Pounds	33%
3,001-6,000 Pounds	51%
6,001-9,000 Pounds	2%
9,001-12,000 Pounds	7%
12,001-15,000 Pounds	1%
Don't Know	5%
Total	100%

¹ Only respondents who indicated that they used wood pellets for their home's main or secondary heating equipment were asked this question.

Table C-28 shows that 27% to 44% reported that they reduced wood pellet usage after program services. Due to recall challenges, a higher portion of participants indicated they did not know

how pellet use during the earlier winter one year before services compared to the winter after services.

Table C-28. Comparison of wood pellet usage in winters before / after EmPower+ participation

How did your use of wood pellets compare to your use of wood pellets this past winter? ¹		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	24	24
Reduced Usage After Services	44%	27%
No Change in Usage	18%	17%
Increased Usage After Services	26%	25%
Don't Know	11%	30%
Total	100%	100%

¹ Only respondents who indicated that they used wood pellets for their home's main or secondary heating equipment were asked this question.

Respondents who said they reduced or increased wood pellet consumption in the winter after EmPower+ services were asked to estimate the range of how much wood consumption changed. Table C-29 and Table C-30 display the results.

- **Reduced Usage After Services:** The largest percent of respondents who reduced pellet consumption after program services said they used one to 25% more in the winter before EmPower+ (40% reported this). Respondents were more likely to report using above 25% more in the earlier winter (2022/2023) compared to the winter after services.
- **Increased Usage After Services:** Almost half of the pellet-using participants who increased usage after services reported using 26% to 50% less in each of the winters before services (48% reported this for the 2023/2024 winter and 46 reported it for the 2022/2023 winter).

Table C-29. Percent wood pellet usage was higher in winters before EmPower+ participation

How much <u>more</u> wood pellets did you use compared to your use of wood this past winter? ¹ (This indicates a reduction in usage after EmPower+ services)		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	9	6
1-25%	40%	11%
26-50%	16%	26%
51-75%	0%	0%
76-100%	11%	17%
Over 100%	26%	42%
Don't Know	7%	4%

How much <u>more</u> wood pellets did you use compared to your use of wood this past winter? ¹ (This indicates a reduction in usage after EmPower+ services)		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Total	100%	100%

¹ Only respondents who indicated that they used wood pellets for their home's main or secondary heating equipment were asked this question.

Table C-30. Percent wood pellet usage was lower in winters before EmPower+ participation

How much <u>less</u> wood pellets did you use compared to your use of wood this past winter? ¹ (This indicates an increase in usage after EmPower+ services)		
Period before Services	Immediate Winter Before Participation (2023/2024)	Earlier Winter Before Participation (2022/2023)
Observations	6	7
1-25%	19%	28%
26-50%	48%	46%
51-75%	0%	0%
76-100%	0%	0%
Don't Know	34%	27%
Total	100%	100%

¹ Only respondents who indicated that they used more or less wood in past winters were asked the applicable question.

Table C-31 presents the most common reasons for the differences the amount of pellets used in the earliest winter period compared to the past winter. Common reasons included improved home conditions (72%), changes in winter conditions (13%), wood pellets being cheaper than other fuels (11%), and worse home conditions (2%).

Table C-31. Reasons for changes in wood pellet usage before/after services

What were the main reasons for the differences in the amount of wood pellets you used three winters ago compared to this past winter? ¹	
Observations	13
Improved Home Conditions	72%
Changes in Winter Conditions	13%
Cheaper than Other Fuels	11%
Worse Home Conditions	2%

Note: This was an open-ended question.

¹ Only respondents who indicated that they used more or less wood pellets three winters ago than the past winter were asked this question.

IV. Summary of Findings

The purpose of the EmPower+ add-on participant survey was to quickly collect key data to understand and measure potential household snapback behaviors and other household changes that

could impact EmPower+ energy savings for CY 2023. Overall, the survey found that most 2023 participant households did not make or experience changes in the year after EmPower+ participation. However, the results show that there may be a small amount that the energy savings are underestimated in the billing analysis due to reductions in unmetered fuel usage.

This section provides a summary of key findings from the EmPower+ add-on survey by survey topic.

Survey Topic	Key Findings
Changes in Rooms Heated or Cooled Since Participation	• Result: No impact on energy savings. • Only a small portion of EmPower+ participants report changes to the number of rooms heated or cooled since participation. Approximately the same portion of participants report an increase as report a decrease, indicating that the net change is minimal.
Changes in Temperature Settings Since Participation	• Result: Overestimate (small) of energy savings in the billing analysis. • 68% of participants reported no change to their usual winter temperature settings. While 8% reported raising the temperature (increasing heating use), 20% reported lowering the temperature (decreasing heating use). This indicates snapback behavior related to winter heating thermostat settings is limited and offset by greater energy-saving behaviors that should reduce heating consumption. • 76% of participants said no they did not change their usual summer temperature setting since participating in EmPower+. 8% reports lowering their temperature setting (increasing cooling), but a larger share (12%) reported raising their temperature setting (reducing cooling use).
Changes in Household Size Since Participation	• Result: No impact on energy savings. • Seven percent of participants reported more people living in the home after program services, and 5% reported fewer people living in the home. The survey findings demonstrate that there is not a systematic increase or decrease in participant household sizes that would impact energy consumption after participation.
Uses of Primary and Supplemental Heating	• Result: Underestimate (small) of electric savings in the billing analysis and underestimate (small) of total energy savings in the billing analysis. • Only 7% of participants reported a change in their main heating type since participation. Most of these participants reported switching from a delivered fuel or natural gas to electricity for their primary heating equipment, consistent with the program effort to target electrification. These participants would see an increase in electricity usage after participation. • An estimated 5% of the EmPower+ low-income population reduced use of delivered fuels and two percent increased use of delivered fuels after program participation. This suggests a small decrease in delivered fuel usage that may not be accounted for in the billing analysis.

Survey Topic	Key Findings
Wood and Wood Pellet Usage	• Result: Underestimate (small) of energy savings in the billing analysis. • Wood and wood pellet usage remains rare for EmPower+ participants with approximately nine percent of all Empower+ participants indicating these fuels are used for main or secondary heating. • For both wood and wood pellet users, a higher percentage reported reduced usage of those fuels than those who reported increased use of these fuels after service delivery. Improved home conditions, such as ability to maintain heat due to increased insulation, was the main reason wood consumption changed.

V. Appendix A – Verbatim Response Examples

Examples of Reasons for Reduced Use of Second Heat Source

Select Examples Reported by Respondents
“We insulated better due to EmPower.”
“There was no insulation/sealant on the attic. They did the sealing in the attic and after that, electric heating usage dropped.”
“The Primary heating system is a lot better.”
“Distribution of heat seems better.”
“Home is more energy efficient- [do] not need to burn wood stove as much.”
“Mini splits are now in each room, and it’s a lot more work to maintain the fireplace.”

Examples of Reasons for Increased Use of Second Heat Source

Select Examples Reported by Respondents
“It’s been colder in the home as the back doors are not insulated and the windows allow the cold to come in.”
“Freezing in the home during the winter, house falling apart.”
“The house is not heating properly.”
“Using it more because it is now in daughter's room.”

Examples of Reasons Less Wood or Wood Pellets Used Three Winters Ago Compared to Most Recent Winter

Select Examples Reported by Respondents
“They had just arrived, and weren't familiar with the chimney until recently.”
“Mild winter, didn't use as much.”
“House was warmer and kept heat in.”
“The house is not heating properly.”

Examples of Reasons More Wood or Wood Pellets Used Three Winters Ago Compared to Most Recent Winter

Select Examples Reported by Respondents
“The improved insulation in the basement and attic areas along with the new windows we installed.”
“Prefer new heating system. [It] made stove less needed.”
“House better sealed in now, insulation.”
“It was cheaper than fuel oil, old furnace was old and unreliable.”

VI. Appendix B – Additional Sample Information

Table C-B-1 presents additional information on the sample frame, sample selected, and the number of survey interviews completed by subgroup and strata.

Table C-B-1. EmPower+ add-on survey sample information by group and strata

Stratum	Electric Utility Area	Job Cost Category	Total Low-Income Participants in Sample Frame	Sample Selected for EmPower+ Survey	Total Survey Completions
Stratum 1	National Grid	Low	694	62	30
Stratum 2	National Grid	Medium	1420	63	33
Stratum 3	National Grid	High	857	62	29
Stratum 4	RG&E	Low	315	62	25
Stratum 5	RG&E	Medium	774	63	33
Stratum 6	RG&E	High	410	62	25
Stratum 7	NYSEG	Low	344	62	32
Stratum 8	NYSEG	Medium	630	63	26
Stratum 9	NYSEG	High	453	62	38
Stratum 10	Con Edison	Low	338	62	24
Stratum 11	Con Edison	Medium	341	62	35
Stratum 12	Con Edison	High	235	35	15
Stratum 13	Other	Low	403	62	20
Stratum 14	Other	Medium	478	63	31
Stratum 15	Other	High	257	62	32
Stratum 16	Wood or Wood Pellet Main Heat	N/A	133	93	49
TOTAL			8,082	1,000	477

Appendix D Inflation Reduction Act (IRA) Interview Findings Memo from APPRISE



MEMO

Date: November 20, 2025

To: Dana Nilsson, Elizabeth Boulton, and Ari Stern

From: Jackie Berger and Dan Bausch

Subject: NYSERDA SF LMI – Inflation Reduction Act (IRA) Interview Findings Memo

I. Introduction

NYSERDA’s EmPower+ program helps low- and moderate-income (LMI) households in New York State save energy and money by making qualifying energy improvements to their primary residence. The program uses multiple funding sources to install approved measures and serve eligible households.

In 2024, NYSERDA integrated new federal Inflation Reduction Act (IRA) Home Electrification and Appliance Rebates (HEAR) funds into EmPower+. These funds were awarded by the Department of Energy (DOE) and included specific rules and criteria for income-eligibility and measure installation documentation. The IRA HEAR funds were available in EmPower+ to provide up to \$14,000 per eligible household in enabling costs for key electrification measures, including heat pumps.

To understand the implementation of the IRA HEAR funds as part of EmPower+, the evaluation team conducted in-depth interviews with key program staff and implementation contractors who are knowledgeable about the program and the IRA rollout. The interviews had the following information objectives.

- Goals for including the IRA funds in EmPower+.
- Changes NYSERDA made to the program to include the funds.
- Challenges associated with the IRA funds.
- NYSERDA’s assessment of the impacts of the IRA funds.
- Lessons learned for future program funding changes.

APPRISE conducted a total of five interviews with seven individuals.

- NYSERDA EmPower+ program managers and senior staff.
- NYSERDA's EmPower+ technical lead responsible for targeted project reviews.
- The Implementation Contractor providing project support (CLEAResult).
- The Implementation Contractor providing support with applications (TRC).

The interviews were approximately 30 to 45 minutes and were completed in October and November 2025. This memo summarizes the findings from these interviews.

II. IRA Goals

Program staff and implementation contractors described multiple goals for NYSERDA in including the IRA HEAR funds in EmPower+. These included the following:

- Leveraging the existing EmPower+ program network and application process for program efficiency.
- Ensuring that IRA funds supplement NYS Clean Heat and utility fundings sources, rather than replacing those funding sources, by including all funds in one unified program that braids funding.
- Increasing the deployment of electrification measures to LMI households in New York State.
- Providing more comprehensive services to LMI households by using the IRA funds to increase the allowable job cost limits.
- Broadening program reach by serving LMI households on Long Island or in municipal utility service territories that are not eligible for certain non-IRA EmPower+ funding sources.

In addition to these broad goals, NYSERDA developed specific targets for the number of households to receive IRA-funded electrification measures.

III. Changes to EmPower+ Needed for IRA Implementation

NYSERDA implemented several significant changes to EmPower+ to accommodate IRA funding and ensure all EmPower+ applicants were assessed for IRA funding eligibility. Program staff and partners described the following changes.

- *Income Eligibility Limits:* EmPower+ uses the greater of 80% of State Median Income or Area Median Income for income eligibility determination. However, the IRA specified that income eligibility must be capped at 80% of Area Median Income. Since a small portion of EmPower+ applicants may not be eligible for IRA funds based on this difference, NYSERDA updated the EmPower+ application and the NYHEP Portal in 2024 to determine whether customers were eligible for IRA funds.

- *Eliminating Geo-Eligibility:* Based on the IRA requirement for household income-verification, NYSERDA eliminated geographic eligibility for EmPower+.
- *Participant Agreement Changes:* For Participating Contractors, the Participant Agreement was updated based on DOE requirements to include language on maintaining consumer protections if a contract is assigned to a third-party creditor (in the rare case that a low-income customer has a financial contribution). This included language that contracts exclude mandatory arbitration clauses.
- *Attestation Form Updates:* NYSERDA updated the participant attestation form to include language on DOE information sharing.
- *Data System Updates:* Changes were made to the program data systems, including NYHEP and the Salesforce application platform, to identify IRA-eligible projects and measures, assign funding sources, document additional IRA data points, and track and report as required by DOE.
- *Program Measures and Funding:* NYSERDA targeted IRA funds to provide up to \$14,000 per eligible project to install IRA-eligible measures, including:
 - Heat Pumps
 - Heat Pump Water Heaters
 - Electric Service Upgrades
 - Electrical Wiring Repairs
 - Insulation, air sealing, ventilation
- *HVAC Commissioning:* Based on the IRA requirements, NYSERDA required Participating Contractors to complete commissioning on IRA-funded HVAC measures. This included documenting that systems were installed according to original specifications and verifying that prior systems were decommissioned if an air source or ground source heat pump was installed.
- *Contractor Reporting and Geo-tagged Photographs:* Based on the IRA requirements, contractors were required to report information on heat pump types and on job labor/material costs. In addition, geo-tagged digital photographs were required for each project receiving IRA funds by early 2025.
- *Contractor Incentives:* For each IRA job, NYSERDA provided up to \$500 in Contractor Incentives based on the number of IRA measures installed and whether the participant was in a disadvantaged community (DAC).

IV. IRA Challenges

Program staff were asked to describe challenges and issues with the IRA implementation and the programmatic changes made because of IRA. The interviewees reported the following challenges.

- *Limited Planning Period:* The planning period for including IRA in the program was described by administrators and implementors as shorter than needed to effectively evaluate different possible approaches, engage stakeholders, and test different system and procedural changes prior to the IRA rollout.
- *Disruptive Rollout Process:* The initial deployment of IRA program changes was described as challenging for program implementors, Participating Contractors, and program applicants. The primary issues were the need for some applicants to reapply or submit additional information because their submitted application did not include the IRA changes, data system limitations, increased application workloads, and confusion about changing program rules and requirements.
- *Increased Reporting and Documentation Requirements:* DOE requirements meant that Participating Contractors needed to provide additional documentation and paperwork, and resulted in increased overhead. Geo-tagged photographs of installed measures required some contractors to return to homes where work had already been completed.
- *Ongoing Changes Due to IRA:* NYSERDA program staff reported that regular programmatic changes or system modifications are needed based on changing DOE guidance. This has caused confusion and concern from some of the Participating Contractor network, and an increase in program administration time and costs.
- *Data System Limitations and Issues:* Program implementation contractors and NYSERDA staff reported data system limitations and barriers when updating the systems to accommodate IRA changes, making work more difficult or requiring manual steps to resolve.
- *Need for Heat Pump Technical Training:* NYSERDA program staff indicated that increased heat pump training, technical assistance, and higher-cost project reviews were needed to increase contractor expertise and installation quality as the program increased heat pump installations.
- *Contractor Adherence to Guidance:* Implementers noted that a small portion of Participating Contractors faced challenges adhering to the new requirements and ensuring that all steps were followed for IRA measures. Examples include obtaining permits for electrical work and submitting correct geo-tagged photographs.

V. Initial Assessment of IRA Impact

All interviewed staff were asked to describe the impact of the IRA funds and whether NYSERDA's goals for the IRA funds were being achieved.

- All interviewees described NYSERDA's deployment of the IRA funds in EmPower+ as successful in meeting the original objectives. While the initial deployment of IRA in the program was challenging for contractors and program implementers, program implementers report that most major issues were resolved

within about a few months and the program is effectively serving LMI households with IRA electrification measures.

- While successful, program managers identified that IRA's inclusion in EmPower+ has added administrative costs and resulted in larger programmatic changes than were originally planned or anticipated. In particular, staff noted challenges with changing reporting requirements and more system and documentation changes than have occurred for other funding sources.
- Program staff and partners indicate that the inclusion of the IRA funds increased programmatic focus on electrification measures and increased data and documentation about those measures.

VI. Lessons Learned (as reported by interviewees)

The interviewees reported the following changes that should be made if other funding sources become available for the program.

- *Ensure Planning Period is Sufficient:* A longer planning period is needed to ensure that different options and approaches are fully evaluated and tested.
- *Include Stakeholders and Implementation Contractors in the Planning Process:* Involving program stakeholders early in development of program implementation plans and system updates could improve the process and reduce the number of challenges.
- *Verify Funder Reporting Expectations:* Confirm the data reporting requirements of the funding awardee early to incorporate those requirements in the program design.
- *Enhance Training for Participating Contractors:* Ensure contractor training and communications highlight expectations and steps using real or realistic examples for various project types.

VII. Summary of Key Findings

The following summarizes the key findings from the IRA interviews.

- *Goals:* Program staff indicated that NYSEERDA's goals for including IRA funds in EmPower+ were to leverage the existing program to efficiently deploy IRA funds, to increase the installation of electrification measures and per-home investment, and to serve more eligible LMI households across New York State. All interviewees reported that they believe the primary goals were being achieved.
- *EmPower+ Changes:* NYSEERDA made substantial changes to EmPower+ procedures to accommodate IRA funding and ensure all EmPower+ applicants are assessed for eligibility.
 - Updating eligibility requirements and application processing procedures.

- Changing the Participant Agreement language.
 - Changing the Attestation Form language.
 - Adding system steps to determine when to apply different funding sources to each project and measure.
 - Requiring commissioning for applicable HVAC measures.
 - Adding new documentation steps for Participating Contractors, particularly for geo-tagged photographs.
 - Furnishing new contractor incentives for installed IRA measures.
- *Challenges:* The initial deployment of IRA in the program was challenging for contractors and program implementers due to the programmatic changes and the need to return to existing applicants to re-apply or submit additional information. Program implementers report that most initial issues were resolved within about a few months.
 - *Changing Guidance:* IRA has continued to create administrative challenges for program managers, especially as DOE has issued updated guidance on reporting expectations.
 - *Training and Quality Control:* In response to initial project reviews and installation concerns, NYSERDA increased technical training on Heat Pumps and implemented a special review process for higher-cost heat pump jobs. IRA's focus on electrification measures has increased program attention on training, technical assistance, and project QA for these measures.
 - *Electrification Data:* The changes for IRA funding have furnished NYSERDA with more data and documentation than previously captured on EmPower+ jobs receiving electrification measures. This information will be useful for future planning.